楮　の　研　究

挿木による苗木養成(I)

外山三郎　山路木曾男

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1. 緒　言

楮は和紙原料として勝れたる特性を有してゐる關係上我國に於ては古くより栽培されてゐるが、最近は又紗繊原料としても定評があり其の增產は一層重要であり、特に最近の如く紙不足を來してゐる時代に於ては其の大量增產は各方面より要望されてゐるところである。楮苗を仕立てる方法としては根挿法（分根法とも云ふ。）挿木法、壓條法、實生法等があるが、最も普通に行はれてゐる方法は根挿法に依る苗木の養成である。楮は年々根元より刈取つて莖の皮部靱皮繊維を利用する關係上、結實を見る成木の存することが少く、種子を大量に得るといふことは母樹の養成でも行はない限り困難である。從つて實生苗の養成は實際的には行ひ難い實狀にある。現在民間に普通に行はれてゐる方法は根挿法であり、本法が最も安全且つ容易な苗木養成法とされ又推奬されてゐる。然し此の方法は大量の苗木の養成にはやや困難を伴ひ、一株から精々10數本、多くて20～30本位の種根しか得られず又母木の發育を少くも１ケ年間は阻害するといふ缺點がある。母木を掘越して種根を採取する場合は一層其の生長は阻害される。壓條法も大量の苗木養成には適しない。挿木法が可能であれば一株から得られる挿穗の數も遙かに

多く有利である筈であるが、本法の可能なることが文献に記されながら一般に行はれてゐないのは如何なる理由に依るのであらうか。之に關する精細な報告も無いやうである。

筆者等は實驗室並に圃場に於て楮の挿木に關する若干の實驗を試み、楮の挿木は如何なる條件を必要とするか、どの程度可能であるか、又可能であれば實際挿木を行ふには如何なる點に注意を拂ふべきかといふことを明にした。本實驗は楮の發根生理全般に亘つて實施したものではなく、發根溫度關係の實驗を中心とし其他若干の實驗を試みたに過ぎないが、此の報告が實地に楮を仕立てやうといふ人々に何等かの參考ともなれば筆者等の最も悦びとする處である。

本研究は前林業試驗場長林學博士藤岡光長氏、並に九州帝國大學教授兼林業試驗場技官、農學博士佐藤敬二氏の御督勵と御指導に依り實施したものであり此處に謹みて感謝の意を表する次第である。尙本研究は溫室建設等の準備期間を除けば、實際の實驗は昭和20年1月～8月の最も戰亂の峻烈を極めた期間中に行はれたものであり、其の間試驗場の大半燒失といふ戰災を蒙りたるにも拘らず常に實驗並に苗木の管理に特別の助力を致されたる寺尾節二、阿部榮、根岸節子、韮澤和子の諸氏の苦勞に對しては衷心より感謝の意を表する次第である。

2. 發根及び開舒と溫度

溫度は挿木の可否を支配する大きな因子であることは周知の通りである。楮の挿木には如何なる溫度が必要であるかを試驗する爲に下記の如き實驗を行つた。

（1）使用したる器具

（イ）定溫器　6ケの定溫器を夫々 13° 18° 23° 28° 33° 38° の 6階級に調節（溫度誤差 ±0.5° 以下）

（ロ）植木鉢　直徑約30糎、深さ約20糎の植木鉢30ケを用意し、これに8分目に苗圃の土壤を盛り、植木鉢5ケ宛を1組として挿付の5日前に夫々定溫器に入れ植木鉢の溫度を一定に保つた。

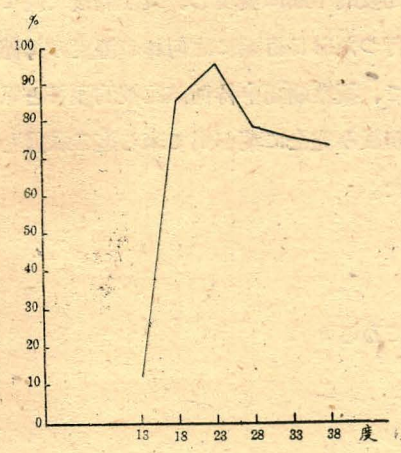
（2）挿穗

昭和20年1月25日林業試驗場內苗圃に生育中の楮母木より成る可く條件の類似せる莖を切り取り長さ20糎に穗ごしらへし、更に此等のものより直徑約 0.6～1.0 糎の類似の穗 180 本を嚴選した。此等の穗は基部を1晝夜水道水に浸漬して翌日挿付を行つた。

（3）挿付及び管理

植木鉢には豫め水道の水を充分灌水し前記の穗を1月26日1鉢6本1組30本宛挿付を行ひ爾後毎日朝及夕刻灌水を行ふと共に定溫器內の溫度及濕度の觀測を行ひ誤差の生じないやう細心の注意を拂つた。尙又定溫器內は上下の通風口を開口し空氣の流通を計つた。又定溫器內の乾燥を防ぐ爲に底部には常に滿水せるバツトを挿入して置いた。從つて定溫器內は常に關係濕度90%以上の濕度を保持した。

第1圖　温度別發根率



（4）　調査

（イ）　發根率の調査

1月26日に挿付けたるものを64日目の3月31日に掘取つて調査した。温度別の發根率は第1圖に示す通りである。13° に於て漸く發根し、温度の上昇と共に曲線は急に昇り23° に於て最高を示し、更に温度の上ると共に曲線は徐々に降る。38° 以上の實驗値が無いから夫以上の温度の場合の發根狀況は不明であるが、18°～38°の温度は椿挿木の可能温度と見てよく、20°～30°は實用温度と見ることが出來る。

（ロ）　發根速度の調査

（イ）に於ける調査により各温度に於ける發根率を明かにすることが出來たが、此の場合各温度に於ける發根の狀態を精細に見るに其の形成量に差違あり温度別に發根に遲速のあることが想像されたので發根の速度を次の如く數値により表はした。

卽ち、(i)＋　挿穗の基部にカルスが$\frac{1}{3}$以下生じてゐるもの

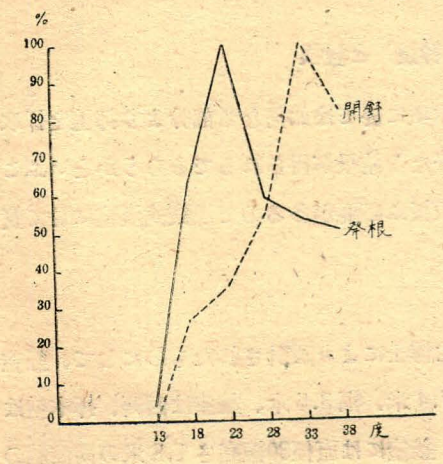
(ii)＋＋　挿穗の基部にカルスが$\frac{1}{3}$～$\frac{2}{3}$生じてゐるもの

(iii)$\overset{+}{+}\!\!+$　挿穗の基部にカルスが$\frac{2}{3}$以上生じてゐるもの

(iv)$\overset{++}{++}$　根を1本生じてゐるもの

(v)$\overset{+}{\underset{+}{++}}$　根を2本以上生じてゐるもの

第2圖　温度別發根及開舒速度



以上の如く發根の進行狀況を5階級に分ち各温度別に＋の數を合計し最大なものを100として他を換算してグラフに表はしたのが第2圖である。23° に於て最大の發根速度を示すこと發根率と同樣であるが、それより高温に於ては發根率は良好であるが發根速度はやゝ急速に低下してゐる。卽ち温度が高ければ（28°以上）發根率は惡くはないが、根の發達は次第に遲くなる傾向があるといふことを表はしてゐる。此のことは又根の發生と根の發達に對する温度の作用は異るものであることを暗示してゐる。

（ハ） 開舒の速度の調査

挿付後毎日芽の開舒の觀察を行つた。開舒は發根より比較的早期に發現し、或期間後（約1ケ月）には各溫度區共其の特徴が次第に縮少し、堀取を行つた64日目頃には何れの溫度の挿穗も開舒は略ゝ終了して其の差は殆んど見られなかつたので、觀察期間中特徴が比較的顯著と思はれた12日目（2月7日）の觀察結果に就て述べる。芽が脹み完全に葉が出て來る迄の狀態を5階級に分ち、發根速度の場合の如く數値により表はした。

卽ち （i）+ 芽の脹みたるもの

（ii）++ 芽の綻び始めたるもの

（iii）$\overset{+}{++}$ 若葉生じたるも伸びきらないもの（卷いてゐる）

（iv）$\overset{++}{++}$ 若葉伸びて開いたもの

（v）$\overset{+}{\underset{++}{++}}$ 完全な葉を形成したもの

1本の挿穗に2ケ以上の芽の存する場合は、同一穗の芽は大體近似の開舒を行ふが、異る時は上記の規準により各芽の數値を出し、之を平均して其の穗の＋の數を決定した。斯くして溫度別に＋の數を合計し發根速度算定の場合に於けると同樣其の最大なるものを100として他を換算し、グラフに表はしたのが第2圖である。圖に於て明かなる如く發根は23°に於て最大であるが開舒は23°では低位を示し33°の時が最大である。此の關係は自然界に於ける地中溫度と空中溫度との關係を考へ併せると興味が深い。開舒は12日目の觀察は上記の通りであつたが、18日目には13°區の挿穗に＋のもの2本表はれ1ケ月後には何れの溫度區のものも進行を示し2ケ月後には差違は次第に消失した。卽ち根の發達に比し芽の發育は急速度である。換言すれば水分の蒸發面は急に增大するが、水分の吸收面は挿木の初期（約2ケ月）に於ては之に平行する丈の發育が無いといふことになる。從つて後にも述べる如く地中の水分を充分にし又、空中濕度を高くしなければ活着は望めないといふことを暗示している。

3. 挿穗の種類（大小、幹枝）と發根

發根の適溫は前述の實驗により明かとなつたが、本項に於ては如何なる部分より挿穗を採取し又、如何なる程度の大さの穗を用ふるのが最も良好なる結果が得られるであらうかといふことに就て述べる。斯樣な實驗には相當本數の試料を取扱ふ必要があるので溫突式溫室に於て實驗を試みた。

（1） 實驗裝置

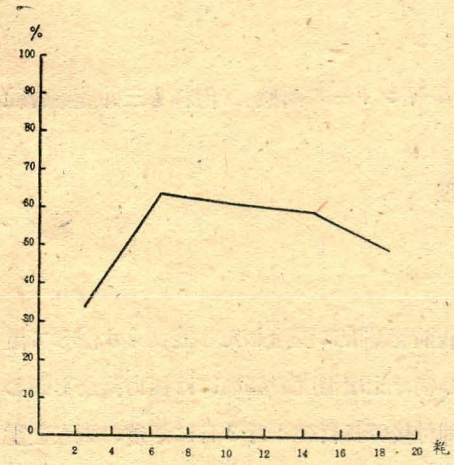
林業試驗場に裝置されてゐる溫突式溫室は佐藤敬二博士により設計されたものにして、釜室と挿木室の二室より成る。溫室は東西に長く、長さ7.4米、幅3.6米、釜室は西側、挿木室は其の東側に隣接して設けられガラス戶にて境される。釜室には直徑30糎高さ1.8米の同筒狀の

竪釜を据え上部より鋸屑を入れ蓋をして下部の焚口より點火して徐々に燃燒せしむる。朝夕の2回鋸屑を補給すれば一晝夜燃燒を持續することが可能である。燃燒と共に煙は挿木室の土管へ導かれ挿木床を暖める。挿木室は東西に長く北側及び南側の窓に接して挿床が設けられ中央が通路となつてゐる。此等兩側の挿木床は各々長さ6米、幅1米にして其の斷面は上部より土壤層20糎、砂礫層7糎、其の下部に直徑約15糎の土管が2本列び釜からの煙を導き、後部の煙突より排氣される。又釜からの煙は挿木床の入口に設けられたる調節板により侵入する煙の量が調節され、土壤溫度を適度に保つやうに出來ており地中溫度は普通約±5°Cの誤差內に保たれる。然し燃料其他外圍の條件により稀に約±10°Cの誤差を生ずることがあつた。實驗は成るべく土壤の溫度が20°～30°の範圍內にある如く調節してから開始した。

（2）　幹の大小と發根率

林業試驗場苗圃に成育中の椿を伐採し幹枝を問はず全部20糎の長さに切取つて950本の挿穗を採取し之を直徑別　0～4　4～8　8～12　12～16　16～20糎の5階級に分ち挿木床に昭和20年1月25日に挿付を行つた。挿付に際しては挿付位置により誤差の生ずるのを最少限度に止むる爲各直徑階を集團狀に挿付けることをさけ、列狀とし小より大への排列を繰返して挿付け68日目の4月3日に活着の有無を調査した。其間每日每夕2回灌水を行ひ又溫度の調節には細心の注意を拂つた。以上を調査した結果は第3圖の通りである。圖により明かなる如く4糎以下のものは最も悪く實用には供し難く、最高發根率は4～8糎のものであるが16糎迄は實用に供し得ることが明となつた。本實驗に於て最高は直徑4～8糎區の64%である。定溫器實驗に比し比較的發根率が劣るのは多數の穗を使用した關係上同一生育狀態の良好なる穗のみを選定することが出來なかつたのと地中溫度を定溫器程正確に保つことが出來ず、又溫室內の空中濕度も常には定溫器程高くないといふこと等が若干低率を示した原因と思はれた。

第3圖　直徑別發根率



第1表　幹と枝の發根率

幹枝の別	發根率(%)	發根比
幹	76	100
枝	56	74

（3）　幹枝の別と發根率

同一株（11號）より萠芽みる幹を切取り、其の幹枝全體から幹125本、枝181本の穗を作り、昭和20年1月23日に挿付を行ひ70日目の4月3日に活着の有無を調査した。其の結果は次表の通りである。

卽ち枝より幹の方が發根率が良く、幹の發根を100とした時枝は74に當る。本實驗に於ても

挿穗の人爲的選擇による誤差の介入するのを除く爲、切り取つた幹及び枝は先端を除くの外は全部實驗に供した。從つて稍々發根率の低下を來してゐるが、幹と枝との何れが挿穗に適してゐるかの大體を知るには本實驗で支障ないものと考へる。

4．發根と生長ホルモン

生長ホルモン處理により發根の促進されたといふ報告は今迄に多數發表されてゐる。楮の挿木に對して生長ホルモン處理を行へば其の効果は如何樣に表はれるかといふことを明かにする爲に次の實驗を行つた。

（1）　挿床

前項に於て述べた溫突式挿木溫室の挿床を使用した。

（2）　實驗及び調査

林業試驗場內楮9號、23號、30號より昭和20年1月25日に1500本の挿穗を採取し次の如く處理を行つた。

（イ）　生長ホルモンの種類及濃度

種類　フエニール醋酸。　α-ナフタリン醋酸。　β-インドール醋酸。（何れも三共農藥會社製）

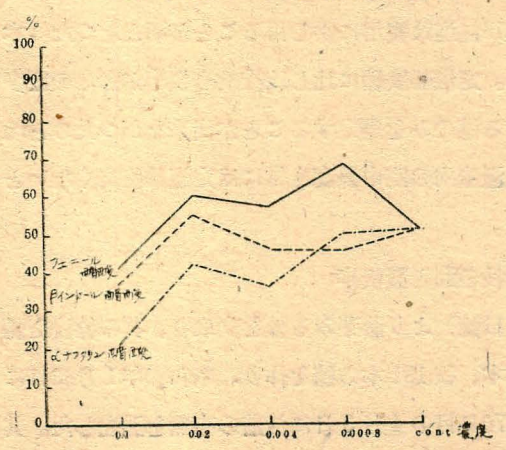
濃度　0.1　0.02　0.004　0.0008%及對照（無處理）

合計　15組

（ロ）　處理法

1500本の挿穗を大小平均に15組に分ち穗拵後1晝夜前記藥液に浸漬したる後良く水洗して溫室へ挿付けを行つた。而して每日朝夕2回灌水を行ひ尙ほ土壤溫度の調節には極力萬全を期し挿付後67日目の4月3日に活着の調査を實施した。其結果は第4圖に示せる通りである。

第4圖　生長ホルモン處理に依る發根率



フエニール醋酸處理は對照區に比し 0.1%を除くの外はやゝ活着良く0.0008%區は對照區より 17%高率を示したが β-インドール醋酸處理區は顯著ならず α-ナフタリン醋酸處理區は反つて活着は低下してゐる。三藥品を通じ0.1%區は何れも藥害の有ることを示してゐる。對照區が51%の活着率しか示さなかつたのは小徑（0.5粍以下）或は大徑（1.5粍以上）のものも生長ホルモン使用により如何なる根發をなすかを見る爲

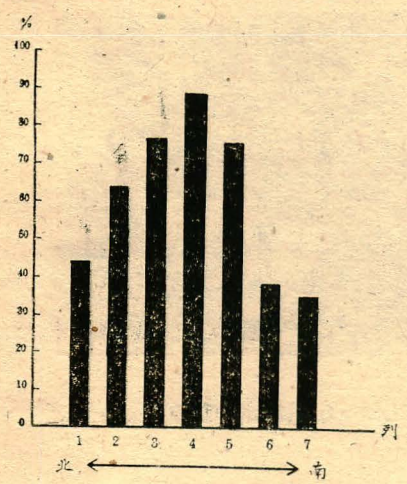
に多數實驗に供した爲である。然しながら此等小徑或は大徑の挿穗も生長ホルモンの使用により特別の發根率の向上は見られなかつた。此等の小徑或は大徑のものは均等に各組に分配して實驗を行つた關係上全體としての傾向を見る上には何等支障は無いものと考へる。

要するに生長ホルモン劑使用に依る活着率の向上は餘り顯著でない。斯様に比較的容易に發根を見る樹種に於ては、適當の濃度であれば若干はカルス及び根の形成を促進し一定量の根系を生ずる迄の日數を短縮する効果はあるが、一定期間を過ぐれば其の効果は次第に不鮮明となり一定期間後は全く無處理のものと區別がつかなくなるのが一般ではあるまいか。著者は嘗て杉の挿木に於て此の傾向の顯著であるのを實驗した。

5．野外の挿床に於ける發根

實驗室内に於ける實驗と野外に於ける實驗は應々食違ひの生ずることがある。苗木養成等に關する研究は野外に於ける實地試驗と相俟つて初めて實用化されるものである。以上述べ來つた處は何れも室内實驗にして而かも冬期實驗であつた。室内實驗に依り椹挿木の可能なることが略ゝ確實となつたので、春季野外苗圃に於ける實地試驗を施行した。然し諸都合で普通の挿木時期に實施することが出來なかつたので止むを得ずやゝ遲れて6月22日に漸く挿付を行つた。7月22日に第1回調査を、8月10日に發根活着の第2回の精細調査を行ひ興味ある結果を得ることが出來た。其の經過及び結果は次の通りである。

第5圖　野外の挿床に於ける各列の發根率



（1）　普通挿試驗

（イ）　挿穗　　林業試驗場苗圃内椹數本より總數 959 本を採取。穗の長さ20糎。

（ロ）　挿床　　東西に長さ12米、幅1米の挿床を準備した。

（ハ）　挿付　　縦に7列挿とし1列137本、列間約12糎、縦列の穗間隔約9糎、1平方米内に約80本挿付。

（ニ）　管理　　毎日、朝夕2回灌水、晴天の日は晝間簀掛を爲し夕刻より翌朝迄は除去。簀の高さは地上20糎。

（ホ）　結果　　列毎に活着の有無を調査した。其の結果は第5圖の通りである。圖に明示された通り列により活着率を著しく異にする。兩側の列程活着率は低下し中央最高にして89%の活着を示した。北側より數へて第7列目（最南端の列）最も低く36%、第6列之に次ぎ其の差は僅かに3%である。次は第1列（最北端の列）にして第7列より8%良好である。第2列は第7列より28%高い。全體の平均は60.1%にして此の數値より高いのは 2，3，4，5 列である。簀を可なり低く掛けた關係上、床の中央部と兩側では

空中濕度が異る筈であり、又地中濕度も中央の方が高いことが想像される。實際朝灌水すれば晝迄には兩側列附近は可成り乾燥するが中央程乾燥は少い。地表溫度は春季より夏にかけては可成り高溫となり自然に楮の發根溫度圈内にある。從つて苗圃に於ける楮の活着を支配する第一因子は空中並に地表面近くの濕度であらうと思はれる。此のことは先に述べた發根と開舒の速度の關係並に次の疎挿の實驗に依つても確認された。

（2）　疎挿試驗

（イ）　挿穗　　（1）と同じ、總數588本。

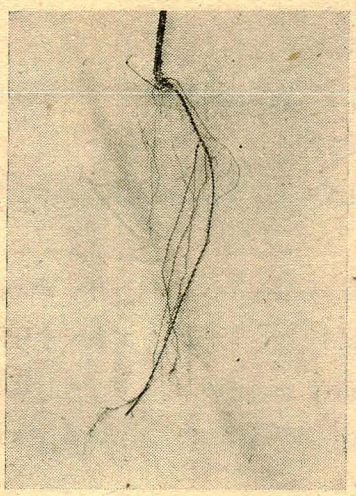
（ロ）　挿床　　東西に長さ12米、幅1米。（1）の普通挿床に隣接し環境の諸條件は同じ。

（ハ）　挿付　　（1）と同日挿付。1平方米當横縦7本計49本。

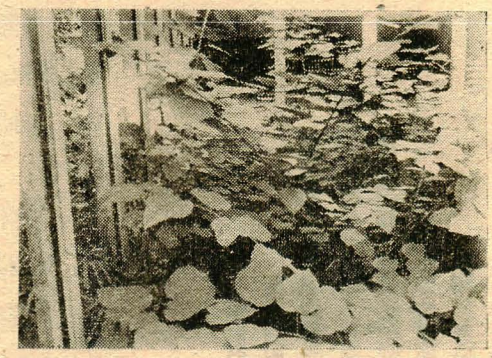
（ニ）　管理　　（1）に同じ。

（ホ）　結果　　發根活着247本、枯損341本。活着率42%にして（1）の普通挿の平均値60.1%の場合に比し19.1%の低率を、（1）の第4列の最高89%のものに比し實に47%の低率を示し其の半にも達しない。

以上二つの實驗により簀は成るべく低くし、又出來れば挿床の周圍に垣を圍らす方がよいやうに思はれる。場合に依つては林内に挿床を設け挿付を行へば活着は更に容易となるのではなからうか。此等に關する微細氣象學的研究は後日の實驗に俟ちたい。



楮挿木後一年目の根系



生育しつゝある挿木楮（温室）

6．結　　言

實驗室並に温室内の實驗に依り楮の挿木は成るべく幹より直徑約5～10粍位の穗を選び之を地中溫度を約20°～30°に保ちたる挿床に挿せば例へ嚴寒中にあつても容易に發根するものであることを明にした。温室内に冬期間養成じた此等の苗木は約6ケ月後には見事な根系を形成し又地上部も均衡のとれた發達を示し、移植は充分可能なるものとなつた。又苗圃に於ける野

外實驗の結果、春季以降地表面附近の溫度暖まり 20° 以上となれば乾燥を避け空中濕度を高く保つ如く管理すれば楮苗木の養成は比較的容易であることが明となつた。假に秋期に挿穗を取り溫室内で挿床を暖めながら冬期間養成すれば翌春或は秋迄には充分發達した苗木を得ることが出來苗木の養成期間を著しく短縮することが可能ではあるまいか。

7. 摘　要

定溫器、溫突式溫室及び野外苗圃に於て楮の發根實驗を行ひ次の結果を得た。

（1） 挿床の最適溫度は 23°C. 實用溫度は 20°～30°C.

（2） 發根速度は 23°C が最高、15° 以下及び 28° 以上は約半減、芽の開舒は 33° 最高。芽の發達の方が根の形成より速い。

（3） 挿穗の直徑 4～8 粍が最高發根率を示す。實用直徑は 5～15 粍。

（4） 幹は枝より發根率大。幹 100 に對し枝 74 の割合。

（5） 生長ホルモン劑（β-インドール醋酸、α-ナフタリン醋酸、フエニール醋酸）による効果はフエニール醋酸、0.0008% 溶液に一晝夜浸漬せるものはやゝ良好ではあるが、他は一般に著しくない。强いて用ふる必要はない。

（6） 苗圃に於ける挿付は特に乾燥に對し注意を要し、地中並に空中濕度を高く保つやう管理する必要がある。

（7） 以上の諸條件を考慮すれば實地に於て 80% 以上の活着は困難ではない。

（8） 溫室で苗木の冬期養成を行へば養成期間を短縮することが出來る。

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Résumé

Saburo TOYAMA & Kisoo YAMAJI

Investigation on the Paper-Mulberry (Broussonetia Kazinoki Sieb.)

I. Cultivation of Cutting-Plants.

Summary

In the thermostat, the greenhouse of korean stove type, and the outdoor nursery, I tried the cutting experiments of Paper-mulbery (Broussonetia Kazinoki Siebold) and gained the following effects.

(1) The properest temperature of inserted-bed 23°C. The practical temperature from 20° to 30°C.

(2) The highest speed of cutting 23°C. It makes the reduction by half below 15° and above 28°C.

(3) The diameter of inserted-ear It shows the highest percentage of cutting in the size of 4~8 mm. The practical diameter from 5 to 15 mm.

(4) The trunk is larger than the branch in the percentage of cutting. The proportion of the branch, 74 to the trunk, 100

(5) The effects by heteroauxin (β-indol acetic acid, α-naphthalene acetic acid, phenyl acetie acid) are good in some degree, if they are put into phenyl acetic acid, the solution of 0.0008% all day long, but otherwise they are not remarkable generally. It is not always to use them.

(6) The inserting of seed-bed is required to take care of drying specially, and to administer to keep the higher humidity in the earth and air.

(7) If the cultivation of cutting in winter is executed in the greenhouse, the term of cultivation may be shortened.

Résumé

Masaru KAWADA and Yojurō KANAYA

On the Effect of Tree-Density of Plantation for the Silviculture of "Akamatsu" (Japanese red pine, Pinus densiflora Sieb. et Zucc.) and "Karamatsu" (Japanese larch, Larix Kaempferi Sarg.) as a Result of Experiment continued 40 years long.

Preface

From the standpoint of forestry that the tree-density of plantation should have notable effect upon the constitution of forest-stand is very natural thought. By this reason this experiment has been made during 40 years long since 1904 to 1943, and still continued.

On begining this experiment were made for the four kinds of trees, i. e. "Sugi" (Cryptomeria japonica D. Don.), "Hinoki" (Chamaecyparis obtusa Sieb. et Zucc.), "Akamatsu" (Pinus densiflora Sieb. et Zucc.), and "Karamatsu" (Larix Kaempferi Sarg.). Among these species the experimental stands of Cryptomeria and Chamaecyparis were damaged by the injury of frost, so severe that the experiment can be continued no longer, which happens in early spring of 1915. Since the year of injury the experimental stands of Cryptomeria and Chamaecyparis are excluded from the experiment.

At present we can not conjecture the aims of men who actually carried out this experiment, but it can be supposed that the Chamaecyparis were selected as a representatative of tolerant-tree and the pine as of intolerant, Cryptomeria and larch as intermediates but the former as species having tendency rather tolerant and the latter intolerant. From this point of view to be thought as follows is very natural that the result of this experiment should give no distinctive colour between these two kinds of trees kept and remained from fate of injury of frost, because both Piuns densiflora and Larix Kaempferi are intolerant species of high degree. The actual result, however, arrived after this 40 years shows very striking contrast for which we could never expect between two species i. e. pine and and larch. Now, we are going to suggest that the effect of tree-density of plantation has no connection, entirely, with tolerant habit of tree-kind but depends on inherent natures as a whole, not only upon the nature for the light factor.

The result of this experiment is reported in the following papers, and from the view point above mentioned, we believe this information should offer some contributions as a indicator of determination of tree-numbers of plantation per Hektar.

Order of contents.

This report is described as following orders:

1. Outline of the forest of experiment.
2. Brief explanation about the methods and plan.
3. The constitution of even-aged coniferous stand.

4. The effect of tree-density of plantation for the tree-numbers and the volume per Hektar.
5. The effect of tree-density of plantation for the form of single tree.
6. Conclusion as far as in the period of this 40 years.

1. Outline of the forest of experiment

The main articls are as follows:

(a) Tree kinds. Japansse red pine ("Akamatsu", Pinus densiflora Sieb. et Zucc.) and Japanese larch ("Karamatsu", Larix Kaempferi Sarg.)

(b) The situation of the forest used for this experiment. Forest of Oneyama, Goryō, Usuimachi, Usuigun, Gumma Prefecture (National forest belongs to Maebashi Local Forest Office, Maebashi Divisional Office.)

(c) Publications. The first report issued on the date 1924
〃 second 〃 〃 〃 1927
〃 third 〃 〃 〃 1941

This report is issued as the fourth report, but described to cover and involve the essential contents of preceding publications.

2. Brief explanation about the methods and plan.

There are settled six sample plots for each kind of trees, viz. totally twelve plots, and the kinds of which are as follows:

Sample plots of plantation of 4.5 (Shaku) triangle (shown by 4.5△)
〃 〃 〃 〃 〃 4.5 (〃) rectangle (shown by 4.5□)
〃 〃 〃 〃 〃 6.0 (〃) triangle (shown by 6.0△)
〃 〃 〃 〃 〃 6.0 (〃) rectangle (shown by 6.0□)
〃 〃 〃 〃 〃 8.0 (〃) triangle (shown by 8.0△)
〃 〃 〃 〃 〃 8.0 (〃) rectangle (shown by 8.0□).

The areas of each sample plot are shown in the Table 1.

The main field works such as thinnings, measurements and accessories are practised on the dates as the Table 2. shows. According to this table it shall call some care that for the pine the times of thinnings are coming successively following the order of wideness of plantation, but for the larch thinnings mostly arrive at same time having no relation of tree-density of plantation. Probably, this facts shall be arising from the different habit of tree-kind relating to the manner of recovering canopy after thinning.

3. The constitution of even-aged stand of coniferous trees.

The twelve sample plots of this experimental forest are the series of stands which are planted with different tree-densify, on the one hand, but same time, the stands of all are even-aged forest of pine and larch, on the other hand. Therefore, the actual state of each plot seems to be the compound product composed of the essential effects i. e. one of them the one comes from the common nature of even-aged stands and the other from the tree-density of plantation.

From this point of view, authors attempted to discuss, at first, the common nature

of even-aged forest relating the constitution of stand, then the effect of tree-density of plantation.

(a) The relation between diameter and height.

The distributions of tree-numbers in respect of diameter and height on the date of precede measurements are shown in the bulletins of Imperial Forest Experiment Station as the Table 3. is showing, and the distributions in the stands on the date of 1943 are shown with the Table 4 (1.2). According to these tables the areas of distribution of tree-numbers always have tendency of hanging from the upper left to the down right diagonally of the tables, so as this facts let us guess a certain relation existing between diameter and height. Thus, authors tried to compute the correlation ratios betwesn the two subjects. The results of these computations are shown in the Table 5. Among the numerous numbers of correlation ratios we can find only one having the value smaller than 0.5 as well as no one with probable error showing too large value for significance. Here, authors can propose, in the even-aged coniferous forests, there exists always heigh correlation diameter and height. Besides this fact, if we consider the ranges of value of the correlation ratios there seems to be a certain difference among those due to the tree-kinds. According the contrast of the ranges of η shown in the Table 6. the ranges concerning pine cover relatively lower ranks of value of η than that concerning larch. It is reasonable to guess that the results is indicating the nature for incident light of species, i. e. the larch is more tolerantt than pine, so as the suppressed one can live longer under the canopy of dominant trees than the case of pine, thus the value of η concerning larch tends to be heigher than that of pine.

Now further, authors exerted themselves to know the tree-height curve in respect to diameter. At first, the Table 7. showing the transitions of mean height of trees respecting each diameter during the period of the age 12 to 40 has been made, and from data contained in the table the 3-diameter moving averages of height have been made. The illustration of the computation is shown with the Table 8. (see Fig. 1.), and the general results are shown in the Table 11(1~2). From these moving-averages the curves of tree-height have been get by tuch computation illustrated with the Table 9., and then tested about their fitness as illustrated with the Table 10., and the general results are shown and tested in the Table 12 (a. b)., Table 13 (1.2). (see Fig. 2.1~2.10, Fig. 3.1~3.10). In this case it shall be noted that the areas of plots of 4.5 □ and 8.0 □ in larch forest are too small so as the numbers of trees in these plots are insufficient for computation of curves of tree-height, thus, both the plots of 4.5 □ and 8.0 □ of larch are excluded.

There are five types of formula as follows:

Type I. $H=ae^{bD-\frac{c}{D}}+k$ or $\log(H-k)=\log a+D\,b\log e-c\log e/D$

T. II. $H=ae^{-\frac{b}{D}}+k$ or $\log(H-k)=\log a-b\log e/D$

T. III. $H=aD^{b}+k$ or $\log(H-k)=\log a+b\log D$

T. IV. $H=ae^{-bD-\frac{c}{D}}+k$ or $\log(H-k)=\log a-Db\log e-c\log e/D$

T. V. $H=ae^{bD+\frac{c}{D}}+k$ or $\log(H-k)=\log a+Db\log e+c\log e/D$

Now here, we can not know it will be reasonable or not, because we are not mathematicians, that to recognise the formulas of type IV and V as special cases of type I, and if this recognition be permitted, there can be seen a tendency that the formula of tree-height curve changes the type with the ages of stand becoming heigh, namely, primarily the formula takes the Type I. then transforms to Type III. through Type II. as the Table 14. shows. In this table among total plots except the plots of 6.0□ and 8.0□ of pine and 6.0□ of larch the others of all are showing they are changing the forms of formula following the orders above suggested. (see Fig. 2.1~2.10 and Fig. 3.1~3.10)

(b) The relation between diameter and clear-length.

The distributions of tree-numbers relating to diameter and clear-length concerning preceding publications on the date of 1943 are shown with the Table 16 (1.2).

According to the manners of distribution, the areas of distribution occupy the central part of the table showing with a certain clearness of contrast for the case of the relation of diameter and height. Then we proceeded to calculate the correlation ratios betwecn diameter and clear-length. As the Table 17. shows, we can suggest the ratios for the pine forest are mostly taking lower values than 0.5 except the plot 8.0△ on the date 1943, while the ratios for the forest of larch among the total number of 24 ratios the 15 ones, i. e. more than half, take the lower value.

Thus, generally speaking, there can be no heigher correlation between diameter and clear-length, but in detail we can see, although it is general tendency that the relation is always low, during relatively young stage also the relation is low but the ages becoming high the relation becomes high gradually in larch forest. Hereupon, authors tryed to get the direction of correlation so calculated the coefficients of correlation of both forests pine and larch on the dates 1943 and 1942 respectively, as the Table 18. is showing. By this table we could to know that mostly the coefficients have values of insignificance. Thus, we can recognise there are no correlation, between diameter and clear-length, sufficiently high.

(c) The relation between diameter and branch-spread.

On the beginning of this section we shall explain what is so-called branch-spread: among the numerous horizontal projections of branchs the longest one is called here as branch-spread of a tree. Authors had ever studied in another experiment that such a branch-spread keeps high correlation between the true mean branch-spread viz. the radius of circle occupied by the canopy of a tree, so that, to measure such a length means to know the proportional area of occupation indirectly. But it is very regretful to inform that the data were burned and lost under the air-raid carried out on May 1945.

The distributions of tree-numbers relating to diameter and branch-spread concerning

preceding publications are shown in the bulletins of Imperial Forest Experiment Station as the Table 19. is showing, and the distributions on the date 1943 are shown in the Table 20 (1.2).

The manners of distribution in the tables are very similar to those of distribution relating to diameter and height (see the Table 4.), i. e. the main area of distribution is used to occupy the belt along the diagonal line running from upper left to down right of the table, but the concentration of numbers is not so dense as the case of relation between diameter and height.

Authors stepped forward to know the grade of correlation between diameter and branch-spread, and the results are shown in the Table 21. According to the table we can say there exists high correlation between diameter and branch-spread, but not very heigh as the case of diameter to height.

(d) The summary concerning the constitution of even-aged stands of coniferous trees.

(i) The relation between diameter and height is always very close.

(ii) The formula of tree-height curve relating to diameter takes three forms of equation, i. e. the type I. $H=a\,e^{bD-\frac{c}{D}}+k$, the type II. $H=a\,e^{-\frac{b}{D}}+k$, and the type III. $H=a\,D^{b}+k$. It seems that there is some tendency the formula tends change the type following the order I. II. III. with increasing the ages of stands.

(iii) The relation between diameter and clear-length is usually low, and this fact is more evident for the forest of pine than of larch.

(iv) The relation between diameter and branch-spread — see the meaning of branch-spread by the section 3 (c). — is rather close, but not so heigh as the case of diameter and height.

4. The effect of tree-density of plantation for the tree-numbers and the volume per Hektar.

In the section 3. we could know the constitution of even-aged stand of coniferous trees, keeping the characteristics of constitution, then, we shall know how to be affected the each stand of experiment by the tree-density of plantation for the tree-numbers and volume per unit area, i. e. in this case per Hektar.

(a) Tree-numbers.

Along the decreasing course of tree-numbers with the increase of ages of stand, the real numbers standing in each sample plot are shown in the Table 22 (a. b), and the numbers computed in term of unit areas, i. e. "Chō"—japanese unit of area—and Hektar are shown in the Table 23 (1)(a.b), 23 (2)(a.b), and in Fig. 4.1-4.12.

From these tables we could know the general courses as follows:

(i) The final number of trees is larger the more in the plot of heigher density of plantation, but the percentage of the number for the beginning, i. e. the tree-density of plantation, is vice-versa.

(ii) The manner of reaching to thinning is quite different due to the tree-kind, viz. as the case of pine the ages of thinning come successively following the order of tree-density of plantation from close to apart, but the case of larch the thinning comes at same time through the all plots. This fact seems to be showing the tree-habit with respect to manner of recovering canopy after the practice of thinning.

(iii) As far as the comparison is delimited with respect to tree-number, the close plantaion is more advantageous than apart one. This result is more emphasised by the case of pine than larch, because the pine trees produced by thinning is more useful as fuel than that of larch.

(b) The volume of poles (in abbreviation described as "volume" only)

Tracing the growing course of volume with the increase of ages of stand, the real numbers of each plot are shown in the Table 24 (a. b)., and the numbers computed in term of unit area, i. e. "Cho"—japanese unit of area—and Hektar are shown in the Table 25 (1) (a. b)., 25 (2) (a. b), and Fig. 5.1-5.12, Fig. 6.

From these tables we could know the general courses as follows:

(i) The final volumes remaining on the date 1943 show the tendency, with some certainty, that the volume is larger the more in the plot of higher density of plantation for the case of pine, but for the larch such a tendency can not be seen. As the Table 24 (b). shows, the sample areas of the plots 4.5□ and 8.0□ of larch are too small to compute in term of unit area, thus, if we keep this fact in mind and put these plots out of comparison, it can be thought slightly that the remaining volume, contrarily to the case of pine, is larger the more in the plot of lower density of plantation.

(ii) The total yield shows also the result to the contrary between pine and larch, viz. for the case of pine the yield is larger the more in the plot of heigher density of plantat.on, but for the case of larch the yield is rather larger the more in the plot of lower density of plantation, also under the condition of excluding the plots 4.5□ and 8.0□ from the comparison.

(iii) The size of single tree show the tendency that it is larger the more in the plot of lower density of plantation, and this is seen more obviously for the larch than pine as the Table 26. shows. On account of this fact, it can be supposed the yield of the plot of lower density of plantation shall become larger than that of the plot of heigh density in case of larch.

(iv) According to the results above mentioned, we can say broadly, but not so certain, that from point of view of volume the close plantation is rather more advantageous in case of pine, but entirely contradictory in case of larch.

5. The effect of tree-density of plantation for the form of single tree.

This study has been made relating following articles subdivided, viz. the diameter, the height, the clear-length, and the branch-spread. For the each article it is compared

primarily about the mean value of whole trees in a plot and secondarily about the value for each class of diameter, of course, through two cases the discussion has been done relating to the different tree-density of plantation, because the each result is the product, as precedingly explained, of the effect from the nature of even-aged stand and the tree-density of plantation.

(a) Effect for the mean diameter in a stand.

With the increase of ages the distribution of the numbers of trees with respect to diameter moves its range as the Table 27. shows. From the data contained in the Table 27. the mean diameters (M. D), their standard deviations (σ D), and the coefficients of variation (c. v.) are calculated as the Table 28. is showing. Further, the coefficients of correlation between tree-density of plantation and the mean diameter computed as illustrated in the Table 30., and the data of these computations are shown in the Table 31, and 32, the Table 29. and 30. respectively.

According to the results we can recognise considerably heigh correlations between the tree-density of plantation and the mean diameter in a stand, and the direction of correlation indicates the tendency that the mean diameter is larger the more in the plot of lower density of plantation, because as far as the coefficients having the significant value take negative sign.

(b) Effect for the mean height.

(i) Effect for the mean height in a stand. With the increase of ages the distribution of numbers of trees moves its range as the Table 34 (a. b). shows. From the data contained in the table mean heights (M. H), standard deviations (σ D), and coefficients of variation (c. v.) are computed as the Table 35. is showing. After the arrangement of the Table 36. the correlation coefficients between the tree-density of plantation and the mean height in a stand are computed as the Table 37. is showing (see Table 29. and 30.).

According to the table we can recognise obviously that there exists heigh correlation between the subjects, and it is a very striking contrast that, while the values concerning pine have always positive sign, while the signs concerning larch are always negative. Probably, this results arise from the entire difference of the tree-habit existing between these two kinds of trees.

(ii) Effect for the mean height with respect to class of diameter. By the reason, which is often suggested, that the actual mean height of a stand is the result composed of the effect of tree-density of plantation and the characteristic of constitution of even-aged stand of coniferous trees, we must, hereupon, proceed to discuss whether the same effect of tree-density of plantation for the mean height of stand can be seen in the relation with respect to each class of diameter too or not.

Among the diameters contained in the Table 38 (a. b), we can select the diameters keeping commonly any mean height through the all plots as the successive numbers are showing at the bottom of each division of the table. About the each rank indicated by the successive number by the same way of computation shown with the Table 29.

and 30. numerous coefficients of correlation corresponding to the number of ranks are obtaindd as the Table 39 (a. b) is showing.

According to the coefficients contained in the Table 39. we can say, broadly, while the numbers concerning pine are mostly taking positive sign, the signs concerning larch tend to take negative sign rather more. By this facts, broadly, it should be recognised that there appears same tendency between the case of mean height in a stand and the case of mean height of each class of diameter, concerning the correlation between the tree-density of plantation and the mean height.

(c) Effect for the mean clear-length.

(i) Effect for the mean clear-length in a stand. The manners with which the distributions of numbers of trees changing the range with increase of the ages of stand are shown in the Table 40 (a. b)., and after the same orders of treatment and computation as the case of discussion concerning effect of tree-density of plantation for the mean height, the Table 41., 42., and 43. are computed. If we consider only for the signs of coefficient of correlation, whether the values are significant or not, we can see the coefficients concerning pine take always the positive sign and the ones concerning larch take mostly negative except the younger age, hence, it seems can be supposed that there lies some difference due to the tree-habit. Introduced from this hint our consideration becomes to touch the rate of the lowest mean height in a plot to the heighest one in another on each year, thus, the Table 44. have been obtained. According to the result, the percentages concerning larch are always smaller than the one concerning pine. Therefore, it can be thought that there may be rather more number of trees sufficiently heigh with the clear-length absolutely heigh in the plot of lower tree-density of plantation, thus, arising from this reason the correlation coefficients concerning larch shown in the Table 43. tend to negatve sign, while concerning the pine the tendency is contradictory.

(ii) Effect for the mean clear-length with respect to the class of diameter. By same reason explained on the case of height, further, authors discussed about this subject. Under the same treatment above mentioned concerning height, the Table 46 (a. b). is computed from the data contained in the Table 45 (a. b). According to the appearing manner of signs of coefficients we can say with considerable certainty that there is tendency same as the case of the mean clear-length of stand, i. e. the clear-length whether it may be the mean of the whole stand or of each class of diameter, is larger the more in the plot of higher tree-density of plantation for the case of pine, but for larch this tendency can not be seen.

(d) Effect for the mean branch-spread.

(i) Effect for the mean branch-spread in a stand. With the increase of ages of stand the distribution of numbers of trees in respect of diameter moves its range as the Table 47 (a. b) shows. By the same treatments of the data contained in the table as the cases of height and clear-length there are obtained the Table 48., 49., and 50. The last table enables us to agree that there exist heigh correlation with negative

sign between the tree-density of plantation and the mean branch-spread in a stand, viz. the branch-spread tends to be larger the more in the plot of lower density of plantation.

(ii) Effect for the mean branch-spread with respect to class of diameter. From the same reasons and treatments as of the cases of height and clear-length, the correlation coefficients between tree-density of plantation and the branch-spread about the each class of diameter, through the arrangement of the Table 51 (a. b), as the 52 (a. b) shows.

According to the contents of this table it shall be observed that signs of the coeff-icients of correlation are appearing with both positive and negative showing no regular orders, so we can not recognise any correlation between the tree-density of plantation and the mean branch-spread with respect to the class of diameter. Thus, we can suggest with considerable certainty that, nevertheless, the result shown in above small section (i) comes from only the fact that the trees with larger diameter, same time, with larger branch-spread, are more numerous in the plot planted more apart, and not comes from there is correlation particularly between the tree-density of plantation and the mean branch-spread with respect to the class of diameter. This result has some contrast for the results cases when the height and clear-length.

(e) The summary concerning the effect of tree-density for the form of single tree.

(i) It is recognisable with certainty, that there exists heigh correlation between the tree-density of plantation and the mean diameter in a stand and the results show always the mean diameter is larger the more in apart plantation.

(ii) The relation between the tree-density of plantation and the mean height in a stand suggests us obviously an interesting result as follows: in the case of pine the tree-density correlates with mean height with positive sign, i. e. the mean height is larger the more in close plantation, but in the case of larch, contrarily, the mean height is larger the more in apart plantation.

(iii) We can recognize the heigh correlation between the tree-density of plantation and the mean clear-length concerning the pine, i. e. the clear-length is larger the more in close plantation, but for larch it is not so certain but something resonable that let us suppose this relation is contradictory for the case of pine, i. e. the clear-length should be larger the more in apart plantation.

(iv) The relation between the tree-density of plantation and the mean branch-spread suggests us the same results as the case of diameter, i. e. the branch-spread is wider the more in apart plantation, but the numbers concerning show more or less lower values than the case of diameter.

6. Coclusion

(a) Strictly speaking, it is very difficult and may be impossible to get some numbers of sample plots having quite same site in the field, and this fact, same

time, is also the unavoidable weak point of such experiment. During the 40 years in which this experiment has been continued, the plots 6.0□ in both of pine and larch become to be found that the sites of these plots are inferior to the others not adequate for comparison. Besides this the areas of sample plots of 4.5□ and 8.0□ of larch forest both are too small for computatin in term of unit area as precedingly explained.

From the reasons above mentioned, finally we decided to exclude these 4 plots, i. e. 6.0□ of pine and larch, 4.5□ and 8.0□ of larch, from the discussion. In addition to the elimination of the sample plots, on account of to know the emphasised effect of tree-density of plantation for the silviculture of pine and larch we select the stands of 4.5△ and 8.0□ of pine, and the stands of 4.5△ and 8.0△ of larch as the representatives of close and apart plantation respectively. The direct results compairing the tree-numbers, stand-volume, mean diameter, and mean height are shown with Fig. 7 and 8, and the comparisons concerning mean form of single tree are shown in Fig. 9 and 10.

(b) Let us assume primarily the term "advantage" means always large as well as the term "disadvantage" means small, and secondarily the tree-form with larger height and clear-length is superior to form with smaller height and length.

(c) Under the explanations in the term (a) and the assumptions in the term (b), there has been obtained Fig. 11. According to the contents of the figure, we can propose the following conclusion:

As a whole and as far as this experiment concerns, we can say, the close plantation is more advantageous for the silviculture of pine, but for the larch vice-versa. What is the cause from which this result arises, is left to the further researches of the adjustment of tree-habit for the environment as a whole, not to the habit for the light factor only.

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Table 1. The area of sample plots

Kinds of plantation	4.5 △	4.5 □	6.0 △	6.0 □	8.0 △	8.0 □
Pine	930	900	936	936	907	936
Larch	247	34	258	266	258	56

Notes : Pine (Pinus densiflora Sieb. et Zucc.)
Larch (Larix Kaempferi Sarg.)
The unit of area is "Tsubo"
1 tsubo = 6 (Shaku) ^{2}, 1 "Shaku" = 1.0/3.3m,
therefore, 1 tsubo = 6 × 6 / 3.3 × 3.3 ≒ 3.31□m
4.5△ means plantation of 4.5 (Shaku) triangle.
4.5□ means plantation of 4.5 (〃) rectangle.
6.0△, 6.0□, 8△, 8□ each has meaning respectively.

Table 2. The proceeding course and the dates of thinning.

	The dates on which thinning has been carried out	4.5 △	4.5 □	6.0 △	6.0 □	8.0 △	8.0 □	The ages of the stand	Notes
Pine (Pinus densiflora)	March 1918 (Taisho 7)	1	1	–	–	–	–	15	
	May 1919 (〃 8)	2	2	1	1	–	–	16	
	October 1921 (〃 10)	3	3	2	2	1	1	18	The 1 st report finished
	October 1926 (〃 15)	4	4	–	–	–	–	23	The 2 nd report finished
	October 1930 (Showa 5)	–	–	3	3	–	–	27	
	November 1933 (〃 8)	–	–	–	–	2	2	30	The 3 rd report finished
	May 1943 (〃 18)	5	5	4	4	3	3	40	The 4 th report finished
Larch(Larix Kaempferi)	April 1914 (Taisho 3)	1	1	1	1	1	–	11	
	August 1919 (〃 8)	2	2	2	2	2	1	16	The 1 st report finished
	October 1926 (〃 15)	3	3	3	3	3	2	23	The 2 nd report finished
	November 1933 (Showa 8)	4	4	4	4	4	3	30	The 3 rd report finished
	July 1932 (〃 17)	–	–	–	–	–	–	39	The 4 th report finished

Table 3. The table indicating the names of preceding publications, in which the distribution of tree-numbers relating to diameter and height is shown.

No. of Report	No. of Bulltin, date	No. of Table	page	Contents
1st	25 1924	1, (1)	end	Pine, 1915, age 12
	〃	〃. (2)	〃	〃 1919, 〃 16
	〃	〃. (3)	〃	〃 1921, 〃 18
	〃	〃. (4)	〃	Larch, 1914, 〃 11
	〃	〃. (5)	〃	〃 1919, 〃 16
2nd	27 1927	1. (1)	end	Pine, 1926, 〃 23
	〃	〃. (2)	〃	Larch, 1926, 〃 23
3rd	37 1941	1. (1)	end	Pine, 1930, 〃 27
	〃	〃. (2)	〃	Larch, 1930, 〃 27
	〃	〃. (3)	〃	Pine, 1933, 〃 30
	〃	〃. (4)	〃	Larch, 1933, 〃 30

Notes: Bulletin=Bulletin of the Imperial Eorest Experiment Station (Ringyō Shiken Hōkoku)

Tadle 4. The distribution of numbers of trees

(1) Pine (Pinus densiflora)

Table 4. (1) Pine (a)

Plot	D \ H	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
4.5△	4.5														1	1		
	5.0									1	–	–	1	1	1	1	1	–
	5.5								1	–	4	–	3	1	1	1	–	2
	6.0							1	1	1	1	1	–	1	1	1	2	4
	6.5					1	–	2	–	–	–	–	3	1	1	5	1	2
	7.0												3	1	2	1	4	1
	7.5										1	–	–	–	–	–	3	4
	8.0													1	–	–	1	2
	8.5														1	2	1	1
	9.0															1	–	1
	9.5																	
	10.0																	
	10.5																	
	sum	–	–	–	–	1	–	3	2	2	6	1	10	6	8	13	13	17
	mean					6.5	–	6.3	5.8	5.5	5.9	6.0	6.2	6.3	6.3	6.7	7.0	7.0
4.5□	4,0												1	–	1			
	4.5								1	–	–	–	1	3	–	–	1	
	5.0									1	–	1	–	3	1	–	2	–
	5.5									1	–	1	–	1	–	1	3	2
	6.0									1	–	1	1	1	2	2	2	2
	6.5									1	–	–	–	2	–	1	1	2
	7.0														2	1	2	3
	7.5										1	–	1	1	1	–	–	1
	8.0															1	1	–
	8.5																1	–
	9.0																1	–
	9.5																	
	10.0																	
	10.5																	
	11.0																	
	sum	–	–	–	–	–	–	–	1	4	1	3	4	11	7	6	14	10
	mean								4.5	5.8	7.5	5.5	5.5	5.5	6.1	6.5	6.4	6.5

with respect to diameter and height.

51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	sum	mean
																	2	47.5
–	–	1															7	47.1
–	1	–	1														15	46.3
1	4																19	47.8
3	1	3	4	–	–	–	1										28	49.0
2	4	1	1	–	–	1	2										23	50.4
3	6	2	4	1	1	–	1										26	51.8
2	3	2	2	2	1	1	–	1									18	52.7
2	2	2	1	3	3	3	2	1	–	1							25	53.9
–	1	1	1	1	1	2	1	1									11	54.5
1	–	1	–	1	–	–	2	–	1								6	55.8
		1	–	–	1	1	1										4	56.0
				1	–	–	–	–	1								2	57.5
14	22	14	14	9	7	8	10	3	2	1	–	–	–	–	–	–	186	
7.4	7.2	7.7	7.3	8.7	8.6	8.6	8.3	8.5	10.0	8.5								
																	2	46.0
																	6	45.5
2																	10	47.1
2	3																14	48.9
–	2	–	–	1	–	1											16	48.8
4	4	3	1	4	1												24	51.3
1	2	2	–	2	3	2											20	52.2
4	3	2	3	1	–	3	1										22	52.0
3	2	3	1	1	1	3	1	–	1								18	53.7
2	–	3	2	3	1	2	2	1	–	1	–	–	–	1			19	55.5
–	–	–	2	2	2	1	1										9	54.9
	1	–	–	–	–	–	–	1	–	1							3	57.3
1	–	–	–	–	–	–	1	–	–	–	–	–	1				3	57.7
					1	–	1										2	57.0
											1						1	62.0
19	17	13	9	14	9	12	7	2	1	2	1	–	1	1	–	–	169	
7.1	6.9	7.5	8.0	7.5	8.1	7.7	8.9	9.0	8.0	9.0	11.0	–	10.0	8.5				

Notes : The unit of diameter and height is "Sun", and "Shaku" respectively
1 Sun = $^1/_{10}$ Shaku. 1 Shaku = $^{10}/_{33}$ metre

Table 4. (1) Pine (continued) (b)

Plot	D \ H	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
6.0 △	3.5											1						
	4.0						1	–	–	–	1							
	4.5								2	–	–	3						
	5.0								1	–	2	1						
	5.5				1	–	–	1	1	1	–	1	1	2	3	2	1	1
	6.0	1	–	–	–	–	–	–	–	–	1	–	1	2	3	2	2	–
	6.5								1	1	1	–	3	3	3	3	3	3
	7.0												3	–	–	–	–	3
	7.5													2	2	3	2	–
	8.0													2	1	2	1	3
	8.5														1	1	1	–
	9.0																	2
	9.5																	
	10.0																	
	10.5																	
	11.0																	
	11.5																	
	12.0																1	–
	sum	1	–	–	1	–	1	1	5	2	5	6	8	11	13	13	11	12
	mean	6.0	–	–	5.5	–	4.0	5.5	5.2	6.0	5.1	4.6	6.5	6.7	6.6	6.9	7.3	7.3
6.0 □	4.0	1	–	–	1													
	4.5				1	1	–	1	–	–	–	–	1					
	5.0		1	–	1	–	3	–	2	1	3	–	3	1				
	5.5						1	–	–	1	3	2	1	–	2	1		
	6.0								1	1	3	1	2	–	2	1	3	–
	6.5					1	1	–	1	–	2	2	1	–	3	2	1	3
	7.0					1	–	–	–	–	1	1	2	1	2	1	5	5
	7.5										1	–	1	–	3	1	1	–
	8.0										1	–	–	1	1	1	1	5
	8.5														2	1	–	–
	9.0																1	3
	9.5													1	–	1	–	–
	10.0																	
	10.5																	
	11.0																	
	sum	1	1	–	3	3	5	1	4	3	14	6	11	4	15	9	12	16
	mean	4.0	5.0	–	4.5	6.0	5.4	4.5	5.6	5.5	6.1	6.2	5.9	7.4	6.9	7.2	7.0	7.6

51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	sum	mean
																	1	44.0
																	2	41.0
																	5	42.8
																	4	42.8
–	2																17	45.9
1	1	1	–	–	1												16	47.6
4	1																26	47.6
3	1	1	1	1													13	50.2
2	2	1	2	–	2												18	50.4
4	1	3	2	2	1	–	–	–	–	1							23	51.5
3	4	1	1	3													15	51.8
–	–	2	2	–	2	1											9	53.7
		2	1														3	53.3
1	1	–	–	–	–	–	–	–	–	1							3	54.7
				1	1	–	–	1									3	56.7
				1	–	1											2	56.0
								1									1	59.0
–	–	–	–	–	–	–	–	–	1								2	54.5
18	13	11	9	8	7	2	–	2	1	2	–	–	–	–	–	–	163	
7.5	7.5	8.2	8.2	8.8	8.2	10.0	–	11.0	12.0	9.0								
																	2	35.5
																	4	40.0
																	15	41.5
																	11	44.1
1	1	1															17	56.5
3	–	1	1														22	47.0
1	2	1	1	1													25	48.6
1	2	–	–	–	–	1	–	–	1								12	49.8
–	1	1	–	–	–	–	–	1									13	49.7
3	2	1	3	3	1	1	1										18	52.8
–	1	1															6	50.7
1	–	1															4	49.5
	1	2															3	52.7
1	–	–	–	–	–	–	–	–	1								2	55.5
				1													1	55.0
11	10	9	5	5	1	2	1	1	2	–	–	–	–	–	–	–	155	
7.8	7.9	8.3	7.8	8.7	8.5	8.0	8.5	8.0	9.0									

Table 4. (1) Pine (continued) (c)

Plot	H / D	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
8.0△	4.0							1										
	4.5							–									1	
	5.0		1	–	–	–	–	–	–	–	–	1	–	–	–	–	–	1
	5.5										2	–	–	1	1	–	–	–
	6.0										2	1	1	2	–	–	1	–
	6.5												2	–	2	2	3	–
	7.0													1	–	–	–	–
	7.5													1	1	1	1	1
	8.0												1	–	1	1	2	–
	8.5																1	2
	9.0												1	–	1	–	2	–
	9.5																	1
	10.0																	
	10.5																	
	11.0																	
	11.5																	
	sum	–	1	–	–	–	–	1	–	–	4	2	5	5	6	4	11	5
	mean		5.0	–	–	–	–	4.0	–	–	5.8	5.5	7.4	6.4	7.2	7.1	7.3	7.8
8.0□	4.5					1	1	–	1	–	1							
	5.0							1	2	1								
	5.5						2	–	1	–	2	–	1	–	1	1	–	1
	6.0						1	–	–	–	2	–	2	1	1	1	1	–
	6.5				1	–	1	–	2	1	3	1	1	–	3	1	2	1
	7.0							1	2	1	1	1	–	1	3	1	1	–
	7.5							1	1	–	1	1	1	–	1	–	2	2
	8.0											2	–	–	2	2	1	1
	8.5										1	–	–	1	1	–	3	1
	9.0													2	–	1	3	1
	9.5															1	–	–
	10.0																2	–
	10.5																	1
	11.0																	
	11.5																	
	12.0																	
	12.5																	
	sum	–	–	–	1	1	5	3	9	3	11	5	5	5	12	8	15	8
	mean				6.5	4.5	5.6	6.5	6.1	6.2	6.4	7.4	6.3	7.9	7.0	7.4	8.3	7.9

51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	sum	mean
																	1	40.0
																	1	49.0
																	3	43.0
1																	5	46.0
–	1																8	46.0
–	2	1	–	–	–	1											12	49.0
1	2	1	–	–	–	2											7	52.6
2	–	–	–	1	2	1											11	51.5
1	1	2	2	1	–	–	–	1									13	51.5
1	1	1	1	1	1	–	–	1	–	–	–	–	1				11	53.9
–	1	–	1														6	49.3
–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	1		3	58.7
			1	1	1				–								3	55.0
									1	1							2	60.5
	1	–	1	–	–	–	1	1	1	–	–	–	1				6	57.8
1	1	–	–	–	1	1	1	–	–	–	–	–	–	–	–	1	6	56.8
7	10	4	6	4	5	5	2	3	3	1	–	–	2	–	1	1	98	
7.9	8.1	7.9	9.1	8.5	9.0	7.9	11.3	9.2	10.3	10.5	–	–	9.8	–	9.5	11.5		
																	4	40.3
																	4	41.0
																	9	43.9
–	–	–	1														10	45.9
1	–	2															20	45.6
–	–	1															13	45.2
2																	12	46.7
1	1																10	48.0
–	–	1	2	–	1	–	1										12	50.7
1	–	1															9	49.0
1	–	–	–	–	1	–	–	–	–	1							4	54.0
–	–	1															3	50.3
–	1	–	–	–	–	1											3	53.0
			1	1	–	–	–	–	1	1							4	57.5
	1	1	–	–	–	2											4	54.8
	1	1	–	–	–	1	1										5	54.2
		1															1	53.0
7	4	9	4	1	2	4	2	–	1	2	–	–	–	–	–	–	127	
8.6	10.5	9.3	8.5	11.0	9.0	11.4	10.3	–	11.0	10.3								

Table 4. (2) Larch

Plot	D \ H	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58
4.5△	3.5													1					
	4.0													–	–				
	4.5														1				
	5.0	1	–	–	–	–	–	–							–				
	5.5							1	–	1	–	1	–	1	1				
	6.0											1	1	2	–	–	1	1	
	6.5											2	–	–	1				
	7.0														1	–	–	–	–
	7.5																1	–	1
	8.0																		–
	8.5																		1
	9.0																		–
	9.5																		
	sum	1	–	–	–	–	–	1	–	1	–	4	1	4	4	–	2	1	2
	mean	5.0	–	–	–	–	–	5.5	–	5.5	–	6.1	6.0	5.3	5.9	–	6.8	6.0	8.0
4.5□	5.5									1									
	6.0									–									
	6.5									–	–	–	–	–	–	–	–	–	–
	7.0																		1
	7.5																		
	8.0																		–
	8.5																		1
	sum	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	2
	mean									5.5	–	–	–	–	–	–	–	–	7.8

Table 4. (2) Larch (a)

(Larix Kaempferi)

59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	sum	mean
																			1	53.0
																			–	–
																			1	54.0
																			1	41.0
																			5	90.8
																			6	53.7
																			3	52.0
1	2	–	–	1	1														6	60.0
–	–	–	–	–	1														3	59.3
				1	1	–	–	1											3	64.7
																			1	58.0
–	–	–	–	–															–	–
				1															1	63.0
1	2	–	–	3	3	–	–	1	–	–	–	–	–	–	–	–	–	–	31	
7.0	7.0	–	–	8.2	7.5	–	–	8.0												
																			1	49.0
																			–	–
																			–	–
–	–	–	1																2	60.0
1																			1	59.0
–	–	–	–	–	–	1													1	65.0
																			1	58.0
1	–	–	1	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	6	
7.5	–	–	7.0	–	–	8.0														

Table 4. (2) Larch (continued) (b)

Plot	D \ H	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58
6.0△	6.5																	1	2
	7.0																		1
	7.5																		
	8.0																		
	8.5																		1
	9.0																		
	9.5																		
	sum	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	4
	mean																	6.5	7.1
6.0□	4.5			1	–	–	–	–	–										
	5.0								1	–	–	1	–	–	–	–	–	1	
	5.5						1	–	–	–	–	–	–	–	1				
	6.0					1	–	1	–	–	–	–	–	1	–	1	–	–	1
	6.5																		–
	7.0														1	–	1	2	2
	7.5															1	–	–	–
	8.0																		1
	8.5																		
	9.0																		
	sum	–	–	1	–	1	1	1	1	–	–	1	–	1	2	2	1	3	4
	mean			4.5	–	6.0	5.5	6.0	5.0	–	–	5.0	–	6.0	6.3	6.8	7.0	6.3	7.0

59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	sum	mean
–	1	–	–	1															5	59.2
–	–	–	–	–	–	1	–	–	–	–	–	1							3	64.7
				4	3	–	1	1	1										10	64.5
								1	1	1									3	68.0
–	–	–	–	–	–	–	–	1	–	–	1	1							4	66.5
								1											1	67.0
								–	–	–	–	–	–	2					2	73.0
–	1	–	–	5	3	1	1	4	2	1	1	2	–	2	–	–	–	–	28	
–	6.5	–	–	7.3	7.5	7.0	7.5	8.3	7.8	8.0	8.5	7.8	–	9.5	–	–	–	–		
																			1	43.0
																			3	52.0
																			2	50.0
																			5	51.6
																			–	–
																			6	56.7
–	1	2	1	–	1	1													7	61.1
1																			2	58.5
1	–	–	–	–	–	1													2	62.0
		1	–	–	–	–	1												2	63.5
2	1	3	1	–	1	2	1	–	–	–	–	–	–	–	–	–	–	–	30	
8.3	7.5	8.0	7.5	–	7.5	8.0	9.0													

Table 4. (2) Larch (continued) (c)

Plot	H / D	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58
8.0△	5.0										1								
	5.5										–	–	–	–	–	–	–	–	–
	6.0																		1
	6.5																	1	–
	7.0																		
	7.5																		
	8.0																		
	8.5																		
	9.0																		
	9.5																		
	10.0																		
	sum	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	1	1
	mean										5.0	–	–	–	–	–	–	6.5	6.0
8.0□	7.0																		
	7.5																		
	8.0																		
	8.5																		
	sum	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	mean																		

59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	sum	mean
																			1	50.0
																			–	–
																			1	58.0
–	1	1	–	–	–	1													4	60.8
1	1	–	–	–	–	–	1	1											4	63.0
							2	2											4	66.5
								–	2	2	1								5	68.8
					1	–	–	2	1	–	1	–	–	–	–	–	–	1	6	68.8
				1	–	–	–	–	–	–	–	–	–	1					2	68.0
										1	1								2	69.5
											–	–	–	1					1	73.0
1	2	1	–	1	1	1	3	5	3	3	3	–	–	2	–	–	–	–	30	
7.0	6.8	6.5		– 9.0	8.5	6.5	7.3	7.8	8.2	8.5	8.7	–	–	9.5	–	–	–	8.5		
1	1																		2	59.5
	–	–	1																1	62.0
			–	–	2														2	64.0
					–	–	–	–	2										2	68.0
1	1	–	1	–	2	–	–	–	2	–	–	–	–	–	–	–	–	–	7	
7.0	7.0		– 7.5		– 8.0		–	–	– 8.5											

Table 5. The correlation ratios(η)between diameter and height in even-aged stands.

	Year (age)	η	4.5 △	4.5 □	6.0 △	6.0 □	8.0 △	8.0 □
Pine (Pinus densiflora)	1915 (12)	ηD.H	0.71±0.01	0.75±0.01	0.74±0.01	0.75±0.01	0.74±0.01	0.79±0.01
		ηH.D	0.73±0.01	0.71±0.01	0.67±0.01	0.74±0.01	0.81±0.01	0.81±0.01
	1919 (16)	ηD.H	0.63±0.01	0.70±0.01	0.75±0.01	0.74±0.01	0.75±0.01	0.78±0.01
		ηH.D	0.60±0.02	0.65±0.01	0.72±0.01	0.73±0.01	0.71±0.01	0.75±0.01
	1921 (18)	ηD.H	0.68±0.02	0.67±0.02	0.70±0.02	0.72±0.01	0.74±0.01	0.80±0.01
		ηH.D	0.63±0.02	0.63±0.02	0.68±0.02	0.69±0.02	0.70±0.02	0.75±0.01
	1926 (23)	ηD.H	0.53±0.03	0.60±0.02	0.64±0.03	0.58±0.03	0.56±0.03	0.69±0 03
		ηH.D	0.52±0.02	0.59±0.02	0.66±0.02	0.61±0.03	0.62±0.03	0.69±0.03
	1930 (30)	ηD.H	0.51±0.04	0.62±0.03	0.66±0.02	0.61±0.03	0.74±0.02	0.68±0.03
		ηH.D	0.55±0.03	0.68±0.03	6.67±0.02	0.62±0.03	0.72±0.02	0.65±0.03
	1933 (30)	ηD.H	0.46±0.04	0.61±0.03	0.67±0.03	0.75±0.02	0.69±0.03	0.72±0.02
		ηH.D	0.51±0.04	0.63±0.03	0.64±0.03	0.70±0.03	0.53±0.01	0.73±0.02
	1943 (40)	ηD.H	0.62±0.03	0.67±0.03	0.71±0.03	0.73±0.03	0.74±0.03	0.74±0.03
		ηH.D	0.67±0.03	0.71±0.03	0.76±0.03	0.72±0.03	0.72±0.03	0.76±0.03
Larch (Larix Kaempferi)	1914 (11)	ηD.H	0.72±0.02	0.81±0.03	0.86±0.01	0.87±0.01	0.80±0.02	0.90±0.02
		ηH.D	0.80±0.01	0.70±0.04	0.86±0.01	0.87±0.01	0.85±0.01	0.96±0.01
	1919 (16)	ηD.H	0.77±0.02	0.85±0.03	0.82±0.02	0.90±0.01	0.88±0.01	0.94±0.01
		ηH.D	0.85±0.01	0.94±0.01	0.83±0.02	0088±0.01	0.90±0.01	0.95±0.01
	1926 (23)	ηD.H	0.80±0.02	0.93±0.02	0.85±0.02	0.85±0.02	0.81±0.02	0.94±0.02
		ηH.D	0.85±0.02	0.95±0.02	0.85±0.02	0.89±0.01	0.83±0.02	0.99±0.00
	1930 (27)	ηD.H	0.85±0.03	0.85±0.07	0.81±0.03	0.78±0.04	0.86±0.03	0.91±0.04
		ηH.D	0.87±0.02	0.89±0.05	0.92±0.02	0.85±0.03	0.81±0.03	1.00±0.00
	1933 (30)	ηD.H	0.80±0.03	0,99±0.01	0.75±0.04	0.85±0.03	0.85±0.03	0.91±0.04
		ηH.D	0.87±0.02	1.00±0.00	0.78±0.04	0.84±0.03	0.87±0.02	0,91±0.04
	1942 (39)	ηD.H	0.91±0.02	0.97±0.02	0.76±0.05	0.84±0.04	0.66±0.07	0.98±0.01
		ηH.D	0.83±0.04	0.90±0.05	0.85±0.04	0.88±0.03	0.93±0.02	0.89±0.05

Table 6. The contrast of the value of η due to the different kind of tree.

Ranks of the value of η	ηD.H		ηH.D	
	Pine	Larch	Pine	Larch
0.4—0.5	1	–	–	–
0.5—0.6	4	–	5	–
0.6—0.7	15	1	17	–
0.7—0.8	21	5	18	2
0.8—0.9	1	19	2	22
0.9—1.0	–	11	–	12
Total	42	36	42	36

Table 7. The transitions of mean heigt of trees for the each diameter during the period of experiment. (a) Pine.

	4.5 △						
age	12	16	18	23	27	30	40
year / D	1915	1919	1921	1926	1930	1933	1943
0.5	7.7						
1.0	9.6	12.0	12.0				
1.5	11.4	15.4	16.9				
2.0	12.7	17.2	20.1				
2.5	13.9	19.0	21.8	24.0			
3.0	15.0	20.0	23.1	26.4			
3.5	15.3	20.8	23.7	29.4	32.0		
4.0	16.0	21.5	24.5	29.5	33.8	35.5	
4.5		21.9	25.0	30.7	35.2	37.5	47.5
5.0		21.7	25.6	31.7	34.2	38.3	47.1
5.5		20.0	25.6	31.8	35.7	38.7	46.3
6.0			27.7	32.3	36.0	40.0	47.8
6.5			26.0	32.9	37.3	39.9	49.0
7.0				32.7	38.1	40.8	50.4
7.5				34.3	38.2	41.9	51.8
8.0					38.4	42.5	52.7
8.5					44.0	42.8	53.9
9.0					39.0	43.3	54.5
9.5						46.0	55.8
10.0							56.0
10.5							57.5
11.0							–
11.5							–
12.0							–
12.5							–

	4.5 □						
age	12	16	18	23	27	30	40
year / D	1915	1919	1921	1926	1930	1933	1943
0.5	7.3						
1.0	9.7	13.1	16.0				
1.5	11.7	14.6	16.0				
2.0	13.5	17.6	20.0				
2.5	15.3	19.3	22.4	22.5			
3.0	15.7	20.3	23.5	26.5			
3.5	15.5	20.7	24.5	29.6	31.0		
4.0		22.3	25.1	31.2	33.0	36.5	46.0
4.5		22.6	26.0	36.5	35.2	36.3	45.5
5.0		23.7	25.9	31.8	35.5	39.5	47.1
5.5		22.0	26.4	32.9	36.6	39.9	48.9
6.0		–	26.0	33.7	36.8	40.3	48.8
6.5		19.0	28.0	33.8	38.0	41.6	51.3
7.0		–		35.3	38.8	41.9	52.2
7.5		23.0		37.5	40.6	53.1	52.0
8.0					38.8	44.9	53.7
8.5					40.2	44.4	55.0
9.0					–	44.7	54.9
9.5					–	–	57.3
10.0					49.0	–	57.7
10.5						53.0	57.0
11.0							62.0
11.5							–
12.0							–
12.5							–

	6.0 △						
age	12	16	18	23	27	30	40
year / D	1915	1919	1921	1926	1930	1933	1943
0.5	7.3	10.0					
1.0	8.9	11.8	14.5				
1.5	10.7	14.6	16.5				
2.0	12.3	16.7	18.5				
2.5	13.8	18.1	20.3	24.5	28.0		
3.0	15.2	19.2	22.0	25.2	29.0		
3.5	15.0	20.1	22.7	27.1	28.2	30.0	44.0
4.0	15.3	20.8	23.8	28.5	32.4	34.4	41.0
4.5		21.5	24.2	29.5	33.3	35.1	42.8
5.0		21.3	25.4	30.4	34.2	36.7	42.8
5.5		22.0	25.3	31.2	35.0	37.5	45.9
6.0			25.3	32.0	36.1	37.8	47.6
6.5				32.7	36.0	40.2	47.6
7.0				32.6	37.3	41.1	50.2
7.5				33.5	38.2	41.2	50.4
8.0				35.0	39.3	42.1	51.5
8.5					40.0	43.7	51.8
9.0					37.0	42.0	53.7
9.5					42.0	45.7	53.3
10.0						37.0	54.7
10.5							56.7
11.0							56.0
11.5							59.0
12.0							54.5
12.5							–

6.0 □							
12	16	18	23	27	30	40	
1915	1919	1921	1926	1930	1933	1943	
6.4	9.0						
8.6	11.9	14.5					
10.3	13.4	14.7					
12.0	16.0	18.1					
12.9	17.1	19.4	28.0				
14.5	18.1	20.9	24.1	26.5			
15.5	19.0	21.7	26.6	29.4	28.0		
	20.3	22.7	27.6	30.6	27.7	35.5	
	21.2	23.6	28.4	31.5	32.5	40.0	
	20.6	24.0	29.5	32.7	35.5	41.5	
		23.8	29.5	33.8	36.1	44.1	
		24.6	30.8	34.2	38.2	46.5	
		26.0	32.3	35.1	38.1	47.0	
			30.8	36.7	39.3	48.6	
			30.0	36.2	39.6	49.8	
			33.0	38.0	41.3	49.7	
				26.5	43.5	52.8	
				40.0	39.0	50.7	
					42.0	49.5	
						52.7	
						55.5	
						55.0	
						–	
						–	
						–	

8.0 △							
12	16	18	23	27	30	40	
1915	1919	1921	1926	1930	1934	1943	
6.5							
9.1	10.5	7.0					
10.2	13.1	16.7					
11.5	14.5	19.4					
13.5	17.5	21.7					
14.5	18.9	22.4	24.0				
15.3	19.8	23.5	27.5	29.4	33.0		
15.0	21.2	24.8	28.1	31.9	33.7	40.0	
	21.5	25.1	29.5	30.7	32.6	49.0	
	22.1	25.6	31.0	31.9	36.9	43.0	
	–	26.4	32.0	34.0	37.7	46.0	
	23.5	25,8	32.7	35.7	39.3	46.0	
	21.0	26.0	33.4	37.7	41.6	49.0	
		27.0	34.2	37.3	41.4	52.6	
			33.2	39.0	42.3	51.5	
			34.0	41.1	43.6	51.5	
				41.5	45.7	53.9	
				42.0	44.5	49.3	
				39.5	47.0	58.7	
					43.0	55.0	
						60.5	
						57.8	
						56.8	
						–	

8.0 □							
12	16	18	23	27	30	40	
1915	1919	1921	1926	1930	1933	1943	
6.1							
8.5	10.7	14.2					
10.1	11.3	16.1					
11.4	14.9	18.8					
17.7	19.0	19.8					
12.9	17.3	20.8	24.0				
16.6	18.8	22.0	24.0	27.0	29.0		
	19.5	22.8	25.7	27.7	30.4		
	20.0	23.6	27.9	29.6	33.6	40.3	
	20.3	24.0	28.0	31.4	33.6	41.0	
	22.3	24.4	29.7	32.4	35.1	43.9	
		25.2	29.8	33.6	36.8	45.9	
		26.3	31.6	32.7	37.6	45.6	
		27.0	31.1	35.2	38.7	45.2	
			32.6	34.4	38.7	46.7	
			32.7	36.6	38.1	48.0	
			29.0	36.7	42.1	50.7	
				39.5	41.6	49.0	
				37.3	42.1	54.0	
				39.0	43.0	50.3	
					45.0	53.0	
					–	57.5	
					–	54.8	
					41.0	54.2	
						53.0	

Notes : Pine (Pinus densiflora) , the unit of height is "shaku", 1 shaku = $^1/_{3.3}$m,

the unit of diameter is "Sun", 1 sun = $^1/_{10}$ shaku = $^1/_{3.3} \times ^1/_{10}$m.

Table 7. The transitions of mean height of trees for the each diameter during the period of experiment. (b) Larch.

	4.5 △						4.5 □						6.0 △					
age	11	16	23	27	30	39	11	16	23	27	30	39	11	16	23	27	30	39
yaer / D	1914	1919	1926	1930	1933	1942	1914	1919	1926	1930	1933	1942	1914	1919	1926	1930	1933	1942
0.5	14.0						–						8.5					
1.0	14.5						12.6						13.1					
1.5	17.6	19.0					17.6	19.0					16.5	20.3				
2.0	20.1	24.0	25.0				18.4	24.0					20.0	25.3				
2.5	22.3	26.1	31.7				21.0	26.1					22.6	29.9	29.0			
3.0	23.8	30.1	36.2				23.3	30.0					25.1	32.9	27.0			
3.5		32.5	38.5	38.0	40.0	53.0		30.3	34.3				25.9	36.0	29.3			
4.0		35.1	40.9	41.3	40.5	–		32.8	37.0				24.0	37.2	43.3	44.0	44.0	
4.5		39.7	43.7	44.0	45.0	54.0		34.0	35.0	39.0				39.2	47.8	44.5	45.5	
5.0		42.0	46.2	47.7	48.3	41.0			41.3	–	41.0			43.0	48.0	53.6	50.0	
5.5			47.8	50.8	51.3	50.8			43.3	39.0	42.0	49.0			49.5	53.6	57.4	
6.0			48.0	54.0	54.1	53.7				45.3	48.0	–			51.8	55.2	57.9	
6.5			50.0	55.3	59.3	52.0				48.0	50.3	–			51.0	56.5	58.9	59.2
7.0				55.0	53.5	60.0					52.0	60.0			52.0	62.0	60.3	64.7
7.5				53.0		59.3						59.0				61.0	64.0	64.5
8.0						64.7						65.0				61.0	65.0	68.0
8.5						58.0						58.0					64.0	66.5
9.0						–						–						67.0
9.5						63.0						–						73.0
10.0						–						–						–

6.0 □						8.0 △						8.0 □					
11	16	23	27	30	39	11	16	23	27	30	39	11	16	23	27	30	39
1914	1919	1926	1930	1933	1942	1914	1919	1926	1930	1933	1942	1914	1919	1926	1930	1933	1942
8.7						11.0						–					
13.3	15,0					12.0	14.3					–					
16.8	17.9					16.4	19.3					15.8	16.0				
20.0	23.0					18.7	24.2					19.4	21.3				
22.8	26.3					21.3	28.9					21.4	24.3				
24.0	28.4	32.8				23.5	31.8	37.5				25.1	28.0	34.0			
27.6	32.6	37.4				24.4	34.0	35.7				26.9	32.0	38.5			
28.0	35.3	41.4	41.0	41.0		–	35.9	43.1	41.0	43.0			36.7	–	41.0	44.0	
	37.7	43.9	43.7	45.2	43.0	28.0	36.4	44.9	44.3	45.8			36.8	46.0	–	–	
	37.7	47.1	47.2	51.3	52.0		39.8	47.4	48.0	49.0	50.0		39.6	45.5	–	–	
	42.5	49.2	49.1	50.2	50.0		40.0	49.9	53.9	52.0	–			47.2	–	–	
		50.8	51.2	53.4	51.6		42.0	50.5	54.4	56.5	58.0			51.3	50.3	52.0	
		50.0	53.7	57.6	–			51.5	55.8	59.8	60.8			53.0	56.0	58.5	
		51.5	53.0	55.3	56.7			49.0	58.2	58.7	63.0				57.0	59.5	59.5
			55.7	61.3	61.1				60.0	63.0	66.5				57.0	57.5	62.0
					58.5				57.0	64.0	68.8						64.0
					62.0					66.5	68.8						68.0
					63.5						68.0						–
					–						69.5						–
					–						73.0						–

Notes : Larch (Larix Kaempferi) ; about the units of height and diameter see the Table 7. (a) .

Table 8. An illustration of computation of moving averages of height.

D	n	H	nH	Σn	ΣnH	ΣnH/Σn
4.5	2	47.5	95.0			
5.0	7	47.1	329.7	24	1,119.2	46.63
5.5	15	46.3	694.5			
5.0	7	47.1	329.7			
5.5	15	46.3	694.5	41	1,932.4	47.13
6.0	19	47.8	908.2			
5.5	15	46.3	694.5			
6.0	19	47.8	908.2	62	2,974.7	47.98
6.5	28	49.0	1,372.0			
6.0	19	47.8	908.2			
6.5	28	49.0	1,372.0	70	3.439.4	49.13
7.0	23	50.4	1,159.2			
6.5	28	49.0	1,372.0			
7.0	23	50.4	1,159.2	77	3,878.0	50.36
7.5	26	51.8	1,346.8			
7.0	23	50.4	1,159.2			
7.5	26	51.8	1,346.8	67	3,454.6	51.56
8.0	18	52.7	948.6			
7.5	26	51.8	1,346.8			
8.0	18	52.7	948.6	69	3,642.9	52.80
8.5	25	53.9	1,347.5			
8.0	18	52.7	948.6			
8.5	25	53.9	1,347.5	54	2,895.6	53.62
9.0	11	54.5	599.5			
8.5	25	53.9	1,347.5			
9.0	11	54.5	599.5	42	2,281.8	54.33
9.5	6	55.8	334.8			
9.0	11	54.5	599.5			
9.5	6	55.8	334.8	21	1,158.3	55.16
10.0	4	56.0	224.0			
9.5	6	55.8	334.8			
10.0	4	56.0	224.0	12	673.8	56.15
10.5	2	57.5	115.0			

Notes : This table shows the computation concerning 4.5 △ plantation of pine (Pinus densiflora) as of 1943.
D=diameter, n=number of trees, H=heigt,
about the units of D and H see Table 7.

Table 9. An illustration of computation of constants in a formula of tree-height curve relating to diameter.

Case : Pine, Plot 4.5△, on the date 1943, Age 40.

General equation of assumed formula : $y=ax^b+c$ $y=H$ $x=D$

Changed form of this formula : $H=aD^b+c$ i.e. $H-C=aD^b$

c is the breast-height = 4 Shaku, 1 Shaku = $^{10}/_{33}$ metre.

Thus, the formula twice changed as $(H-4.0)=aD^b$, i.e.,

log (H−4.0) = loga + b log D. The unit of D is "Sun", 1 Sun = $^1/_{10}$ Shaku.

Computation is made as follows :

D	H	(H−4.0)	log (H−4.0)	log D
5.0	46.63	42.63	1,62972	0.69897
5.5	47.13	43.13	1,63478	0.74036
6.0	47.98	43.98	1,64326	0.77815
6.5	49.13	45.13	1,65447	0.81291
7.0	50.36	46.36	1,66614	0.84510
7.5	51.56	47.56	1,67724	0.87506
8.0	52.80	48.80	1,68842	0.90309
8.5	53.62	49.62	1.69566	0.92942
9.0	54.33	50.33	1.70183	0.95424
9.5	55.16	51.16	1.70893	0.97772
10.0	56.15	52.15	1.71725	1.00000

$\sum_{D=7.5}^{5.0}$ $\log(H-4.0)=9.90561$ $\sum_{D=7.5}^{5.0}$ $\log D=4.75055$

$\sum_{D=10.0}^{0}$ $\log(H-4.0)=8.51209$ $\sum_{D=10.0}^{9.0}$ $\log D=4.76447$

$9.90561=6\ \log a+4.75055b$ ..... (1)

$8.51209=5\ \log a+4.76447b$ ..... (2)

(1) × 5 $49.52805=30\log a+23.75275b$ ..... (3)

(2) × 6 $51.07254=30\log a+28.58682b$ ..... (4)

(4) − (3) $1.54449=4.83407b$ ∴ $b=0.31950$

substitute this value of b viz. 0.31950 to equation (2)

$8.51209=5\log a+1.52225$

∴ $5\log a=6.98984$ $\log a=1.39797$

Notes : H is the value of moving 3-diameter average, see Table 8.

Table 10. An illustration of test of fitness of formula comparing the original number with the number computed from the formula.

D	H	H−4.0	logD	b logD	loga+blogD	(H−4.0)	H'	H−H'
5.0	46.63	42.63	0.69897	0.22332	1.62129	41.81	45.81	+0.82
5.5	47.13	43.13	0.74036	0,23655	1.63452	43.10	57.10	+0.03
6.0	47.98	43.98	0.77815	0.24861	1.64658	44.32	48.32	−0.34
6.5	49.13	45.13	0.81291	0.25972	1.65769	45.47	49.47	−0.34
7.0	50.36	46.36	0.84510	0.27001	1.66798	46.56	50.56	−0.20
7.5	51.56	47.56	0.87506	0.27958	1.67755	47.59	51.59	−0.03
8.0	52.80	48.80	0.90309	0.28854	1.68651	48.59	52.59	+0.21
8.5	53.62	49.62	0.92942	0.29695	1.69492	49.54	53.54	+0.08
9.0	54.33	50.33	0.95424	0.30488	1.70285	50.45	54.45	−0.12
9.5	55.16	51.19	0.97772	0.31238	1.7.035	51.33	55.33	−0.17
10.0	56.15	52.15	1,00000	0.31650	1.71747	52.18	56.18	−0.03
								+1.14
								−1.23
								−0.09

Notes : The unit of D and H is "Sun" and "Shaku" respectively.
1 Sun = $^1/_{10}$ Shaku 1 Shaku = $^{10}/_{33}$ metre.
H is the value of moving 3-diameter average.
H is the value computed from the formula.

Table 11. The contrast of original mean heigt for each diameter of trees and moving three-diameter average of height, for each age of the forest. (1) Pine (Pinus densiflora)

Table 11. (1) Pine (a)

Plot	year	1915			1919			1921			1926			1930			1933			1943		
	age	12			16			18			23			27			30			40		
	D	n	H	(H)	n	H	(H)	n	H	(H)	n	H	(H)	n	H	(H)	n	H	(H)	n	H	(H)
4.5 △	0.5	58	7.7																			
	1.0	273	9.6	10.41	1	12.0		1	12.0													
	1.5	379	11.4	11.40	30	15.4	15.92	11	16.0	18.74												
	2.0	377	12.7	12.43	93	17.2	17.79	27	20.1	20.63												
	2.5	194	13.9	13.29	187	19.0	19.07	56	21.8	22.36	1	24.0										
	3.0	62	15.0	14.18	203	20.0	19.85	124	32.1	23.11	5	26.4	28.33									
	3.5	4	15.3	15.65	137	20.8	20.52	126	23.7	23.71	13	29.4	29.22	1	32.0							
	4.0	2	16.0		68	21.5	21.14	97	24.5	24.26	41	29.5	30.09	4	33.8	34.56	2	35.5				
	4.5				29	21.9	21.41	65	25.0	24.88	54	30.7	30.75	10	35.2	34.42	4	37.5	37.81	2	47.5	
	5.0				3	21.7		39	25.6	25.26	56	31.7	31.40	20	34.2	35.14	12	38.3	38.49	7	47.1	46.63
	5.5				(1)			12	25.6	25.72	52	31.8	31.89	33	35.7	35.48	29	38.7	39.16	15	46.3	47.13
	6.0							3	27.7	26.02	39	32.3	32.21	35	36.0	36.35	28	40.0	39.55	19	47.8	47.98
	6.5							1	26.0		25	32.9	32.54	35	37.3	37.06	34	39.9	40.22	28	49.0	49.13
	7.0										3	32.7	33.02	28	38.1	37.77	29	40.8	40.78	23	50.4	50.36
	7.5										3	34.3		17	38.2	38.17	26	41.9	41.59	26	51.8	51.56
	8.0													8	38.4	38.47	16	42.5	42.25	18	52.7	52.80
	8.5													1	44.0	39.02	9	42.8	42.68	25	53.9	53.62
	9.0													1	39.0		3	43.3	43.16	11	54.5	54.33
	9.5																1	46.0		6	55.8	55.16
	10.0																			4	56.0	56.15
	10.5																			2	57.5	
	sum	1.349			752			562			292			193			193			186		

Notes : The unit of diameter and height "Sun" and "Shaku" respectively
1 Sun = $^1/_{10}$ Shaku 1 Shaku = $^{10}/_{33}$ metre
n = number of tree. H = original mean height (H) = moving average of H

Table 11. (1) Pine (continued) (b)

Plot	D	n	H	(H)	n	H	(H)	n	H	(H)	n	H	(H)	n	H	(H)	n	H	(H)	n	H	(H)
4.5 □	0.5	48	7.3																			
	1.0	184	9·7	10.36	10	13.1		1	16.0													
	1.5	341	11.7	11.83	33	14.6	15.93	5	16.0	19.36												
	2.0	383	13.5	13.26	101	17.6	17.92	27	20.0	21.48												
	2.5	216	15.3	14,32	175	19.3	19.30	73	22.4	22.64	2	22.5										
	3.0	74	15.7	15,41	183	20.3	20.08	104	23.5	23.63	4	26.5	28.39									
	3.5	21	15.5		155	20.7	20.82	118	24.5	24.37	16	29.6	30.49	1	31.0							
	4.0				77	22.3	21.41	102	25.1	25.02	43	31.2	31.10	1	33.0	34.86	2	36.5		2	46.0	
	4.5				34	22.6	22.43	54	26.0	25.50	50	31.5	31.52	17	35.2	35.31	4	36.3	38.78	6	45.5	46.44
	5.0				3	23.7	22.70	35	25.9	26.02	53	31.8	32.07	22	35.5	35.85	20	39.5	39.15	10	47.1	47.62
	5.5				1	22.0		15	26.4	26.05	52	32.9	32.66	25	36.6	36.40	18	39.9	39.89	14	48.9	48.41
	6.0				–	–		5	26.0	26.45	32	33.7	33.34	38	36.8	37.09	26	40.3	40.77	16	48.8	49.94
	6.5				(1)	(19.0)		2	28.0		25	33.8	33.94	26	38.0	37.77	37	41.6	41.24	24	51.3	50.93
	7.0				–	–					8	35.3	34.35	30	38.8	38.87	21	41.9	42.27	20	52.2	51.81
	7.5				(1)	(23.0)					2	37.5		15	40.6	39.15	27	43.1	43.21	22	52.0	52.58
	8.0													5	38.8	40.08	18	44.9	43.91	18	53.7	53.65
	8.5													5	40.2		8	44.4	44.74	19	55.5	54.68
	9.0													–	–		4	44.7		9	54.9	55.50
	9.5													–	–		–	–		3	57.3	55.94
	10.0													(1)	(49.0)		–	–		3	57.7	57.38
	10.5																(1)	(53.0)		2	57.0	58.18
	11.0																			1	62.0	
		1.267			774			541			287			186			186			169		

Table 11. (1) Pine (continued) (c)

Plot	D	n	H	(H)	n	H	(H)	n	H	(H)	n	H	(H)	n	H	(H)	n	H	(H)	n	H	(H)
6.0 △	0.5	13	7.3		2	10.0																
	1.0	119	8.9	10.04	22	11.8	13.96	2	14.5													
	1.5	261	10.7	11.25	87	14.6	15.68	2	16.5	18,15												
	2.0	309	12.3	12.31	177	16.7	16.58	30	18.5	19.55												
	2.5	198	13.8	13.31	207	18.1	18.03	50	20.3	20.92	4	24.5			28.0							
	3.0	72	15.2	14.19	191	19.2	19.03	95	22.0	21.97	5	25.2	26.02	2	29.0	28.35						
	3.5	8	15.0	15.18	148	20.1	19.79	109	22.7	22.86	15	27.1	27.88	6	28.2	31.26	1	30.0		1	44.0	
	4.0	9	15.3		68	20.8	20.45	106	23.8	23.44	40	28.5	28.75	20	32.4	32.44	5	34.4	34.40	2	41.0	42.50
	4.5				27	21.5	21.02	57	24.2	24.22	47	29.5	29.60	31	33.3	33.47	7	35.1	35.94	5	42.8	42.47
	5.0				8	21.3	21.48	39	25.4	24.75	60	30.4	30.35	38	34.2	34.58	18	36.7	36.86	4	42.8	44.83
	5.5				2	22.3		10	25.3	25.37	43	31.2	31.08	47	35.0	35.08	24	37.5	37.40	17	45.9	46.30
	6.0							7	25.3		40	32.0	31.73	37	36.1	35.65	25	37.8	38.58	16	47.6	47.11
	6.5										12	32.7	32.25	41	36.0	36.33	28	40.2	39.78	26	47.6	48.21
	7.0										8	32.6	32.80	23	37.3	36.76	29	41.1	40.78	13	50.2	49.08
	7.5										4	33.5	33.06	13	38.2	37.90	16	41.2	41.27	18	50.4	50.82
	8.0										1	35.0		7	39.3	38.82	7	42.1	41.93	23	51.5	51.23
	8.5													4	40.0	39.34	6	43.7	42.59	15	51.8	52.02
	9.0													1	37.0	39.83	2	42.0	43.56	9	53.7	52.60
	9.5													1	42.0		3	45.0		3	53.3	53.82
	10.0																(2)	(37.0)		3	54.7	54.90
	10.5																			3	56.7	55.48
	11.0																			2	56.0	56.85
	11.5																			1	59.0	56.00
	12.0																			2	54.5	
	sum	982			939			507			279			272			173			163		

Table 11. (1) Pine (continued) (d)

Plot	D	n	H	(H)	n	H	(H)	n	H	(H)	n	H	(H)	n	H	(H)	n	H	(H)	n	H	(H)
6.0 □	0.5	17	6.4		1	9.0																
	1.0	104	8.6	9.63	16	11.9	12.89	2	14.5													
	1.5	242	10.3	10.69	59	13.4	14.51	10	14.7	16.92												
	2.0	238	12.0	11.56	127	16.0	16.13	23	18.1	18.47												
	2.5	147	12.9	12.60	182	17.1	17.14	50	19.4	20.05	1	28.0										
	3.0	53	14.5	13.39	158	18.1	17.96	91	20.9	20.83	7	24.1	25.96	4	26.5							
	3.5	6	15.5		127	19.0	18.81	74	21.7	21.74	17	26.6	26.95	5	29.4	29.44	2	28.0				
	4.0				60	20.3	19.63	83	22.7	22.61	40	27.6	27.80	17	30.6	31.00	7	27.7	30.56	2	35.5	
	4.5				25	21.2	20.57	60	23.6	23.23	48	28.4	28.55	30	31.5	31.92	18	32.5	33.27	4	40.0	40.64
	5.0				5	20.6		30	24.0	23.74	48	29.5	29.12	45	32.7	32.80	22	35.5	35.08	15	41.5	42.25
	5.5							13	23.8	24.01	44	29.5	29.85	44	33.8	33.55	24	36.1	36.68	11	44.1	44.14
	6.0							5	24.6	24.22	34	30.8	30.30	41	34.2	34.29	26	38.2	37.51	17	46.5	46.19
	6.5							2	26.0		9	32.3	31.08	31	35.1	35.08	27	38.1	38.57	22	47.0	47.49
	7.0										6	30.8	31.59	22	36.7	35.83	30	39.3	38.89	25	48.6	48.25
	7.5										1	30.0	30.97	10	36.2	36.71	13	39.6	39.73	12	49.8	49.17
	8.0										1	33.0		4	38.0	36.67	9	41.3	40.56	13	49.7	51.03
	8.5													4	36.5	37.50	2	43.5	40.98	18	52.8	51.37
	9.0													1	40.0		4	39.0	40.71	6	50.7	51.88
	9.5																1	42.0		4	49.5	50.79
	10.0																			3	52.7	51.90
	10.5																			2	55.5	54.02
	11.0																			1	55.0	
	sum	807			760			443			256			258			180			155		

Table 11. (1) Pine (continued) (e)

Plot	D	n	H	(H)	n	H	(H)	n	H	(H)	n	H	(H)	n	H	(H)	n	H	(H)	n	H	(H)
8.0 △	0.5	11	6.5																			
	1.0	53	9.1	9.69	4	10.5		2	17.0													
	1.5	132	10.2	10.57	12	13.1	13.79	12	16.7	18.59												
	2.0	137	11.5	11.65	30	14.5	16.36	32	19.4	20.51												
	2.5	115	13.5	12.74	83	17.5	17.67	68	21.7	21.57												
	3.0	47	14.5	13.89	89	18.9	18.84	72	22.4	22.57	1	24.0										
	3.5	12	15.3	14.67	111	19.8	19.90	77	23.5	23.56	13	27.5	27.64	5	29.4		2	33.0				
	4.0	2	15.0		76	21.2	20.65	71	24.8	24.38	12	28.1	28.71	8	31.9	30.83	8	33.7	33.16	1	40.0	
	4.5				61	21.5	21.44	53	25.1	25.11	29	29.5	29.90	10	30.7	31.60	7	32.6	34.98	1	49.0	43.60
	5.0				23	22.1		47	25.6	25.56	30	31.0	30.84	22	31.9	32.59	14	36.9	36.58	3	43.0	45.33
	5.5				–	–		27	26.4	25.88	29	32.0	31.88	24	34.0	34.29	21	37.7	38.22	5	46.0	45.44
	6.0				(2)	(23.5)		8	25.8	26.24	28	32.7	32.62	21	35.7	35.78	27	39.3	39.38	8	46.0	47.44
	6.5				(1)	(21.0)		3	26.0	25.95	20	33.4	33.25	23	37.7	36.94	17	41.6	40.64	12	49.0	49.04
	7.0							1	27.0		13	34.2	33.64	24	37.3	37.78	26	41.4	41.69	7	52.6	50.76
	7.5										6	33.2	33.89	11	39.0	38.78	15	42.3	42.15	11	51.5	51.75
	8.0										1	34.0		14	41.1	40.50	12	43.6	43.58	13	51.5	52.25
	8.5													8	41.5	41.34	9	45.7	44.50	11	53.9	51.94
	9.0													3	42.0	41.30	10	44.5	45.40	6	49.3	53.24
	9.5													2	39.5		4	47.0	44.82	3	58.7	58.08
	10.0																3	43.0		2	55.0	57.76
	10.5																			2	60.5	57.53
	11.0																			6	57.8	57.76
	11.5																			6	56.8	
	sum	509			492			473			182			175			175			98		

Table. 11. (1) Pine (continued) (f)

Plot	D	n	H	(H)	n	H	(H)	n	H	(H)	n	H	(H)	n	H	(H)	n	H	(H)	n	H	(H)
8.0 □	0.5	14	6.1																			
	1.0	56	8.5	9.38	3	10.7		12	14.2													
	1.5	133	10.1	10.45	17	11.3	13.61	23	16.1	17.15												
	2.0	164	11.4	11.28	37	14.9	15.42	36	18.8	18.74												
	2.5	97	12.7	12.02	63	17.0	16.77	55	19.8	19.99												
	3.0	39	12.9	12.89	105	17.3	17.85	66	20.8	21.20	2	24.0										
	3.5	5	16.6		117	18.8	18.52	75	22.0	22.12	9	24.0	24.98	3	27.0		2	29.0				
	4.0				96	19.5	19.26	80	22.8	22.99	15	25.7	26.64	9	27.7	28.74	9	30.4	31.70			
	4.5				40	20.0	19.73	75	23.6	23.33	30	27.9	27.53	17	29.6	30.04	9	33.6	32.78	4	40.3	
	5.0				19	20.3	20.24	34	24.0	23.94	34	28.0	28.57	21	31.4	31.37	17	33.6	34.32	4	41.0	42.37
	5.5				4	22.3		22	24.4	24.33	35	29.7	29.09	27	32.4	32.54	24	35.1	35.37	9	43.9	44.27
	6.0							11	25.2	24.80	22	29.8	30.24	26	33.6	33.23	26	36.8	36.56	10	45.9	45.28
	6.5							3	26.3	25.54	21	31.6	30.79	27	33.7	34.04	28	37.6	37.60	20	45.6	45.55
	7.0							1	27.0		16	31.1	31.53	18	35.2	34.32	19	38.7	38.17	13	45.2	45.78
	7.5										5	32.6	31.61	12	34.4	35.43	11	38.7	38.53	12	46.7	46.51
	8.0										3	32.7		14	36.6	35.94	12	38.1	39.66	10	48.0	48.49
	8.5										(1)	(29.0)		12	36.7	36.85	12	42.1	40.48	12	50.7	49.34
	9.0													2	39.5	37.02	8	41.6	41.95	9	49.0	50.62
	9.5													3	37.3	38.32	7	42.1	41.97	4	54.0	50.49
	10.0													1	39.0		2	43.0	42.79	3	50.3	52.59
	10.5																2	45.0		3	53.0	53.99
	11.0																–	–		4	57.5	55.29
	11.5																–	–		4	54.8	55.40
	12.0																(1)	(41.0)		5	54.2	54.32
	12.5																			1	53.0	
	sum	507			504			493			193			192			189			127		

Table 14. The moving courses of the formula of tree-heigt curve with increase of ages of the forest. (a) Pine

year	1915	1919	1921	1926	1930	1933	1943
age	12	16	18	23	27	30	40
4.5△	I	II	II	II	III	III	III
4.5□	I	II	II	III	III	III	III
6.0△	I	I	I	II	III	III	III
6.0□	I	I	I	III	III	II	I
8.0△	I	I	II	II	III	III	III
8.0□	I	I	I	III	III	III	I

Table 14. (b) Larch.

year	1914	1919	1921	1926	1936	1933	1942
aae	11	16	18	23	27	30	39
4.5△	I	I	–	I	II	II	III
6.0△	I	I	–	II	II	II	II
6.0□	II	III	–	II	I	I	I
8.0△	I	I	–	I	I	I	I

Notes : Formula I .....log (H–k) =log a+Db loge−c loge/D

„ II .....log (H–k) =log a−b loge/D

„ Iii.....log (H–k) =log a+b logD

Table 11. (2) Larch (Larix Kaempferi)

year		1914			1919			1926			1930			1933			1642		
age		10			16			23			27			30			39		
Plot	D	n	H	(H)	n	H	(H)	n	H	(H)	n	H	(H)	n	H	(H)	n	H	(H)
4.5 △	0.5	1	14.0																
	1.0	48	14.5	16.74															
	1.5	129	17.6	18.41	6	19.0													
	2.0	173	20.1	19.71	62	24.0	24.79	1	25.0										
	2.5	79	22.3	20.95	68	26.1	26.82	3	31.7	34.75									
	3.0	14	23.8		70	30.1	29.13	13	36.2	37.60									
	3.5				37	32.5	31.72	31	38.5	38.91	1	38.0		1	40.0		(1)	(53.0)	
	4.0				16	35.1	34.16	23	40.9	40.81	7	41.3	42.54	8	40.5	41.85	–	–	
	4.5				3	39.7	36.64	26	43.7	43.28	9	44.0	45.01	4	45.0	45.60	1	54.0	
	5.0				1	42.0		15	46.2	44.96	13	47.7	48.11	13	48.3	49.36	1	41.0	49.86
	5.5							5	47.8	46.67	16	50.8	50.06	12	51.3	51.37	5	50.8	51.43
	6.0							1	48.0	48.13	5	54.0	52.00	12	54.1	53.43	6	53.7	52.30
	6.5							1	50.0		3	55.3	54.54	3	59.3	54.95	3	52.0	55.88
	7.0										1	55.0	54.78	2	53.5		6	60.0	57.83
	7.5										1	53.0					3	59.3	61.00
	8.0																3	64.7	61.43
	8.5																1	58.0	
	9.0																–	–	
	9.5																(1)	(63.0)	
	sum	444			263			119			56			55			31		

Table 11. (2) Larch (a)

6.0 △	0.5	6	8.5																	
	1.0	15	13.1	14.88																
	1.5	40	16.5	18.04	4	20.3														
	2.0	69	20.0	20.42	16	25.3	28.18													
	2.5	85	22.6	21.80	45	29.9	30.28	1	29.0											
	3.0	47	25.1	23.65	37	32.9	32.98	1	27.0	37.25										
	3.5	9	25.9	25.19	37	36.0	35.28	9	39.3	41.15										
	4.0	2	24.0		32	37.2	36.89	14	43.3	44.56	2	44.0		2	44.0					
	4.5				10	39.2	28.03	20	47.8	46.63	2	44.5	49.44	2	45.5	45.80				
	5.0				3	43.0		17	48.0	48.55	5	53.6	52.39	1	50.0	54.56				
	5.5							26	49.5	49.14	8	53.6	54.52	8	57.4	57.24				
	6.0							4	51.8	49.79	18	55.2	55.24	9	57.9	58.28				
	6.5							1	51.0	51.70	11	56.5	55.90	17	58.9	59.02	5	59.2		
	7.0							1	52.0		1	62.0	57.27	7	60.3	59.50	3	64.7	63.06	
	7.5										1	61.0	61.33	1	64.0	61.23	10	64.5	65.19	
	8.0										1	61.0		1	65.0	64.33	3	68.0	65.59	
	8.5													1	64.0		4	66.5	67.13	
	9.0																1	67.0	68.43	
	9.5																2	73.0		
	sum	273			184			94			49			49			28			

Table 11 (2) Larch (continued) (b)

Plot	D	n	H	(H)	n	H	(H)	n	H	(H)	n	H	(H)	n	H	(H)	n	H	(H)
6.0 □	0.5	3	8.7																
	1.0	22	13.3	15.11	2	15.0													
	1.5	35	16.8	18.41	7	17.9	20.54												
	2.0	100	20.0	20.43	12	23.0	24.60												
	2.5	72	22.8	21.58	39	26.3	26.96												
	3.0	30	24.0	23.58	51	28.4	29.03	5	32.8										
	3.5	5	27.6	23.36	39	32.6	31.43	14	37.4	38.10									
	4.0	1	28.0	24.61	28	35.3	34.29	14	41.4	41.47	3	41.9		3	41.0				
	4.5				11	37.7	36.10	24	43.9	44.45	3	43.7	45.73	6	45.2	47.08	1	43.0	
	5.0				3	37.7	38.30	21	47.1	46.09	12	47.2	47.56	7	51.3	49.34	3	52.0	49.83
	5.5				2	42.5		10	49.2	48.27	10	49.1	49.04	13	50.2	51.31	2	50.0	51.40
	6.0							6	50.8	49.81	10	51.2	51.16	7	53.4	53.11	5	51.6	51.14
	6.5							1	50.0	50.87	8	53.7	52.35	8	57.6	55.58	–	–	54.38
	7.0							2	51.5		1	53.0	54.14	3	55.3	57.90	6	56.7	59.07
	7.5										3	55.7		3	61.3		7	61.1	58.99
	8.0																2	58.5	60.79
	8.5																2	62.0	61.33
	9.0																2	63.5	
	sum	268			194			97			50			50			30		
	0.5	1	11.0																
	1.0	12	12.0	14.46	6	14.3													
	1.5	17	16.4	16.89	4	19.3	20.44												
	2.0	37	18.7	19.55	11	24.2	26.65												

8.0 △																				
	2.5	48	21.3	21.39	25	28.9	29.20													
	3.0	49	23.5	22.61	24	31.8	31.68	2	37.5											
	3.5	11	24.4		29	34.0	34.16	3	35.7	41.34										
	4.0	–	–		35	35.9	35.41	14	43.1	42.87	2	41.0		1	43.0					
	4.5	(1)	(28.0)		24	36.4	36.39	9	44.9	45.75	3	44.3	44.41	4	45.8	45.87				
	5.0				5	39.8	37.09	27	47.4	47.92	2	48.0	50.78	1	49.0	48.91	(1)	(50.0)		
	5.5				1	40.0	40.14	21	49.9	48.91	8	53.9	53.64	4	52.0	54.80	–	–		
	6.0				1	40.0		12	50.5	50.29	12	54.4	54.83	10	56.5	57.33	1	58.0		
	6.5							4	51.5	50.71	13	55.8	55.73	12	59.8	58.44	4	60.8	61.47	
	7.0							1	49.0		6	58.2	56.73	12	58.7	59.54	4	63.0	63.43	
	7.5										1	60.0	58.13	2	63.0	59.63	4	66.5	66.31	
	8.0										2	57.0		1	64.0	64.60	5	68.8	68.19	
	8.5													2	66.5		6	68.8	68.68	
	9.0																2	68.0	68.78	
	9.5																2	69.5	69.60	
	10.0																1	73.0		
	sum	176			165			93			49			49			30			

Table 12. The formulas of the curve

	Year Age		1919 16
4.5△	Type	log (H-k) =	loga+Db loge-cloge/D
	Formula	log(H-4.0) =	0.79812+0.08068D-0.07340/D
4.5□	Type	log (H-k) =	loga+Db loge-cloge/D
	Formula	log(H-4.0) =	0.98611+0.05073D-0.24203/D
6.0△	Type	log (H-k) =	loga+Db loge-cloge/D
	Formula	log(H-4.0) =	0.88288+0.06061D-0.16633/D
6.0□	Type	log (H-k) =	loga+Db loge-cloge/D
	Formula	log(H-4.0) =	0.82237+0.06570D-0.14040 D
8.0△	Type	log (H-k) =	loga+Db loge-cloge/D
	Formula	log(H-4.0) =	0.78681+0.08086D-0.12418 D
8.0□	Type	log (H-k) =	loga+Db loge-cloge/D
	Formula	log(H-4.0) =	0.99715+0.06361D-0.12725/D

Table 12. The formulas of the curve

	Year Age		1914 11
4.5△	Type	log (H-k) =	loga+Db loge-cloge/D
	Formula	log(H-4.0) =	1.13579+0.05008D-0.07954/D
6.0△	Type	log (H-k) =	loga+Db loge-cloge/D
	Formula	log(H-4.0) =	1.26317+0.03911D-0.26368 D
6.0□	Type	log (H-k) =	loga-b loge/D
	Formula	log(H-4.0) =	1.41280-0.38087/D
8.0△	Type	log (H-k) =	loga+Db loge-cloge/D
	Formula	log(H-4.0) =	1.35089+0.01393D-0.36880/D

of tree-height relating to diameters, changed the form with increase of ages

1919 16	1921 18	1926 23
loga-b loge/D 1.32448-0.37035/D	loga-b loge/D 1.39867-0.35080/D	loge-b loge/D 1.51936-0.40860/D
loga-b lcge/D 1.35350-0.42465/D	loga-b loge/D 1.40709-0.33613/D	loga+b logD 1.29301+0.22386logD
loga+Db loge-cloge/D 1.21098+0.01702D-0.25801/D	loga+Db loge-cloge/D 1.30502+0.01332D-0.26867/D	loga-b loge/D 1.54260-0.59503/D
loga+Db loge-cloge/D 1.11184+0.03335D-0.19868/D	ioga+Db loge-cloge/D 1.35220+0.00363D-0.39205/D	loga+b logD 1.21650+0.26439logD
loga+Db loge-cloge/D 1.29654+0.01069D-0.46774/D	loga-b loge/D 1.41226-0.40783/D	loga-b loge/D 1.57507-0.72139/D
loga+Db loge-cloge/D 1.29537+0.00209D-0.48115/D	loga+Db loge-cloge/D 1.32709+0.00856D-0.34906/D	loga+b logD 1.13725+0.35570logD

of tree-height relating to diameters, changed the form with increase of ages

1919 16	1936 23	1930 27
loga+Db loge-cloge/D 1.25132+0.06511D-0.13341/D	loga+Db loge-cloge/D 1.53943+0.02567D-0.28505/D	loga-b loge/D 1.88030-1.8827/D
loga+Db loge-cloge/D 1.59946+0.00953D-0.48963/D	loga-b loge/D 1.79927-0.79098/D	loga-b loge/D 1.86446-0.91117/D
loga+b logD 1.12550+0.58413logD	loga-b loge/D 1.83270-1.03613/D	loga+Db loge-cloge/D 1.65396+0.01623D-0.47978/D
loga+Db loge-cloge/D 1.58791+0.01009D-0.53870/D	loga+Db loge-cloge/D 1.97480-0.01768D-1.22870/D	loga+Db loge-cloge/D 2.23461-0.02926D-2.13350/D

of the forest. (a) Pine.

1930 27	1933 30	1943 40
loga+b logD 1.34322+0.21696logD	loga+b logD 1.38249+0.21993logD	loga+b logD 1.39797+0.31950logD
loga+b logD 1.33703+0.24001logD	loga+b logD 1.36241+0.26247logD	loga+b logD 1.43581+0.28941logD
loga+b logD 1.27295+0.29217logD	loga+b logD 1.29172+0.31975logD	loga+b logD 1.39332+0.31068logD
loga+b logD 1.25267+0.29454logD	loga−b loge/D 1.67239−0.90682/D	loga+Db loge−cloge/D 1.92940−0.00969D−1.47943/D
loga+b logD 1.15018+0.44937logD	loga+b logD 1.23650+0.39593logD	loga+b logD 1.38998+0.32328logD
loga+b logD 1.19724+0.34111logD	loga+b logD 1.25318+0.35477logD	loga+Db loge−cloge/D 1.47308+0.01994D−0.09557D

of the forest. (b) Larch.

1933 30	1942 39
loga−b loge/D 1.90985−1.30057/D	loga+b logD 1.26536+0.55273logD
loga−b loge/D 1.90416−1.06771/D	loga−b loge/D 1.93615−1.14039/D
loga+Db loge−cloge/D 1.41400+0.0426.+0.13801/D	loga+Db loge−cloge/D 2.08768−0.01163D−1.94087/D
loga+Db loge−cloge/D 1.31643−0.02915D−2.53393/D	loga+Db loge−cloge/D 2.86202−0.05748D−4.77016/D

Table 15. The table indicating the names of preceding publications, in which the distribution of tree-numbers relating to diameter and clear-length is shown.

No. of Report	No. of Bulletin date	No. of Table	Page	Contents
1 st	25. 1934	4. (1)	end	Pine, 1919, age 16
	〃	〃. (2)	〃	〃 1921, 18
		〃. (3)	〃	Larch, 1919, 16
2 nd	27. 1927	4. (1)	end	Pine, 1926, 23
	〃	〃. (2)	〃	Larch, 1926, 23
3 rd	37. 1941	4. (1)	end	Pine, 1930, 27
	〃	〃. (2)	〃	Larch, 1930, 27
	〃	〃. (3)	〃	Pine, 1933, 30
	〃	〃. (4)	〃	Larch, 1933, 30

Notes : Bulletin=Bulletin ot the Imperial Forest Experiment Station (Ringyō Shiken Hōkoku)

Table 13. (1) Pine (a)

Table 13. The test of fitness of the formulas of tree-height comparing moving averages (H) with the corresponding numbers H calculated from the formulas. (1) Pine.

Year(Age)	D (sun)	4.5△			4.5□			6.0△			6.0□			8.0△			8.0□		
		(H)	H	(H)-H	(H)	H	(H)-H	(H)	H	(H)-H	(H)	H	(H)-H	(H)	H	(H)-H	(H)	H	(H)-H
1915 (12)	1.0	10.41	10.39	+0.02	10.36	10.23	+0.13	10.04	9.99	+0.05	9.63	9.59	+0.04	9.69	9.54	+0.15	9.38	9.41	−0.03
	1.5	11.40	11.42	−0.02	11.83	11.96	−0.13	11.25	11.29	−0.04	10.69	10.72	−0.03	10.57	10.69	−0.12	10.45	10.42	+0.03
	2.0	12.43	12.37	+0.06	13.26	13.26	0.00	12.31	12.34	−0.03	11.56	11.65	−0.09	11.65	11.70	−0.05	11.28	11.25	+0.03
	2.5	13.29	13.34	−0.05	14.32	14.38	−0.06	13.31	13.39	+0.02	12.60	12.52	+0.08	12.74	12.70	+0.04	12.02	12.04	−0.02
	3.0	14.18	14.37	−0.19	15.41	15.42	−0.01	14.19	14.22	−0.03	13.39	13.39	0.00	13.89	13.73	+0.16	12.89	12.78	+0.11
	3.5	15.65	15.47	+0.18				15.18	15.16	+0.02				14.67	14.82	−0.15			
				+0.26			+0.13			+0.09			+0.12			+0.35			+0.17
				−0.26			−0.20			−0.10			−0.12			−0.32			−0.05
				0.00			−0.07			−0.01			0.00			+0.03			+0.12
1919 (16)	1.0							13.96	13.33	+0.63	12.89	12.84	+0.05						
	1.5	15.92	15.96	−0.04	15.93	15.76	+0.17	15.68	15.60	+0.08	14.51	14.70	−0.19	13.79	14.02	−0.23	13.61	13.50	+0.11
	2.0	17.79	17.78	+0.01	17.92	17.84	+0.08	16.58	17.06	−0.48	16.13	16.00	+0.13	16.36	16.14	+0.22	15.42	15.45	−0.03
	2.5	19.07	19.01	+0.06	19.30	19.26	+0.04	18.03	18.10	−0.07	17.14	17.05	+0.09	17.67	17.68	−0.01	16.77	16.83	−0.06
	3.0	19.85	19.89	−0.04	20.08	20.09	−0.01	19.03	19.00	+0.03	17.96	17.99	−0.03	18.84	18.88	−0.04	17.85	17.84	+0.01
	3.5	20.52	20.55	−0.03	20.82	21.07	−0.25	19.79	19.73	+0.06	18.81	18.85	−0.04	19.90	19.86	+0.04	18.52	18.63	−0.11
	4.0	21.14	21.05	+0.08	21.41	21.67	−0.26	20.45	20.39	+0.06	19.63	19.67	−0.06	20.65	20.69	−0.04	19.26	19.26	0.00
	4.5	21.41	21.47	−0.06	22.43	22.15	+0.28	21.02	20.99	+0.03	20.57	20.51	+0.06	21.44	21.41	+0.03	19.73	19.77	−0.04
	5.0				22.70	22.56	+0.14	21.48	21.56	−0.08							20.24	20.20	+0.04
				+0.15			+0.71			+0.89			+0.33			+0.29			+0.16
				−0.17			−0.52			−0.63			−0.32			−0.32			−0.24
				−0.02			+0.19			+0.26			+0.01			−0.03			−0.08

Table 13. (1) Pine (continued) (b)

1921 (18)	1.5	18.74	18.62	+0.12	19.36	19.24	+0.12	18.15	17.99	+0.16	16.92	16.48	+0.44	18.59	17.82	+0.77	17.15	16.80	+0.35
	2.0	20.63	20.72	−0.09	21.48	21.34	+0.14	19.55	19.75	−0.20	18.47	18.57	−0.10	20.51	20.16	+0.35	18.74	17.78	−0.04
	2.5	22.36	22.13	+0.23	22.64	22.73	−0.07	20.92	21.02	−0.10	20.05	20.02	+0.03	21.57	21.75	−0.18	19.99	20.18	−0.19
	3.0	23.11	23.16	−0.05	23.63	23.73	−0.10	21.97	22.01	−0.04	20.83	21.08	−0.25	22.57	22.90	−0.33	21.20	21.23	−0.03
	3.5	23.71	23.88	−0.17	24.37	24.47	−0.10	22.86	22.71	+0.16	21.74	21.90	−0.16	25.56	23.76	−0.20	22.12	22.09	+0.08
	4.0	24.26	24.46	−0.20	25.02	25.04	−0.02	23.44	23.55	−0.11	22.61	22.57	+0.04	24.38	24.44	−0.06	22.99	22.80	+0.19
	4.5	24.88	24.93	−0.05	25.50	25.50	0.00	24.22	24.20	+0.02	23.23	23.12	+0.11	25.11	24.98	+0.13	23.33	23.41	−0.08
	5.0	25.26	25.31	−0.05	26.02	25.87	+0.15	24.75	24.79	−0.04	23.74	23.59	+0.15	25.56	25.42	+0.14	23.84	23.96	−0.12
	5.5	25.72	25.62	+0.10	26.05	26.18	−0.13	25.37	25.35	+0.02	24.01	23.99	+0.02	25.88	25.79	−0.09	24.33	24.45	−0.12
	6.0	26.02	25.89	+0.13	26.45	26.44	+0.01				24.22	24.35	−0.13	26.24	26.10	+0.14	24.80	24.91	−0.11
	6.5													25.95	26.37	−0.42	25.54	25.34	+0.20
				+0.58			+0.42			+0.36			+0.79			+1.62			+0.77
				−0.61			−0.42			−0.49			−0.64			−1.19			−0.69
				−0.03			0.00			−0.13			+0.15			+0.42			+0.08
1926 (23)	3.0	28.33	28.16	+0.06	28.39	29.11	−0.72	26.02	26.09	−0.07	25.96	26.01	−0.05						
	3.5	29.22	29.27	−0.04	30.47	29.99	+0.50	27.88	27.58	+0.30	26.95	26.93	+0.02	27.64	27.39	+0.25	24.98	25.42	−0.44
	4.0	30.09	30.13	−0.04	31.10	30.78	+0.32	28.75	28.77	−0.02	27.80	27.75	+0.05	28.71	28.82	−0.11	26.64	26.46	+0.18
	4.5	30.75	30.82	−0.07	31.52	31.49	+0.03	29.60	29.73	−0.13	28.55	28.50	+0.05	29.90	29.99	−0.09	27.53	27.42	+0.11
	5.0	31.40	31.39	+0.01	32.07	32.15	−0.08	30.35	30.52	−0.17	29.12	29.20	−0.08	30.84	30.97	−0.13	28.57	28.32	+0.25
	5.5	31.89	31.86	+0.03	32.66	32.76	−0.10	31.08	31.19	−0.11	29.85	29.84	+0.01	31.88	31.79	+0.09	29.09	29.15	−0.06
	6.0	32.21	32.27	−0.06	33.34	33.33	+0.01	31.73	31.76	−0.03	30.30	30.44	−0.14	32.62	32.50	+0.12	30.24	29.94	+0.30
	6.5	32.54	32.61	−0.07	33.94	33.85	+0.09	32.25	32.25	0.00	31.08	31.00	+0.08	33.25	33.20	+0.05	30.79	30.69	+0.10
	7.0	33.02	32.91	+0.11	34.35	34.35	0.00	32.80	32.68	+0.12	31.59	31.54	+0.05	33.64	33.65	−0.01	31.53	31.41	+0.12
	7.5							33.06	33.05	+0.01				33.89	34.12	−0.23	31.61	32.09	−0.49
				+0.21			+0.95			+0.43			+0.26			+0.51			+1.06
				−0.29			−0.90			−0.53			−0.27			−0.57			−0.99
				−0.08			+0.05			−0.10			−0.01			−0.06			+0.07

1930 (27)	3.0							28.35	29.84	−1.39									
	3.5							31.26	31.03	+0.23	29.74	29.88	−0.14						
	4.0	34.56	33.77	+0.79	34.86	34.31	+0.55	32.44	32.11	+0.33	31.00	30.92	+0.08	30.83	30.35	+0.50	28.74	29.28	−0.54
	4.5	34.42	34.55	−0.14	35.31	35.18	+0.13	33.47	33.09	+0.38	31.92	31.87	+0.05	31.60	31.78	−0.50	30.04	30.31	−0.26
	5.0	35.14	35.25	−0.11	35.85	35.97	−0.12	34.58	34.00	+0.58	32.80	32.74	+0.06	32.59	33.13	−0.54	31.37	31.23	+0.14
	5.5	35.48	35.91	−0.43	36.40	36.71	−0.31	35.08	34.85	+0.23	33.55	33.56	−0.01	34.29	34.41	−0.12	32.54	32.17	−0.37
	6.0	36.35	36.51	−0.16	37.09	37.40	−0.31	35.65	35.65	0.00	34.29	34.33	−0.04	35.78	35.61	+0.17	33.23	33.02	+0.21
	6.5	37.06	37.08	−0.04	37.77	38.05	−0.28	36.33	36.40	−0.07	35.08	35.05	+0.03	36.94	36.77	+0.17	34.04	33.82	+0.22
	7.0	37.77	37.62	+0.15	38.87	38.67	+0.20	36.76	37.10	−0.34	35.83	35.74	+0.09	37.78	37.88	−0.10	34.32	34.59	−0.27
	7.5	38.17	38.12	+0.05	39.15	39.24	−0.09	37.90	37.78	+0.12	36.71	36.39	+0.32	38.78	38.95	−0.17	35.42	35.31	+0.12
	8.0	38.47	38.61	−0.14	40.08	39.79	+0.29	38.82	38.42	+0.40	36.67	37.01	−0.43	40.50	39.98	+0.52	35.94	36.01	−0.07
	8.5	39.02	39.61	−0.04				39.34	39.05	+0.29	37.50	37.61	−0.11	41.34	40.97	+0.37	36.85	36.68	+0.17
	9.0							39.83	39.63	+0.20				41.30	41.93	−0.63	37.02	37.32	−0.30
	9.5																38.32	37.94	+0.38
				+0·99			+1.17			+2.76			+0.63			+1.73			+1.61
				1.06			−1.11			−1.80			−0.73			−1.74			−1.44
				−0.07			+0.06			+0.96			−0.10			−0.01			+0.17
1933 (30)	4.0							34.44	34.50	−0.06	30.56	31.91	−1.35	33.16	33.85	−0.69	31.70	31.98	−0.27
	4.5	37.81	37.59	+0.22	38.78	38.19	+0.59	35.94	35.67	+0.27	33.27	33·57	−0.30	34.98	35.27	−0.29	32.78	33.17	−0.39
	5.0	38.49	38.37	+0.12	39.15	39.14	+0.01	36.86	36.75	+0.10	35.08	34.98	+0.90	36.58	36.60	−0.02	34.32	34.28	+0.04
	5.5	39.16	39.10	+0.06	39.89	40.04	−0.15	37.40	37.76	−0.36	36.68	36.15	+0.53	38.22	37.86	+0.36	35.37	35.32	+0.05
	6.0	39.55	39.78	−0.23	40.77	40.87	−0.10	38.58	38.72	−0.14	37.51	37.21	+0.30	39.38	39.04	+0.34	36.56	36.30	+0.26
	6.5	40.22	40.41	−0.19	41.24	41.65	−0.41	39.78	39.62	+0.16	38.57	38.11	+0.46	40.64	40.17	+0.47	37.60	37.23	+0.37
	7.0	40.78	41.01	−0.23	42.27	42.39	−0.12	40.78	40.51	+0.27	38.89	38.90	−0.01	41.69	41.25	+0.44	38.17	38.12	+0.05
	7.5	41.59	41.58	+0.01	43.21	43.09	+0.12	41.27	41.21	+0.06	39.93	39.60	+0.13	42.15	42.28	−0.13	38.53	38.97	−0.44
	8.0	42.25	42.12	+0.13	43.91	43.76	+0.15	41.93	42.06	−0.13	40.56	40.23	+0.33	43.58	43.27	+0.31	39.66	39.77	−0.11
	8.5	42.68	42.63	+0.05	44.74	44.40	+0.34	42.59	42.81	−0.22	40.98	40.79	+0.19	44.50	44.22	+0.28	40.48	40.55	−0.07
	9.0	43.16	43.12	+0.04				43.56	43.52	+0.04	40.71	41.29	−0.42	45.40	45.14	+0.36	41.95	41.30	+0.59
	9.5													44.82	46.04	−1.20	41.97	42.02	−0.25
	10.0																42.79	42.72	+0.07
				+0.63			+1.21			+0.90			+2.84			+2.56			+1.49
				−0.65			−0.78			−0.91			−2.08			−2.33			−1.53
				−0.02			+0.42			−0.01			+0.76			+0.23			−0.04

Table 13. (1) Pine (continued) (c)

1945 (40)																
	4.0							42.50	42.05	+0.45						
	4.5				46.44	46.16	+0.28	42.47	43.47	−1.00	40.64	40.06	+0.58	43.60	43.93	−0.33			
	5.0	46.63	45.81	+0.82	47.62	47.46	+0.16	44.83	44.78	+0.05	42.25	42.46	−0.21	45.33	45.30	+0.03	42.37	43.07	−0.70
	5.5	47.13	47.10	+0.03	44.41	48.68	−0.27	46.30	46.01	+0.29	44.14	44.47	−0.33	45.44	46.59	−1.15	44.27	43.82	+0.45
	6.0	47.98	48.32	−0.34	49.94	49.82	+0.12	47.11	47.16	−0.05	46.19	46.14	+0.05	47.44	47.81	−0.37	45.28	44.61	+0.67
	6.5	49.13	49.47	−0.34	50.93	50.89	+0.04	48.21	48.25	−0.04	47.49	47.53	−0.04	49.04	48.96	+0.08	45.55	45.44	+0.11
	7.0	50.36	50.56	−0.20	51.81	51.91	−0.10	49.08	49.28	−0.20	48.25	48.69	−0.44	50.76	50.05	+0.71	45.78	46.30	−0.52
	7.5	51.56	51.59	−0.03	52.58	52.87	−0.29	50.82	50.26	+0.56	49.17	49.65	−0.48	51.75	51.08	+0.67	46.51	47.19	−0.68
	8.0	52.80	52.59	+0.21	53.65	53.79	−0.14	51.23	51.19	+0.04	51.03	50.45	+0.58	52.25	52.08	+0.17	48.49	48.11	+0.38
	8.5	53.62	53.54	+0.08	54.68	54.68	0.00	52.02	52.09	−0.07	51.37	51.10	+0.27	51.94	53.03	−1.09	49.34	49.06	+0.28
	9.0	54.33	54.45	−0.12	55.50	55.52	−0.02	52.60	52.95	−0.35	51.88	51.62	+0.26	53.24	53.94	−0.70	50.62	50.04	+0.58
	9.5	55.16	55.33	−0.17	55.94	56.33	−0.39	53.82	53.78	+0.04	50.79	52.06	−1.27	53.08	54.82	−1.74	50.49	51.05	−0.56
	10.0	56.15	56.19	−0.03	57.38	57.12	+0.26	54.90	54.58	−0.32	51.90	52.37	−0.47	57.76	55.67	+2.09	52.59	52.09	+0.50
	10.5				58.18	57.87	+0.31	55.48	55.36	+0.12	54.02	52.61	+1.41	57.53	56.49	+1.04	53.99	53.15	+0.84
	11.0							56.85	56.10	+0.75				57.76	57.29	+0.47	55.29	54.25	+1.04
	11.5							56.00	56.82	−0.82							55.40	55.37	+0.03
	12.0																54.32	56.52	−2.20
				+1.14			+1.17			+2.62			+3.15			+5.26			+4.88
				−1.23			−1.21			−2.53			−3.25			−5.38			−4.66
				−0.09			−0.04			+0.09			−0.09			−0.12			+0.22

Notes : (H) moving 3 diameter average of height. H=calculated mumber from formula.

The unit of diameteer and height is "Sun" and "Shaku" respectively. 1 Sun=$^1/_{10}$ Shaku.

1 Shaku =$^{10}/_{33}$ metre.

Table 13. (2) Larch

year (age)	D (sun)	4.5 △			6.0 △			6.0 □			8.0 △		
		(H)	H	(H)−H	(H)	H	(H)−H	(H)	H	(H)−H	(H)	H	(H)−H
1914 (11)	1.0	16.74	16.77	−0.03	14.88	14.93	+0.05	15.11	14.76	+0.35	14.46	13.91	+0.55
	1.5	18.41	18.38	+0.03	18.04	18.00	+0.04	18.41	18.42	−0.01	16.89	17.36	−0.47
	2.0	19.71	19.71	0.00	20.42	20.20	+0.20	20.43	20.69	−0.26	19.55	19.68	−0.13
	2.5	20.95	20.95	0.00	21.80	22.01	−0.21	21.58	22.22	−0.64	21.36	21.31	+0.08
	3.0				23.65	23.62	+0.03	23.36	23.32	−0.04	22.61	22.61	0.00
	3.5				25.19	25.15	+0.04	24.61	24.14	−0.45			
				+0.03 −0.03			+0.31 −0.26			+0.84 −0.91			+0.63 −0.60
				0.00			+0.05			−0.07			+0.60
1919 (16)	1.5							20.54	20.92	−0.38	20.44	21.54	−1.10
	2.0	24.79	24.65	+0.14	28.18	27.64	+0.54	24.60	24.02	+0.58	26.65	25.82	+0.83
	2.5	26.82	26.84	−0.02	30.28	30.76	−0.48	26.96	26.81	+0.15	29.20	28.98	+0.22
	3.0	29.13	29.25	−0.12	32.98	33.16	−0.18	29.03	29.36	−0.33	31.68	31.45	+0.23
	3.5	31.72	31.61	+0.11	35.28	35.11	+0.17	31.43	31.75	−0.32	34.16	33.47	+0.69
	4.0	34.16	34.09	+0.07	36.89	36.75	+0.14	34.29	34.00	+0.29	35.41	35.16	+0.25
	4.5	36.64	36.71	−0.07	38.03	38.16	−0.13	36.10	36.14	−0.04	36.39	36.63	−0.24
	5.0							38.30	38.18	+0.12	37.09	37.93	−0.84
	5.5										40.14	39.11	+1.03
				+0.32 −0.21			+0.85 −0.79			+1.14 −1.07			+3.25 −2.18
				+0.11			+0.06			+0.07			+1.07

Table 13. (2) Larch (a)

1926 (23)	2.5	34.94	34.78	−0.03									
	3.0	37.60	37.17	+0.43	37.25	38.35	−1.10						
	3.5	38.91	39.27	−0.36	41.12	41.44	−0.32	38.10	38.41	−0.31	41.34	41.31	+0.03
	4.0	40.81	41.22	−0.41	44.56	43.95	+0.61	41.47	41.47	0.00	42.87	43.48	−0.61
	4.5	43.28	42.96	+0.32	46.63	46.03	+0.60	44.45	44.07	+0,41	45.75	45.90	−0.15
	5.0	44.96	44.82	+0.14	48.55	47.76	+0.79	46.09	46.22	−0.13	47.92	47.72	+0.20
	5.5	46.67	46.54	+0.13	49.14	49.23	−0.09	48.27	48.09	+0.18	48.91	49.10	−0.19
	6.0	48.13	48.25	−0.12	49.79	50.49	−0.07	49.81	49.71	+0.10	50.29	50.13	+0.16
	6.5				51.70	51.60	+0.10	50.87	51.10	−0.23	50.71	50.87	−0.16
				+1.02 −0.10			+2.10 −1.58			+0.69 −0.67			+0.39 −1.11
				+0.10			+0.52			+0.02			−0.72
1930 (27)	4.0	42.54	42.30	+0.24									
	4.5	45.01	45.32	−0.31	49.44	49.92	−0.48	45.73	45.72	+0,01	44.41	46.54	−2.13
	5.0	48.11	47.92	+0.19	52.39	52.11	+0.28	47.56	47.57	−0.01	50,48	49.87	+0.91
	5.5	50.06	50.16	−0.10	54.52	53.98	+0.54	49.04	49.29	−0.25	53.64	52.50	+1.14
	6.0	52.00	52.11	−0.11	55.24	55.60	−0.36	51.16	50.92	+0.24	54.83	54.52	+0.31
	6.5	54.54	53.83	+0.71	55.90	57.00	−1.10	52.35	52.49	−0.14	55.73	56.02	−0.29
	7.0	54.78	55.35	−0.57	57.27	58.24	−0.97	54.14	54.01	+0.13	56.73	57.09	−0.36
	7.5				61.33	59.33	+2.00				58.13	57.78	+0.35
				+1.14 −1.09			+2.82 −2.91			+0.38 −0.40			+2.71 −2.78
				+0.05			−0.09			−0.02			−0.07

Table 13. (2) Larch (continued) (b)

1933 (30)	4.0	41.85	42.43	−0.58								
	4.5	45.60	45.77	−0.17	45.80	50.44	−4.64	47.08	47.28	−0.20	45.87	45.89	−0.02
	5.0	49.36	48.64	+0.72	54.56	53.05	+1.51	49.34	49.14	+0.20	48.91	50.11	−1.20
	5.5	51.37	51.14	+0.23	57.24	55.29	+2.19	51.31	51.14	+0.17	54.80	53.58	+1.22
	6.0	53.43	53.33	+0.10	58.28	57.24	+1.04	53.11	53.27	−0.16	57.33	56.38	+0.95
	6.5	54.95	55.17	−0.22	59.02	58.94	+0.08	55.58	55.54	+0.04	58.44	58.58	−0.14
	7.0				59.50	60.50	−1.00	57.90	57.94	−0.04	59.54	60.27	−0.73
	7.5				61.23	61.78	−0.55				59.63	61.52	−1.89
	8.0				64.33	62.98	+1.78				64.60	62.40	+2.20
				+1.05 −0.97			+6.60 −6.19			+0.41 −0.40			+4.37 −3.98
				+0.08			+0.41			+0.01			+0.39
1942 (39)	5.0	49.86	48.84	+1.02				49.83	47.79	+2.04			
	5.5	51.43	51.27	+0.16				51.40	50.86	+0.54			
	6.0	52.30	53.60	−1.30				51.14	53.48	−2.34			
	6.5	55.88	55.84	+0.04				54.38	55.70	−1.32	61.47	60.82	+0.65
	7.0	57.83	58.01	−0.18	63.06	63.15	−0.09	59.07	57.58	+1.49	63.43	64.01	−0.58
	7.5	61.00	60.11	+0.89	65.19	64.66	+0.53	58.99	59.16	−0.17	66.31	66.36	−0.05
	8.0	61.43	62.15	−0.72	65.59	66.01	−0.42	60.79	60.50	+0.29	68.19	67.96	+0.23
	8.5				67.13	67.23	−0.10	61.33	61.61	−0.28	68.68	68.90	−0.22
	9.0				68.43	68.33	+0.10				68.78	69.27	−0.49
	9.5										69.60	69.14	+0.46
				+2.11 −2.30			+0.63 −0.61			+4.36 −4.11			+1.34 −1.34
				−0.09			+0.02			+0.25			0.00

Table 16. The distribution of numbers of trees with respect to diameter and clear-length. (1) Pine (Pinus densiflora)

Plot	D \ c.l	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	sum	mean
4.5 △	4.5														1	–	–	–	–	–	–	1								2	30.5
	5.0													1	1	–	–	–	–	2	–	1	2								7	31.4
	5.5										2	–	–	1	–	–	2	2	1	2	2	–	–	1	1	–	1				15	30.9
	6.0							1	–	–	–	–	–	1	–	2	1	4	1	–	1	3	2	2	1						19	31.4
	6.5								1	2	–	–	1	–	2	–	1	4	2	4	5	3	1	1	1						28	30.6
	7.0									1	–	–	1	2	–	2	2	6	1	2	3	2	–	1							23	30.0
	7.5										1	1	–	–	1	–	1	4	3	4	1	4	6								26	31.7
	8.0													1	1	–	–	1	5	2	1	–	3	1	1	1	–	1			18	32.8
	8.5													1	2	3	2	2	4	3	2	2	3	1							25	31.1
	9.0										1	–	–	–	1	1	–	2	1	2	–	1	1	–	–	–	–	–	1		11	31.2
	9.5														1	1	2	–	1	–	1										6	29.5
	10.0																			1	2	–	1								4	33.3
	10.5																						–	1	–	–	–	1			2	38.0
	sum	–	–	–	–	–	–	1	1	3	4	1	2	7	10	9	11	25	19	22	18	17	19	8	4	1	1	2	1	–	186	
	mean							6.0	6.5	6.7	6.9	7.5	6.8	6.7	7.4	7.8	7.4	7.0	7.7	7.3	7.4	6.9	7.5	7.3	6.5	8.0	5.6	9.3	9.0			
4.5 □	4.0																1	–	1												2	30.0
	4.5											1	–	–	–	1	–	1	1	2											6	29.5
	5.0											1	1	1	–	–	–	2	–	2	–	1	–	–	–	–	1	–	–	1	10	31.4
	5.5									1	–	–	–	1	–	1	1	–	1	–	2	1	3	1	2						14	32.2
	6.0								2	–	1	–	–	1	2	1	1	1	–	1	3	–	1	–	–	1	1				16	29.7
	6.5		1	–	–	–	–	–	–	–	–	–	–	–	1	2	1	3	3	1	3	1	2	1	2	2	1				24	32.1
	7.0									1	–	–	1	–	–	1	2	3	1	–	5	4	–	1	1						20	31.4
	7.5							1	–	–	–	–	2	–	1	–	1	2	2	3	1	2	2	1	3	–	1				22	31.9
	8.0											1	–	–	–	1	4	2	–	–	2	3	–	2	1	1	–	1			18	32.4
	8.5												1	–	1	1	–	1	1	3	5	1	–	2	3						19	32.6
	9.0															1	1	1	–	1	1	2	–	–	2						9	32.7
	9.5														1	–	–	1	–	–	–	–	–	–	–	–	–	–	1		3	32.7
	10.0													1	–	–	–	–	–	–	–	–	–	–	1	–	1				3	34.0
	10.5																	1	–	–	1										2	31.5
	11.0																				–	–	–	–	–	–	–	1			1	40.0
	sum	–	1	–	–	–	–	1	2	2	1	3	5	4	6	9	12	18	10	13	23	15	8	8	15	4	5	2	1	1	169	
	mean		6.5	–	–	–	–	7.5	6.0	6.3	6.0	5.8	7.1	6.6	7.3	6.8	7.0	7.2	6.4	6.8	7.3	7.4	6.3	7.4	7.7	6.8	7.0	9.5	9.5	5.0		

Table 16. (1) Pine (a)

Notes : c.l = clear-length. The unit of diameter and clear-length is "Sun" and "Shaku" respectively. 1 Sun = 1/10 Shaku. 1 Shaku = 10/33 meter.

Table 16. (1) Pine (continued) (b)

Plot	D \ c.l	14	15	16	17	18	19	20	21	22	23	24	25	26	27
6.0 △	3.5														
	4.0														
	4.5														
	5.0														1
	5.5				1	–	–	–	–	–	1	3	1	–	1
	6.0							1	–	–	–	–	3	–	–
	6.5													3	5
	7.0										3	–	1	1	–
	7.5									2	1	1	3	2	–
	8.0					1	–	–	–	1	–	2	1	3	–
	8.5							1	–	–	1	–	2	1	–
	9.0											1	–	–	–
	9.5							1	–	–	–	–	–	–	1
	10.0														
	10.5									1	–	–	–	–	–
	11.0											1	–	1	
	11.5							1	–	–	–	–			
	12.0										1	1			
	sum	–	–	–	1	1	–	4	–	4	7	9	11	11	8
	mean				5.5	8.0	–	8.9	–	8.4	7.8	8.0	7.1	7.7	6.6
6.0 □	4.0													1	1
	4.5									1	1	–	1	–	–
	5.0								2	1	–	–	2	1	3
	5.5										1	–	–	1	4
	6.0												4	–	5
	6.5									4	–	2	2	2	–
	7.0									1	1	–	5	3	2
	7.5									1	–	–	3	–	3
	8.0										1	–	–	2	1
	8.5							1	–	–	1	1	–	1	2
	9.0									1	–	–	1	2	–
	9.5												2	2	
	10.0										1	–	–	–	–
	10.5													1	–
	11.0														1
	sum	–	–	–	–	–	–	1	2	9	6	3	20	16	22
	mean							8.5	5.0	6.6	7.3	7.2	6.9	7.5	6.5

28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	sum	mean
			1												1	31.0
			1	1											2	31.5
2	1	1	1												5	29.2
1	–	–	1	–	–	1									4	30.0
2	–	1	2	2	1	1	1								17	28.1
1	4	–	2	1	1	1	1	–	1						16	29.5
4	2	5	3	–	2	–	1	1							26	29.3
1	2	1	1	1	2										13	28.1
–	2	–	1	3	1	1	–	–	–	1					18	28.2
–	2	3	2	2	1	2	2	1							23	29.2
4	–	1	2	–	–	1	1	1	1						15	28.5
1	2	–	1	–	3	1									9	30.4
–	–	1													3	25.7
		1	–	–	2										3	32.0
1	1	–													3	26.3
															2	25.0
															1	20.0
															2	23.5
17	16	14	18	10	13	8	6	3	1	1	–	–	–	–	163	
6.9	7.2	7.3	6.4	6.7	7.8	7.2	7.1	7.7	6.0	7.5						
															2	26.5
–	–	–	1												4	25.3
1	1	–	1	–	2	–	1								15	27.3
1	2	1	1												11	27.6
–	2	2	2	–	2										17	28.3
3	1	4	1	1	2										22	27.3
3	2	3	2	2	–	1									25	27.8
1	1	1	–	1	1										12	27.5
2	2	3	1	–	–	–	1								13	28.6
2	3	2	2	3	–	1									18	28.4
–	2														6	26.2
															4	25.5
–	1	1													3	27.3
1															2	27.0
															1	27.0
14	17	16	11	7	7	2	2	–	–	–	–	–	–	–	155	
7.3	7.4	7.2	6.6	7.6	6.1	7.8	6.5									

Table 16. (1) Pine (continued) (c)

Plot	D \ c.l	14	15	16	17	18	19	20	21	22	23	24	25	26	27
8.0 △	4.0														
	4.5														
	5.0										1	–	–	–	–
	5.5											1	–	1	1
	6.0											1	1	1	–
	6.5			1	–	–	–	–	–	–	–	–	–	–	4
	7.0														
	7.5												1	1	1
	8.0							1	–	–	–	1	1	–	1
	8.5													1	1
	9.0							1	–	–	–	–	1	1	–
	9.5														
	10.0					1	–	–	–	–	–	–	–	–	–
	10.5													1	–
	11.0														1
	11.5													2	1
	sum	–	–	1	–	1	–	2	–	–	1	3	4	8	10
	mean			6.5	–	10.0	–	8.5	–	–	5.0	6.5	7.6	8.8	7.8
8.0 □	4.5							1	–	1	–	–	–	–	1
	5.0													2	1
	5.5									1	–	1	–	1	–
	6.0										1	–	–	–	2
	6.5							1	–	1	1	1	4	1	–
	7.0			1	–	–	–	–	1	–	–	2	1	–	1
	7.5							1	–	1	1	–	1	3	2
	8.0						1	–	–	–	1	–	1	1	–
	8.5	1	–	–	–	–	1	–	1	–	–	–	–	1	–
	9.0								1	–	–	1	–	2	–
	9.5												2	–	–
	10.0				1	–	–	1	–	–	–	–	–	–	–
	10.5												1	–	–
	11.0											2	1	–	–
	11.5												2	1	–
	12.0											1	–	–	2
	12.5											1			
	sum	1	–	1	1	–	2	4	3	4	4	9	13	12	9
	mean	8.5	–	7.0	10.0	–	8.3	7.1	8.2	6.0	7.0	9.1	8.7	7.5	7.5

28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	sum	mean
	1														1	29.0
	–	–	–	–	–	–	–	1							1	36.0
–	–	–	–	2											3	28.3
1	–	–	–	–	1										5	27.6
1	–	2	1	–	–	–	–	–	1						8	28.9
3	–	1	–	–	–	1	–	1	1						12	28.8
		1	1	1	1	1	–	–	1	1					7	33.6
1	1	1	1	2	1	–	1								11	29.8
–	–	1	2	2	2	1	1								13	29.8
2	–	–	–	3	2	–	–	–	–	2					11	31.5
–	1	–	–	1	1										6	27.5
1	–	–	–	–	–	–	–	–	–	1	1				3	35.0
1	–	–	1												3	25.7
–	–	–	–	–	–	–	–	1							2	31.0
–	1	1	1	–	–	–	1	–	–	1					6	31.7
1	–	1	–	–	–	–	–	–	1						6	29.0
11	4	8	7	11	8	3	3	3	4	5	1	–	–	–	98	
7.9	7.9	7.9	8.2	7.5	7.8	7.2	8.8	7.2	7.8	8.9	9.5					
–	–	1													4	24.8
–	–	–	–	1											4	27.8
1	1	–	1	–	–	1	1	1							9	29.4
2	1	–	–	–	2	–	1	1							10	29.9
1	2	3	1	–	–	2	1	1							20	28.1
2	1	1	1	1	–	1									13	26.8
–	1	1	–	–	–	–	1								12	26.3
1	1	2	–	2											10	27.4
1	1	2	1	1	–	1	–	–	–	–	–	1			12	27.8
2	–	1	–	1	1										9	27.6
–	–	–	–	1	1										4	28.8
–	–	–	1												3	22.7
1	1														3	27.3
–	–	–	1												4	26.0
–	1														4	26.3
–	–	1	1												5	27.8
															1	24.0
11	10	12	7	7	4	5	4	3	–	–	–	1	–	–	127	
7.5	7.8	7.7	8.6	7.9	7.6	6.8	6.4	6.0	–	–	–	8.5				

Table 16. (2) Larch (Larix Kaempferi)

Plot	D \ c.l	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	sum	mean
4.5 △	3.5														1																1	27.0
	4.0														–																–	–
	4.5									1	–	–	–	–	–																1	22.0
	5.0												1																		1	25.0
	5.5							1	–	–	–	–	–	2	–	–	–	1													4	25.5
	6.0											2	–	–	–	–	–	1	1	1	–	–	1								6	29.3
	6.5														1	1	–	–	–	–	–	–	–	–	1						3	30.7
	7.0									1	–	–	1	–	1	1	–	–	–	1	–	–	1								6	28.2
	7.5																1	–	1	–	1										3	31.0
	8.0													1	–	–	–	–	1	1											3	29.7
	8.5											1	–	–																	1	24.0
	9.0											–																			–	–
	9.5	1	–	–	–	–	–	–	–	–	–	–																			1	14.0
	sum	1	–	–	–	–	–	1	–	2	–	3	2	3	3	2	1	2	3	3	1	–	2	–	1	–	–	–	–	–	–	30	
	mean	9.5	–	–	–	–	–	5.5	–	5.8	–	6.8	6.0	6.3	5.7	6.8	7.5	5.8	7.2	7.0	7.5	–	6.5	–	6.5								
4.5 □	5.5																				1										1	33.0
	6.0																				–										–	–
	6.5																				–										–	–
	7.0													1	–	–	–	–	–	–	–	–	–	1							2	31.0
	7.5																			1											1	32.0
	8.0																			–	–	–	–	–	–	–	1				1	39.0
	8.5										1	–	–	–	–	–	–	–	–	–												1	23.0
	sum										1	–	–	1	–	–	–	–	–	1	1	–	–	1	–	–	1					6	
	mean										8.5	–	–	7.0	–	–	–	–	–	7.5	5.5	–	–	7.0	–	–	8.0						

Table 16. (2) Larch (a)

Table 16. (2) Larch (continued) (b)

Plot	D \ c.l	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	sum	mean
6.0 △	6.5																		2	–	–	–	1	–	–	–	–	1	1			5	35.6
	7.0																				1	–	–	–	1	1						3	36.0
	7.5														1	–	1	1	1	3	–	1	–	–	1	–	–	–	–	–	1	10	32.7
	8.0															1	1	–	–	–	1											3	30.0
	8.5												1	1	–	–	1	–	–	–	–	–	–	–	–	–	–	1				4	30.0
	9.0																				1											1	33.0
	9.5													1	–	–	–	–	–	1	–											2	29.0
	sum	–	–	–	–	–	–	–	–	–	–	–	1	2	1	1	3	1	3	4	3	1	1	–	2	1	–	2	1	–	1	28	
	mean												8.5	9.0	7.5	8.0	8.0	7.5	6.8	8.0	8.0	7.5	6.5	–	7.3	7.0	–	7.5	6.5	–	7.5		
6.0 □	4.5									1	–	–	–	–	–	–	–															1	22.0
	5.0															2	–	1														3	28.7
	5.5												1	–	–	–	–	–	–	–	–	1										2	29.5
	6.0										2	–	–	1	1	1																5	25.4
	6.5												–																			–	–
	7.0												1	2	–	1	1	–	–	–	–	–	1										6	28·2
	7.5									1	–	–	–	1	1	–	1	–	2	–	1												7	28.4
	8.0				1	–	–	–	–	–	–	–	–	–	1																		2	22.0
	8.5													–	–	1	1															2	28.5
	9.5								1	–	–	–	–	1																			2	23.5
	sum	–	–	–	1	–	–	–	1	2	2	–	2	5	3	5	3	1	2	–	1	1	1	–	–	–	–	–	–	–	–	30	
	mean				8.0	–	–	–	9.0	6.0	6.0	–	6.3	7.3	7.2	6.3	7.7	5.0	7.5	–	7.5	5.5	7.0	–	–	–	–	–	–	–	–			

Table 16. (2) Larch (continued) (c)

Plot	c.l / D	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	sum	mean
8.0 △	5.0																		1													1	31.0
	5.5																		–													–	–
	6.0													1	–	–	–	–	–	–	–											1	26.0
	6.5																				2	1	–	–	–	–	1					4	34.8
	7.0												1	–	–	–	–	–	1	1	–	–	–	–	–	–	1					4	31.8
	7.5													1	–	–	–	1	–	–	–	–	–	1	–	1						4	32.5
	8.0																					1	–	1	2	–	–	1				5	36.8
	8.5													3	–	–	1	–	–	1	–	–	–	–	–	–	1					6	29.7
	9.0																1	–	–	–	–	–	–	–	–	1						2	33.5
	9.5																		2													2	31.0
	10.0											1	–	–	–	–	–	–	–													1	24.0
	sum	–	–	–	–	–	–	–	–	–	–	1	1	5	–	–	2	1	4	2	2	2	–	2	2	2	3	1	–	–	–	30	
	mean											10.0	7.0	7.8	–	–	8.8	7.5	7.8	7.8	6.5	7.3	–	7.8	8.0	8.3	7.3	8.0					
8.0 □	7.0													1	–	–	–	1														2	28.0
	7.5													1	–	–	–	–	–	–												1	26.0
	8.0																			1	–	1										2	33.0
	8.5																		2	–												2	31.0
	sum	–	–	–	–	–	–	–	–	–	–	–	–	2	–	–	–	1	2	1	–	1	–	–	–	–	–	–	–	–	–	7	
	mean													7.3	–	–	–	7.0	8.5	8.0	–	8.0											

Table 17. The correlation ratios between diameter and clear-length in even-aged stands.

	year (age)	4.5 △	4.5 □	6.0 △	6.0 □	8.0 △	8.0 □
Pine (P. densiflora)	1919 (16)	0.14±0.02	0.28±0.02	0.33±0.02	0.16±0.02	0.22±0.03	0.31±0.03
	1921 (18)	0.20±0.03	0.28±0.03	0.23±0.03	0.21±0.02	0.24±0.03	0.32±0.03
	1926 (23)	0.21±0.04	0.20±0.04	0.21±0.04	0.18±0.04	0.15±0.05	0.22±0.05
	1930 (27)	0.22±0.05	0.30±0.05	0.28±0.04	0.22±0.04	0.39±0.04	0.31±0.04
	1933 (30)	0.34±0.04	0.16±0.05	0.35±0.05	0.35±0.05	0.36±0.04	0.31±0.04
	1943 (40)	0.30±0.05	0.30±0.05	0.35±0.05	0.24±0.05	0.63±0.04	0.31±0.05
Larch (L. Kaempferi)	1919 (16)	0.32±0.04	0.33±0.10	0.30±0.05	0.28±0.04	0.28±0.05	0.53±0.08
	1926 (23)	0.46±0.05	0.76±0.07	0.43±0.06	0.48±0.05	0.34±0.06	0.48±0.12
	1930 (27)	0.49±0.07	0.65±0.14	0.59±0.06	0.37±0.08	0.48±0.07	0.68±0.12
	1933 (30)	0.37±0.08	0.55±0.17	0.45±0.08	0.50±0.07	0.45±0.08	0.81±0.08
	1924 (39)	0.71±0.06	0.84±0.08	0.50±0.10	0.61±0.08	0.64±0.07	0.90±0.05

Table 18. The correlation coefficients between diameter and clear-length in even-aged stands on 1943 for Pine, 1942 for Larch.

	4.5 △	4.5 □	6.0 △	6.0 □	8.0 △	8.0 □
Pine	+0.100±0.049	+0.179±0.050	−0.147±0.052	+0.024±0.052	+0.166±0.066	−0.108±0.059
Larch	−0.032±0.117	−0.229±0.261	−0.431±0.104	−0.084±0.122	−0.142±0.122	+0.545±0.179

Table 19. The table indicating the names of preceding publications, in which the distribution of tree-numbers relating to diameter and branch-spread is shown.

No. of Report	No. of Bulletin date	No. of Table	page	Contents
1 st	25. 1924	7. (1)	end	Pine. 1921, age 18 (after thinning)
	〃	7. (2)	〃	Larch, 1919, age 16 (after thinning)
2 nd	27. 1927	7. (1)	end	Pine, 1926, age 23
	〃	〃. (2)	〃	Larch, 1926, 23
3 rd	37. 1941	7. (1)	end	Pine, 1930, 27
	〃	〃. (2)	〃	Larch, 1930, 27
	〃	〃. (3)	〃	Pine, 1933, 30
	〃	〃. (4)	〃	Larch, 1933, 30

Notes : Bulletin=Bulletin of the Imperial Forest Experiment Station. (Ringyō Shiken Hōkoku)

Table 20. The distribution of numbers of trees with respect to diameter and branch-spread. (1) Pine (Pinus densiflora)

Plot	b.s / D	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	sum	mean
4.5 △	4.5		1	–	1																2	6.0
	5.0			4	1	1	1														7	6.9
	5.5	2	2	1	5	1	2	–	1	–	–	1									15	7.3
	6.0		1	5	6	3	1	2	1												19	7.4
	6.5		2	3	7	3	3	4	3	2	–	–	–	1							28	8.6
	7.0		1	1	1	4	5	4	3	2	1	–	–	–	–	1					23	9.7
	7.5				2	7	1	2	4	4	3	1	–	1	1						26	10.7
	8.0			1	–	1	2	4	3	4	1	1	–	–	–	–	–	1			18	11.1
	8.5					3	2	4	1	7	5	2	–	–	1						25	11.5
	9.0					1	2	2	1	2	2	–	–	1							11	11.2
	9.5							1	1	3	–	–	1								6	12.0
	10.0							1	–	2	–	–	–	–	1						4	12.8
	10.5						2														2	9.0
	sum	2	7	15	23	24	21	24	18	26	12	5	1	3	3	1	–	1	–	–	186	
	mean	5.5	5.9	6.0	6.1	7.1	7.4	7.7	7.4	8.3	8.2	7.6	9.5	7.7	8.7	7.0		– 8.0				
4.5 □	4.0		1	1																	2	5.5
	4.5		1	2	–	1	2														6	7.2
	5.0		2	4	1	2	–	–	1												10	6.8
	5.5		1	1	2	3	5	1	1												14	8.2
	6.0			2	3	–	1	6	3	–	1										16	9.3
	6.5	1	–	2	6	2	3	7	1	1	–	1									24	8.7
	7.0				2	4	3	3	4	2	–	1	–	1							20	10.1
	7.5				1	3	6	4	3	4	–	–	–	1							22	10.1
	8.0			1	2	1	1	3	1	4	–	4	1								18	10.9
	8.5					1	3	3	3	4	1	1	–	2	1						19	11.7
	9.0						1	1	3	1	–	1	1	–	–	–	1				9	12.4
	9.5								1	–	1	–	–	–	1						3	13.7
	10.0										1	–	1	–	1						3	15.0
	10.5										1	–	–	–	–	–	1				2	16.0
	11.0										1										1	13.0
	sum	1	5	13	17	17	25	28	21	16	6	8	3	4	3	–	2	–	–	–	169	
	mean	6.5	4.8	5.5	6.5	6.5	6.8	7.0	7.4	7.8	9.3	7.9	9.0	7.9	9.3		– 9.8					

Table 20. (1) Pine (a)

Notes : b.s = branch-spread. The unit of diameter and branch-spread is "Sun" and "Shaku" respectively. 1 Sun = 1/10 Shaku. 1 Shaku = 10/33 meter

Table 20. (1) Pine (continued) (b)

Plot	b.s / D	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	sum	mean
6.0 △	3.5		1																		1	5.0
	4.0	1	–	1																	2	5.0
	4.5		2	1	1	1															5	6.2
	5.0		1	1	1	1															4	6.5
	5.5		1	3	3	3	2	2	–	2	–	–	1								17	8.5
	6.0			1	2	4	3	3	2	–	1										16	9.0
	6.5		1	3	3	4	9	4	2												26	8.4
	7.0			1	–	1	3	1	5	1	–	–	1								13	10.2
	7.5					3	2	2	6	3	2										18	10.6
	8.0				1	4	3	4	1	4	3	1	–	–	–	–	1	1			23	11.1
	8.5				1	3	3	3	2	–	1	–	1	–	–	1					15	10.4
	9.0							1	1	2	3	1	–	1							9	12.7
	9.5							1	–	–	1	–	–	–	–	–	–	–	1		3	14.7
	10.0							1	–	–	–	–	1	1							3	13.7
	10.5										1	–	1	–	–	–	–	–	1		3	16.3
	11.0															1	1				2	18.5
	11.5															1					1	18.0
	12.0												1	–	–	1					2	16.5
	sum	1	6	11	12	24	25	22	19	12	12	2	6	2	–	4	2	1	2	–	163	
	mean	4.0	3.9	5.7	6.2	6.8	6.9	7.4	7.3	7.5	8.4	8.5	8.9	9.5	–	10.8	9.5	8.0	10.0			
6.0 □	4.0		2																		2	5.0
	4.5	1	–	–	1	2															4	6.8
	5.0	2	–	3	5	4	1														15	6.8
	5.5			2	1	4	–	2	1	–	–	–	1								11	8.8
	6.0				4	4	7	2													17	8.4
	6.5		1	1	2	3	4	3	2	4	–	2									22	9.7
	7.0					7	1	5	7	3	–	–	–	2							25	10.4
	7.5				1	–	6	1	–	1	2	–	1								12	10.3
	8.0				1	–	2	1	3	3	1	2									13	11.2
	8.5			2	–	1	5	1	2	1	4	1	1								18	10.6
	9.0										2	2	–	1	–	1					6	14.7
	9.5								1	1	–	–	1	–	1						4	13.8
	10.0								1	–	–	–	1	–	–	1					3	14.7
	10.5													1	–	–	–	–	1		2	18.5
	11.0																		1		1	21.0
	sum	3	3	8	15	25	26	15	17	13	9	7	5	4	1	2	–	–	2	–	155	
	mean	4.8	4.8	6.2	5.2	6.1	7.1	6.8	7.5	7.4	8.3	7.9	8.2	8.4	9.5	9.5	–	–	10.8			

Table 20. (1) Pine (continued) (c)

Plot	bs / D	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	sum	mean
8.0 △	4.0		1	–																	1	5.0
	4.5			1																	1	6.0
	5.0			1	–	–	1	–	1												3	8.7
	5.5			1	–	1	–	3													5	8.8
	6.0		1	–	1	2	2	2													8	8.3
	6.5					2	3	2	1	3	–	1									12	10.3
	7.0				1	1	2	2	1												7	9.1
	7.5				1	2	2	1	–	1	1	2	–	1							11	10.9
	8.0						3	2	1	3	4										13	11.2
	8.5				1	–	–	1	2	6	–	1									11	11.4
	9.0						1	1	1	2	1										6	11.2
	9.5								2	–	1	–	–	–							3	11.7
	10.0													1	1	–	1				3	17.3
	10.5								1	–	–	–	–	–	–	1					2	14.5
	11.0									1	1	–	–	2	–	–	2				6	15.8
	11.5							1	–	–	–	–	1	–	1	2	–	–	1		6	16.5
	sum	–	2	3	4	8	14	15	10	16	8	4	1	4	2	3	3	–	1	–	98	
	mean		5.0	5.0	7.3	6.6	7.0	7.2	8.2	8.2	8.6	7.5	11.5	9.9	10.8	11.2	10.7	–	11.5			
8.0 □	4.5	1	1	1	–	1															4	5.8
	5.0				1	3															4	7.8
	5.5			2	2	2	2	–	1												9	7.9
	6.0		1	2	–	1	2	2	2												10	8.5
	6.5	1	–	–	4	6	2	2	4	1											20	8.7
	7.0			1	–	1	4	3	–	3	–	–	1								13	10.1
	7.5				1	1	4	1	2	1	1	1									12	10.2
	8.0						4	4	1	–	–	1									10	10.1
	8.5						1	3	–	4	2	–	1	1							12	12.0
	9.0						1	–	3	3	1	–	–	1							9	11.9
	9.5							1	–	–	1	–	–	1	–	–	–	–	1		4	15.0
	10.0									1	–	1	–	1							3	14.0
	10.5										1	–	–	–	1	1					3	16.0
	11.0											1	–	–	1	–	1	–	1		4	17.8
	11.5									1	–	–	1	–	–	–	1	1			4	16.5
	12.0											1	1	–	–	–	1	1	–	1	5	18.0
	12.5														1						1	17.0
	sum	2	2	6	8	15	20	16	13	14	6	5	4	4	3	1	3	2	2	1	127	
	mean	5.5	5.3	5.8	7.4	6.0	6.7	7.5	7.2	8.4	8.9	9.7	9.8	9.3	11.3	10.5	11.5	11.8	10.3	12.0		

Table 20. (2) Larch (Larix Kaempferi)

Plot	b.s / D	6	7	8	9	10	11	12	13	14	15	16	sum	meau
4.5△	3.5					1							1	10.0
	4.0					1							–	–
	4.5				1	–							1	9.0
	5.0			1	–								1	8.0
	5.5	2	1	–	1								4	7.0
	6.0			2	2	1	1						6	9.2
	6.5				3								3	9.0
	7.0			1	–	2	2	1					6	10.3
	7.5				1	–	1	–	1				3	11.0
	8.0						1	2					3	11.7
	8.5							1					1	12.0
	9.0							–	–	–	–	–	–	–
	9.5											1	1	16.0
	10.0											–	–	
	sum	2	1	4	8	4	5	4	1	–	–	1	30	
	mean	5.5	5.5	6.0	6.1	5.9	7.1	7.9	7.5	–	–	9.5		
4.5□	4.5		–										–	
	5.0		–										–	
	5.5		1										1	7.5
	6.0		–										–	–
	6.5		–	–	–								–	–
	7.0				1	–	–	–	–	–	–	1	2	12.5
	7.5				1						–		1	8.0
	8.0				1						–		1	9.0
	8.5										1		1	15.0
	9.0										–		–	
	sum	–	1	–	3	–	–	–	–	–	1	1	6	
	mean		5.5	–	7.5	–	–	–	–	–	8.5	7.0		

Table 20. (2) Larch (a)

Table 20. (2) Larch (b)

Plot	D \ b.s	6	7	8	9	10	11	12	13	14	15	16	sum	mean
6.0 △	3.5				-								-	
	4.0				-								-	
	4.5				-								-	
	5.0				-								-	
	5.5				-								-	
	6.0				-								-	
	6.5				3	1	1						5	9.6
	7.0					1	1	1					3	11.0
	7.5				1	3	2	1	3				10	11.2
	8.0					1	1	1					3	11.0
	8.5						1	2	-	1			4	12.3
	9.0					1	-						1	10.0
	9.5				1	-	-	-	-	1			2	11.5
	10.0									-			-	
	sum	-	-	-	5	7	6	5	3	2	-	-	28	
	mean				7.5	7.6	7.5	7.9	7.5	9.0				
6.0 □	4.5	1											1	6.0
	5.0	1	-	1	-	1							3	8.0
	5.5		1	-	1								2	8.0
	6.0		1	1	-	2	1						5	9.2
	6.5				-	-							-	-
	7.0				2	-	2	1	1				6	10.8
	7.5				1	1	2	2	1				7	11.1
	8.0						1	-	1				2	12.0
	8.5				1	-	-	1					2	10.5
	9.0						1	-	1				2	12.0
	sum	2	2	2	5	4	7	4	4	-	-	-	30	
	mean	4.8	5.8	5.5	7.1	6.1	7.4	7.6	7.9					

Table 20. (2) Larch (c)

Plot	D \ b.s	6	7	8	9	10	11	12	13	14	15	16	sum	mean
8.0 △	3.5				-								-	-
	4.0				-								-	-
	4.5				-								-	-
	5.0				1								1	9.0
	5.5				-								-	-
	6.0				1								1	9.0
	6.5			1	1	1	1						4	9.5
	7.0					3	1						4	10.3
	7.5			1	-	2	1						4	9.8
	8.0				2	3							5	9.6
	8.5			1	-	2	-	-	1	1	1		6	11.7
	9.0				1	-	-	-	1				2	11.0
	9.5						1	-	1				2	12.0
	10.0								-	1			1	14.0
	sum	-	-	3	6	11	4	-	3	2	1	-	30	
	mean			7.5	7.1	7.6	7.6	-	9.0	9.3	8.5			
8.0 □	4.5				-								-	
	5.0				-								-	
	5.5				-								-	
	6.0				-								-	
	6.5				-								-	
	7.0				1	1							2	9.5
	7.5				-	-	-	1					1	12.0
	8.0						1	1					2	11.5
	8.5							1	1				2	12.5
	9.0								-				-	
	sum	-	-	-	1	1	1	3	1	-	-	-		
	mean				7.0	7.0	8.0	8.0	8.5					

Table 21. The correlation ratios between diameter and branch-spread in even-aged stands.

	Year (age)	4.5 △	4.5 □	6.0 △	6.0 □	8.0 △	8.0 □
Pine (P. densiflora)	1921 (18)	0.63±0.04	0.66±0.02	0.73±0.02	0.59±0.03	0.70±0.03	0.75±0.02
	1926 (23)	0.68±0.02	0.68±0.02	0.73±0.02	0.67±0.02	0.71±0.03	0.78±0.02
	1930 (27)	0.65±0.03	0.65±0.03	0.73±0.02	0.65±0.02	0.72±0.02	0.76±0.02
	1933 (30)	0.69±0.03	0.69±0.03	0.74±0.02	0.68±0.03	7.75±0.02	0.78±0.02
	1943 (40)	0.58±0.03	0.65±0.03	0.75±0.02	0.75±0.02	0.75±0.03	0.83±0.02
Larch (L. Kaempferi)	1919 (16)	0.45±0.05	0.78±0.07	0.49±0.05	0.51±0.05	0.58±0.05	0.43±0.13
	1926 (23)	0.62±0.04	0.76±0.07	0.60±0.04	0.61±0.04	0.58±0.05	0.61±0.10
	1930 (27)	0.79±0.03	0.94±0.03	0.71±0.05	0.71±0.05	0.69±0.05	0.95±0.02
	1933 (30)	0.72±0.04	0.96±0.02	0.54±0.07	0.63±0.06	0.57±0.07	0.94±0.03
	1942 (39)	0.87±0.03	0.80±0.10	0.55±0.09	0.74±0.06	0.59±0.08	0.93±0.03

Table 22. The decreasing courses of real tree-numbers in each sample plot. (a) Pine.

	4.5△	4.5□	6.0△	6.0□	8.0△	8.0□	Ages of forest and the No. of times of thinning
Area of sample plot. "Tsubo"	930	900	936	936	907	936	
〃 . Hektar	0.308	0.298	0.309	0.309	0.300	0.309	
〃 . "Cho"	0.310	0.300	0.312	0.312	0.302	0.312	
(1) Tree density of plantation on 1904.	1.969	1.677	1.080	934	554	539	age 1
(2) Disappeared naturally	620	410	98	127	45	32	
(3) Numbers existing on March, 1915.	1.349	1.267	982	807	509	507	age 12
(4) Disappeared naturally	116	62	43	47	17	3	
(5) Numbers existing before thinning on March, 1918.	1.233	1.205	939	760	492	504	1st for 4.5△ and□
(6) Numbers removed by the thinning.	480	431	-	-	-	-	age 15
(7) (%)	(38.9)	(35.9)	-	-	-	-	
(8) Numbers removed by the thinning on May, 1919.	180	223	416	310	-	-	2 nd for 4.5 △ and □
(9) (%)	(14.6)	(18.5)	(44.3)	(40.8)	-	-	1st for 6.0 △ and □
(10) Numbers standing after thinning.	573	551	523	450	492	504	age 16
(11) Disappeared naturally	10	10	16	7	19	11	
(12) Numbers existing before thinning on October, 1921.	563	541	507	443	473	493	3 rd for 4.5 △ and □
(13) Numbers removed by the thinning.	268	250	228	180	291	300	2 nd for 6.0 △ and □
(14) (%)	(47.6)	(46.2)	(45.0)	(40.6)	(61.5)	(60.9)	1 st for 8.0 △ and □
(15) Numbers standing after thinning.	295	291	279	263	182	193	age 18
(16) Disappeared naturally	1	3	-	2	-	-	
(17) Numbers existing before thinning on October, 1926.	294	388	279	261	182	193	4 th for 4.5 △ amd □
(18) Numbers removed by the thinning.	98	101	-	-	-	-	age 23
(19) (%)	(33.3)	(35.1)	-	-	-	-	
(20) Numbers standing after thinning.	196	187	279	261	182	193	
(21) Disappeared naturally	1	1	7	3	5	1	

(22) Numbers existing before thinning on October, 1930.	195	186	272	258	177	192	3 rd fpr 6.0 △ and □
(23) Numbers removed by the thinning.	-	-	98	87	-	-	age 27
(24) (%)	-	-	(36.0)	(33.7)	-	-	
(25) Numbers standing after thinning.	195	186	174	171	177	192	
(26) Disappeared naturally	-	-	1	1	2	3	
(27) Numbers existing before thinning on November, 1933.	195	186	173	170	175	189	2 nd for 8.0 △ and □
(28) Numbers removed by the thinning.	-	-	-	-	53	50	age 30
(29) (%)	-	-	-	-	(30.3)	(26.5)	
(30) Numbers standing after thinning.	195	186	173	170	122	139	
(31) Disappeared naturally	6	10	5	13	16	8	
(32) Numbers existing before thinning on May, 1943.	189	176	168	157	106	131	5 th for 4.5 △ and □
(33) Numbers removed by the thinning.	42	38	49	43	17	32	4 th for 6.0 △ and □
(34) (%)	(22.2)	(21.6)	(29.2)	(27.4)	(16.0)	(24.4)	3 rd for 8.0 △ and □
(35) Numbers standing after thinning.	147	138	119	114	89	99	age 40
(Percentage for the number of plantation)	(7.5)	(8.2)	(11.0)	(12.2)	(16.1)	(18.4)	

Notes : 1 Tsubo = 6 × 6 (Shaku) = 6 × 6/3.3 × 3.3m² 3.000 Tsubo = 1 Cho 1 Chō = 1 Hektar

Table 22. (b) Larch.

	4.5△	4.5□	6.0△	6.0□	8.0△	8.0□	Ages of forest and the No. of times of thinnig
Area of sample plot. "Tsubo"	247	34	258	266	258	56	
" . Hektar	0.087	0.011	0.085	0.086	0.085	0.019	
" . "Chō"	0.082	0.011	0.086	0.089	0.086	0.019	
(1) Tree density of plantation on 1904.	564	69	326	284	187	36	
(2) Disappeared naturally	120	11	53	16	11	2	
(3) Numbers existing before thinning on March, 1914.	444	58	273	268	176	34	age 11
(4) Numbers removed by the thinning.	173	23	89	67	7	-	1 st thinning

(5) (%)	(39.0)	(39.7)	(32.6)	(25.0)	(4.0)	(0.0)	
(6) Numbers standing after thinning.	271	35	184	201	169	34	
(7) Disappeared naturally	8	1	-	7	4	-	
(8) Numbers existing before thinning on August, 1919.	263	34	184	194	165	34	age 16
(9) Numbers removed by the thinning.	144	19	87	96	70	15	2 nd thinning
(10) (%)	(54.8)	(55.8)	(47.3)	(49.5)	(43.4)	(44.1)	
(11) Numbers standing after thinning.	119	15	97	98	95	19	
(12) Disappeared naturally	-	-	3	1	2	-	
(13) Numbers existing before thinning on October, 1926.	119	15	94	97	93	19	age 23
(14) Numbers removed by the thinning.	63	7	45	47	44	9	3 rd thinning
(15) (%)	(52.9)	(46.7)	(47.9)	(48.5)	(47.3)	(47.4)	
(16) Numbers standing after thinning.	56	8	49	50	49	10	
(17) Numbers existing on October, 1930.	56	8	49	50	49	10	age 27
(18) Disappeared naturally	1	-	-	-	-	-	
(19) Numbers existing before thinning on November, 1933.	55	8	49	50	49	10	age 30
(20) Numbers removed by the thinning.	21	2	19	18	19	3	4 th thinning
(21) (%)	(38.2)	(25.0)	(38.8)	(36.0)	(38.8)	(30.0)	
(22) Numbers standing after thinning.	34	6	30	32	30	7	
(23) Disappeared naturally	3	-	2	2	-	-	
(24) Numbers standing on July, 1942.	31	6	28	30	30	7	age 39
(Percentage for the number of plantation)	(5.5)	(8.7)	(8.6)	(10.6)	(16.0)	(19.4)	

Table 23. (1). The decreasing courses of tree-numbers per "Chō." (a) Pine.

	4.5△	4.5□	6.0△	6.0□	8.0△	8.0□	Ages of forest and the No. of times of thinning
(1) Tree density of plantation on 1904.	6,352	5,589	3,461	2,993	1,832	1,728	age 1
(2) Disappeared naturally	2,000	1,367	314	407	149	103	
(3) Numbers existing on March, 1915.	4,352	4,222	3,147	2,586	1,684	1,625	age 12
(4) Disappeared naturally	374	207	138	150	56	10	
(5) Numbers existing before thinning on March, 1918.	3,974	4,015	3,009	2,436	1,627	1,615	age 15
(6) Numbers removed by the thinning.	1,548	1,437	-	-	-	-	1st for 4.5△, □
(7) (%)	(38.9)	(35.8)	-	-	-	-	
(8) Numbers removed by the thinning on May, 1919.	581	743	1,333	994	-	-	2nd for 4.5△,□ 1st for 6.0△.□
(9) (%)	(14.6)	(18.5)	(44.3)	(40.8)	-	-	age 16
(10) Numbers standing after thinning.	1,847	1,836	1,676	1,442	1,627	1,615	
(11) Disappeared naturally	32	33	51	22	68	34	
(12) Numbers existing before thinning on October, 1921.	1,817	1,803	1,625	1,420	1,564	1,581	age 18 3rd for 4.5△.□
(13) Numbers removed by the thinning.	865	833	731	577	963	962	2nd for 6.0△,□
(14) (%)	(47.6)	(46.2)	(45,0)	(40.6)	(61,5)	(60.9)	1st for 8.0△,□
(15) Numbers standing after thinning.	952	970	894	843	602	619	
(16) Disappeared naturally	3	10	-	6	-	-	
(17) Numbers existing before thinning on October, 1926.	949	960	894	837	602	619	
(18) Numbers removed by the thinning.	316	337	-	-	-	-	age 23
(19) (%)	(33.3)	(35.1)	-	-	-	-	4th for 4.5△,□
(20) Numbers standing after thinning.	633	623	894	837	602	619	
(21) Disappeard naturally	3	3	22	10	17	3	
(22) Numbers existing before thinning on October, 1930.	630	620	872	827	585	616	
(23) Numbers removed by the thinning.	-	-	314	279	-	-	age 27 3rd for 6.0△,□
(24) (%)	-	-	(36,6)	(33,7)	-	-	

(25) Numbers standing after thinning.	630	610	558	548	585	616	
(26) Disappeared naturally	1	–	4	3	6	10	
(27) Numbers existing before thinning on November, 1933.	629	620	554	545	579	606	
(28) Numbers removed by the thinning.	–	–	–	–	175	160	age 30 2nd for 8.0△,□
(29) (%)	–	–	–	–	(30.1)	(26.4)	
(30) Numbers standing after thinning.	629	620	554	545	404	446	
(31) Disappeared naturally	19	33	16	42	53	26	
(32) Numbers existing after thinning on May, 1943.	610	587	538	503	351	420	age 40
(33) Numbers removed by the thinning.	136	127	157	138	57	103	5th for 4.5△.□
(34) (%)	(22.2)	(21.6)	(29.0)	(27.4)	(16.1)	(24.3)	4th for 6.0△.□
(35) Numbers standing after thinning.	474	460	381	365	294	317	3rd for 8.0△.□
(Percentage for the numbers of plantation)	(7.5)	(8.2)	(11.0)	(12.2)	(16.1)	(18.4)	

Table. 23 (1). (b) Larch.

	4.5△	4.5□	6.0△	6.0□	8.0△	8.0□	Ages of forest and the No. of times of thinning
(1) Tree density of plantation on 1904.	6.878	6,273	3,791	3,191	2,174	1,895	age 1
(2) Disappeared naturally	1,463	1,000	616	180	128	105	
(3) Numbers existing before thinning on March, 1914.	5,415	5,273	3,174	3,011	2,047	1,790	age 11
(4) Numbers removed by the thinning.	2,110	2,091	1,035	753	81	–	1st thinning
(5) (%)	(39.0)	(39.7)	(32.6)	(25.0)	(4.0)	(0.0)	
(6) Numbers standing after thinning.	3,305	3,182	2,140	2,258	1,965	1,790	
(7) Disappeared naturally	98	91	–	78	47	–	
(8) Numbers existing before thinning on August, 1919.	3,207	3,091	2,140	2,180	1,919	1,790	age 16
(9) Numbers removed by the thinning.	1.756	1,727	1,012	1,079	814	790	2nd thinning
(10) (%)	(54.8)	(55.9)	(47.3)	(49.4)	(42.4)	(44.1)	
(11) Numders standing after thinning.	1,451	1,364	1,128	1,101	1,105	1,000	

(12) Disappeared naturally	-	-	35	11	24	-	
(13) Numbers existing before thinning on October, 1926.	1,451	1,364	1.093	1,090	1,081	1,000	age 23
(14) Numbers removed by the thinning.	768	636	523	528	511	474	3rd thinning
(15) (%)	(52.9)	(46.6)	(47.9)	(48.4)	(47.3)	(47.4)	
(16) Numbers standing after thinning.	683	728	570	562	570	526	
(17) Numbers existing on October, 1930.	683	728	570	562	570	526	age 27
(18) Disappeared naturally	12	-	-	-	-	-	
(19) Numbers existing before thinning on November, 1933.	671	728	570	562	570	526	age 30
(20) Numbers removed by the thinning.	256	182	221	202	221	158	4th thinning
(21) (%)	(38.2)	(25.0)	(38.8)	(35.9)	(38.8)	(30.0)	
(22) Numbers standing after thinning.	415	-	349	360	349	368	
(23) Disappeared naturally	37	-	23	23	-	-	
(24) Numbers standing on July, 1942.	378	546	326	337	349	368	age 39
(Percentage for the numbers of plantation)	(5.5)	(8.7)	(8.6)	(10.6)	(16.1)	(19.4)	

Table 23 (2) . The decreasing courses of tree-numbers per Hektar. (a) Pine.

	4.5△	4.5□	6.0△	6.0□	8.0△	8.0□	Ages of forest and the No. of times of thinning
(1) Tree density of plantation on 1904.	6,393	5,628	3,495	3,023	1,847	1,744	age 1
(2) Disappeared naturally	2,013	376	317	411	150	104	
(3) Numbers existing on March, 1915.	4,380	4,252	3,178	2,612	1,697	1,640	age 12
(4) Disappeaed naturally	377	208	139	152	57	10	
(5) Numbers existing before thinning on March, 1918.	4,003	4,044	3,039	2,460	1,640	1,630	age 15
(6) Numbers removed by the thinning.	1,558	1,446	-	-	-	-	1st for 4.5△,□
(7) (%)	(38.9)	(35.8)	-	-	-	-	
(8) Numbers removed by the thinning on May, 1919.	584	749	1,346	1,004	-	-	2nd for 4.5△,□ 1st for 6.0△,□
(9) (%)	(14.6)	(18.5)	(44.3)	(40.8)	-	-	age 16

(10) Numbers standing after thinning.	1,861	1,849	1,693	1,456	1,640	1,630	
(11) Disappeared naturally	33	34	52	23	63	35	
(12) Numbers existing before thinning on October, 1921.	1,828	1,815	1,641	1,434	1,577	1,595	age 18
(13) Numbers removed by the thinning.	870	837	738	583	970	971	3rd for 4.5△,□
(14) (%)	(47.6)	(46.1)	(45.0)	(40.6)	(61.5)	(60.9)	2nd for 6.0△,□
(15) Numbers standing after thinning.	958	978	903	861	607	624	1st for 8.0△'□
(16) Disappeared naturally	3	10	-	6	-	-	
(17) Numbers existing before thinning on October, 1926.	955	968	903	845	607	624	age 23
(18) Numbers removed by the thiuning.	318	340	-	-	-	-	4th for 4.5△,□
(19) (%)	(33.3)	(35.1)	-	-	-	-	
(20) Numbers standing after thinning.	637	628	903	845	607	624	
(21) Disappeared naturally	3	3	23	10	17	3	
(22) Numbers existing before thinning on October, 1930.	634	625	880	835	590	621	age 27
(23) Numbers removed by the thinning.	-	-	317	282	-	-	3rd for 6.0△,□
(24) (%)	-	-	(36.0)	(33.8)	-	-	
(25) Numbers standing after thinning.	634	625	563	553	590	621	
(26) Disappeared naturally	-	-	3	3	7	10	
(27) Numbers existing before thinning on November, 1933.	634	625	560	550	583	611	age 30
(28) Numbers removed by the thinning.	-	-	-	-	177	161	2nd for 8.0△,□
(29) (%)	-	-	-	-	(30.1)	(26,4)	
(30) Numbers standing after thinning.	634	625	560	550	406	450	
(31) Disappeared naturally	20	34	16	42	53	26	
(32) Numbers existing before thinning on May, 1943.	614	591	544	508	353	424	age 40 5th for 4.5△,□
(33) Numbers removed by the thinning.	137	128	159	139	57	104	4th for 6.0△,□
(34) (%)	(22.3)	(21.7)	(29.2)	(27.4)	(16.1)	(24.5)	3rd for 8.0△'□
(35) Numbers standing after thinning.	477	463	385	369	296	320	
(Percentage for the numbers of plantation)	(7.5)	(8.2)	(11.0)	(12.2)	(16.0)	(18.3)	

Table. 23 (2). (b) Larch.

	4.5△	4.5□	6.0△	6.0□	8.0△	8.0□	Ages of forest and the No. of times of thinning
(1) Tree density of plantation on 1904.	6,878	6,273	3,835	3,227	2,200	1,895	age 1
(2) Disappeared naturally	1,463	1,000	624	182	129	105	
(3) Numbers existing before thinning on March, 1914.	5,415	5,273	3,211	3,045	2,071	1,790	age 11
(4) Numbers removed by the thinning.	2,110	2,091	1,047	761	83	-	1st thinning
(5) (%)	(39.0)	(39.7	(32.6)	(25.0)	(4.0)	(0.0)	
(6) Numbers standing after thinning.	3,305	3,182	2,164	2,284	1,988	1,790	
(7) Disappeared naturally	98	91	-	80	47	-	
(8) Numbers existing before thinning on August, 1919.	3,207	3,091	2,164	2,204	1,941	1,790	age 16
(9) Numbers removed by the thinning.	1,756	1,727	1,024	1,090	823	790	2nd thinning
(10) (%)	(54.8)	(55.9)	(47.3)	(49.5)	(42.4)	(44.1)	
(11) Numbers standing after thinning.	1,451	1,364	1,140	1,114	1,118	1,000	
(12) Disappeared naturally	-	-	35	11	24	-	
(13) Numbers existing before thinning on October, 1926.	1.451	1,364	1,105	1,103	1,094	1,000	age 23
(14) Numbers removed by the thinning.	768	636	529	534	518	474	3rd thinuing
(15) (%)	(52.9)	(46.6)	(47.9)	(48.4)	(47.4)	(47.4)	
(16) Numbers standing after thinning.	683	728	576	569	576	526	
(17) Numbers existing on October, 1930.	683	728	576	569	576	526	age 27
(18) Disappeared naturally	12	-	-	-	-	-	
(19) Numbers existing before thinning on November, 1933.	671	728	576	569	576	526	age 30
(20) Numbers removed by the thinning.	256	182	224	205	223	158	4th thinning
(21) (%)	(38.2)	(25.0)	(38.9)	(36.0)	(38.7)	(30.0)	
(22) Numbers standing after thinning.	415	546	352	364	352	368	
(23) Disappeared naturally	37	-	24	23	-	-	
(24) Numbers standing on July, 1942.	878	546	328	341	352	368	age 39
(Percentage for the numbers of plantation)	(5.5)	(8.7)	(8.6)	(10.6)	(16.1)	(19.4)	

Table 24. The real number of volume along the growing course in each sample plot. (a) Pine.

	4.5 △	4.5 □	6.0 △	6.0 □	8.0 △	8.0 □
Area of sample plot. "Tsubo"	930	900	936	936	907	936
〃 Hektar.	0.308	0.298	0.309	0.309	0.300	0.309
〃 "Chō"	0.310	0.300	0.312	0.312	0.302	0.312
	Koku (m^3)	Koku (m^3)	Koku (m^3)	Koku (m^3)	Koku (m^3)	Koku (m^3)
(1) Volume on March, 1915.	24.05 (6.681)	27.22 (7.561)	21.22 (5.894)	15.58 (4.329)	11.54 (3.206)	9.76 (2.711)
(2) Volume removed by thinning on March, 1918.	9.16 (2.544)	7.98 (2.217)	-	-	-	-
(3) Volume before thinning on May,1919.	55.76(15.489)	60.11(16.697)	59.26(16.461)	46.99(13.053)	47,53(13.203)	43.72(12.144)
(4) Volume removed by the thinning.	8.88 (2.467)	10.73 (2.981)	15.92 (5.423)	12.37 (3.437)	-	-
(5) (%)	(15.9)	(17.9)	(26.9)	(26.3)	-	-
(6) Volume after thinning.	46.88(13.022)	49.38(13.716)	43.34(12.038)	34.62 (9.617)	47.53(13.203)	43.72(12.144)
(7) Volume before thinning on October, 1921.	72.38(20.106)	66.94(18.594)	65.25(18.125)	54.25(15.069)	66.30(18.381)	62.53(17.369)
(8) Volume removed by the thinning.	24.96 (6.933)	23.48 (6.522)	21.60 (6.000)	14.73 (4.092)	29.30 (8.139)	27.09 (7.525)
(9) (%)	(34.5)	(35.1)	(33.1)	(27.2)	(44.3)	(43.3)
(10) Volume after thinning.	47.42(13.173)	43.46(12.072)	43.65(12.125)	39.52(10.978)	36.87(10.242)	35.44 (9.844)
(11) Volume before thinning on October, 1926.	96.79(26.886)	95.52(26.533)	86.63(24.064)	74.89(20.803)	65.11(18.086)	66.86(18.572)
(12) Volume removed by the thinning.	25.98 (7.217)	28.24 (7.844)	-	-	-	-
(13) (%)	(26.8)	(29.6)	-	-	-	-
(14) Volume after thinning.	70.81(19.669)	67.28(18.689)	86.63(24.064)	74.89(20.803)	65.11(18.086)	66.86(18.572)
(15) Volume before thinning on October, 1930.	107.83(29.953)	104.04(28.900)	128.28(35.633)	113.23(31.453)	102.42(28.450)	101.30(28.139)
(16) Volume removed by the thinning.	-	-	39.71(11.031)	35.21 (9.781)	-	-
(17) (%)	-	-	(31.0)	(31.1)	-	-
(18) Volume after thinning.	107.83(29.953)	104.04(28.900)	88.57(24.603)	78.02(21.672)	102.42(28.450)	101.30(28.139)

(19) Volume before thinning on November, 1933.	136.16(37.822)	135.38(37.606)	112.18(31.161)	95.93(26.647)	126.41(35.114)	126.36(35.100)
(20) Volume removed by the thinnig.	-	-	-	-	32.25 (8.958)	24.11 (6.697)
(21) (%)	-	-	-	-	(25.5)	(19.1)
(22) Volume after thinning.	136.16(37.822)	135.38(37.606)	112.18(31.161)	95.93(26.647(	94,16(26,156)	102.25(98.403)
(23) Volume before thinning on May,1943.	195.25(54.236)	175.10(48.639)	169.92(47.200)	142.51(39.586)	129,99(36.101)	148.54(41.261)
(24) Volume removed by the thinning.	28.55 (7.931)	25.26 (7.017)	31.72 (8.811)	23.21 (6.447)	9.58 (2.661)	20.05 (5.569)
(25) (%)	(14.6)	(14.4)	(18.7)	(16.3)	(7.4)	(13.5)
(26) Volume after thinning (a).	166,70(46.305)	149.84(41.622)	138.20)38.389)	119.30(33.139)	120.41(33.447)	128.49(35.692)
(27) Sum of volume obtained from thinnings. (b)	97.53(27.092)	95.69(26.581)	108.95(30.265)	85.52(23.756)	71.13(19.758)	71.25(19.792)
(28) Total yield during the period from begining (1904) to 1943, viz., (a) + (b)	264.23(73.397)	245.53(68.203)	247.15(68.654)	204.82(56.895)	191.54(53.206)	199.74(55.483)

Notes : The unit "Koku" = $(1\,\text{Shaku})^3 \times 10$ 3.6Koku = 1m^3

The unit "Tsubo" = $(6\,\text{Shaku})^2 = 6 \times 6/3.3 \times 3.3\text{m}^2$

Table 24. (b) Larch.

	4.5 △	4.5 □	6,0 △	6,0 □	8.0 △	8.0 □
Area of sample plot. "Tsubo"	247	34	258	266	258	56
" Hektar	0.082	0.011	0.085	0.088	0.085	0.019
" "Chō"	0.082	0.011	0.086	0.089	0.086	0.019
	Koku (m^3)	Koku (m^3)	Koku (m^3)	Koku (m^3)	Koku (m_3)	Koku (m^3)
(1) Volume before thinning on April,1949.	14.36 (3.939)	2.08 (0.578)	14.03 (3.897)	11.96 (3.322)	9.85 (2.736)	2.54 (0.706)
(2) Volume removed by the thinning.	3.09 (0.858)	0.49 (0.136)	2.41 (0.669)	1.52 (0.422)	0.16 (0.044)	0.00 (0.000)
(3) (%)	(21.5)	(23.6)	(17.2)	(12.7)	(1.6)	(0.0)
(4) Volume before thinning.	11.27 (3.131)	1.59 (0.442)	11.62 (3.228)	10.44 (2.900)	9.69 (2.692)	2.54 (0.706)

(5) Volume before thinning on August, 1919.	26.54 (7.372)	3.83 (1.064)	28.16 (7.822)	26.82 (7.450)	29.58 (8.217)	6.56 (1.822)
(6) Volume removed by the thinning.	9.84 (2.733)	1.52 (0.422(	8.86 (2.461)	8.40 (2.333)	7.42 (2.061)	1.47 (0.408)
(7) (%)	(37.1)	(39.7)	(31.5)	(31.3)	(25.1)	(22.4)
(8) Volume after thinning.	16.70 (4.639)	2.31 (0.642)	19.30 (5.361)	18.42 (5.117)	22.16 (6.156)	5.09 (1.414)
(9) Volume before thinning on October, 1926.	34.96 (9.711)	4.91 (1.364)	42.76(11.878)	38.97(10.825)	47.05(13.070)	9.80 (2.722)
(10) Volume removed by the thinning.	13.72 (3.811)	1.76 (0.489)	16.70 (4.639)	13.89 (3.858)	19.12 (5.311)	3.87 (1.075)
(11) (%)	(38.2)	(35.8)	(39.1)	(35.6)	(40.7)	(39.5)
(12) Volume after thinning.	21.24 (5.900)	3.15 (0.875)	26.06 (7.239)	25.08 (6.967)	27.93 (7.759)	5.93 (1.647)
(13) Volume on October, 1930.	30.25 (8.403)	4.90 (1.333)	37.82(19.506)	32.72 (9.089)	40.00(11.111)	8.40 (2.333)
(14) Volume before thinning on November, 1933.	31.83 (8.842)	5.88 (1.633)	44.40(12.333)	35.18 (9.772)	46.14(12.816)	9.25 (2.569)
(15) Volume removed by the thinning.	10.13 (2.814)	1.18 (0.328)	14.01 (3.892)	9.68 (2.689)	14.39 (3.997)	1.75 (0.486)
(16) (%)	(31.8)	(20.1)	(31.6)	(27.5)	(31.2)	(18.9)
(17) Volume after thinning.	21.70 (6.028)	4.70 (1.305)	30.39 (8.442)	25.50 (7.083)	31.75 (8.819)	7.50 (2.083)
(18) Volume on July, 1942. (a)	29.51 (8.197)	7.26 (2.017)	41.52(11.533)	31.33 (8.708)	45.84(12.733)	10.32 (2.867)
(19) Sum of volume obtained from thinnings. (b)	36.78(10.216)	4.95 (1.375)	41.98(11.661)	33.49 (9.302)	41.09(11.413)	7.09 (1.969)
(20) Total yield during the period from begining(1904)to1942, viz.,(a)+(b)	66.29(18.413)	12.21 (3.392)	83.50(23.194)	64.82(18.005)	86.93(24.146)	17.41 (4.836)

Table 25. (1). The growing courses of volume per "Chō," (a) Pine. (unit "Koku")

	4.5△	4.5□	6.0△	6.0□	8.0△	8.0□	Ages of forest and the No. of times of thinning
(1) Volume on March, 1915.	77.58	90.73	68.01	49.94	38.21	31.28	age 12
(2) Volume removed by thinning on March, 1918.	29.54	26.60	-	-	-	-	1st for 4.5△and 4.5□
(3) Volume before thinning on May, 1919.	179.87	200.37	189.94	150.61	157.38	140.13	age 15
(4) Volume removed by the thinning.	28.64	35.77	51.03	39.65	-	-	age 16
(5) (%)	(15.9)	(17.9)	(26.9)	(26.3)	-	-	2nd for 4.5△and 4.5□
(6) Volume after thinning.	151.22	164.60	138.91	110.96	157.38	140.13	1st for 6.0△and 6.0□
(7) Volume before thinning on October, 1921.	233.48	223.13	209.13	173.88	219.11	200.42	
(8) Volume removed by the thinning.	80.52	78.27	69.23	47.21	97.02	86.83	age 18
(9) (%)	(34.5)	(35.1)	(33.1)	(27.1)	(44.3)	(43.3)	3rd for 4.5△and 4.5□
(10) Volnme after thinning.	152.97	144.87	139.90	126.67	122.09	113.59	2nd for 6.0△and 6.0□
(11) Volume before thinning on October, 1926.	312.23	318.40	277.66	240.03	215.60	214.29	1st for 8.0△and 8.0□
(12) Volume removed by the thinning.	83.81	94.13	-	-	-	-	age 23
(13) (%)	(26.8)	(29.6)	-	-	-	-	4th for 4.5△and 4.5□
(14) Volume after thinning.	228.42	224.27	277.66	240.03	215.60	214.29	
(15) Volume before thinning on October, 1930.	347.84	346.80	411.15	362.92	339.14	324.68	
(16) Volume removed by the thinning.	-	-	127.28	112.85	-	-	age 27
(17) (%)	-	-	(31.0)	(31.1)	-	-	3rd for 6.0△and 6.0□
(18) Volume after thinning.	347.84	346.80	283.88	250,06	339.14	324.68	
(19) Volume before thinning on November, 1933.	439.23	451.27	359.55	307.47	418.58	405.00	
(20) Volume removed by the thinning.	-	-	-	-	106.76	77.28	age 30
(21) (%)	-	-	-	-	(25.5)	(19.1)	2nd for 8.0△and 8.0□
(22) Volume after thinning.	439.23	451.27	359.55	307.47	311.79	327.72	
(23) Volume before thinning on May, 1943.	629.84	538.67	544.62	456.76	430.43	476.09	age 40
(24) Volume removed by the thinning.	92.10	84.20	101.67	74.39	31.72	64.26	5th for 4.5△and 4.5□

(25) (%)	(14.6)	(14,4)	(18.7)	(16.3)	(7.4)	(13.5)	4th for6,0△and 6.0□
(26) Volume after thinning. (a)	537.74	499.47	422.95	382.37	389.71	411.83	3rd for 8.0△ and 8.0□
(27) Sum of volume obtained from thinnings. (b)	314.61	318.97	349.20	274.10	235.53	228.37	
(28) Total yield during the period from begining 1904 to 1943. viz., (a) + (b)	852.35	818.44	792.15	656.47	634.24	640.20	

Notes : The unit 1Koku=10 (shaku) ^{3} 3.6Koku=1m^3

Table 25. (1). (b) Larch. (unit "Koku")

	4.5△	4.5□	6.0△	6.0□	8.0△	8.0□	Ages of forest and the No. of times of thinning
(1) Volume before thinning on April, 1914.	175.12	189.09	163.14	134.38	114.53	133.68	age 11
(2) Volume removed by the thinning.	37.68	44.55	28.02	17.08	1.86	0.00	1st thinning
(3) (%)	(21.5)	(23.6)	(17.2)	(12.7)	(1.6)	(0.0)	
(4) Volume after thinning.	137.44	144.55	135.12	117.30	112.67	133.68	
(5) Volume before thinning on August, 1919.	323.66	348.18	327.44	301.35	343.95	345.26	age 16
(6) Volume removed by the thinning.	120.00	138.18	103.02	94.38	86.28	77.37	2nd thinning
(7) (%)	(37.1)	(39.7)	(31.5)	(31.3)	(25.1)	(22.4)	
(8) Volume after thinning.	203.66	210.00	224.42	206.97	257.67	267.89	
(9) Volume before thinning on October, 1926	426.34	446.36	497.21	437.87	547.09	515.79	age 23
(10) Volume removed by the thinning.	167.32	160.00	194.16	156.07	222.33	203.68	3rd thinning
(11) (%)	(39.2)	(35.8)	(39.1)	(35.6)	(40.6)	(39.5)	
(12) Volume after thinning.	259.02	286.36	303.02	281.80	324.76	312.11	
(13) Volume on Octber, 1930.	368.90	445.45	439.77	367.64	465.12	442.11	age 27
(14) Volume before thinning on November, 1933.	388.17	534.55	516.28	395.28	536.51	486.84	age 30
(15) Volume removed by the thinning.	123.54	107.27	162.91	108.76	167.33	92.11	4th thinning
(16) (%)	(31.8)	(20.1)	(31.6)	(27.5)	(31.2)	(18.9)	
(17) Volume after thinning.	264.63	427.27	353.37	286.52	369.18	394.74	

(18) Volume on July, 1942. (a)	359.88	660.00	482.79	353.02	533.02	543.16	age 37
(19) Sum of volume obtained from thinnings. (b)	448.54	450.00	488.14	376.29	477.80	373.16	
(20) Total yield during the perid from begining 1904 to1942, viz., (a) + (b)	808.41	110.00	970.93	728.31	1,010.82	916.32	

Table 25. (2). The growing course of volume per Hektar. (a) Pine (unit m^3)

	4.5△	4.5□	6.0△	6.0□	8·0△	8.0□	Ages of forst and the No of times of thinning
(1) Volume on March, 1915.	21.69	25.37	19.07	14.01	10.69	8.77	age 12
(2) Volume removed by thinning on March, 1918.	8.26	7.43	-	-	-	-	1st for 4.5△, □
(3) Volume before thinning on May, 1919.	50.29	56.03	53.27	42.24	44.01	39.30	age 15
(4) Volume removed by the thinning.	9.01	10.00	14.31	11.12	-	-	age 16
(5) (%)	(15.9)	(17.9)	(26.9)	(26.3)			2nd for 4.5△,□
(6) Volume after thinning.	42.28	46.03	38.96	31.12	44.01	39.30	1st for 6.0△,□
(7) Volume before thinning on October, 1921.	65.28	62.40	58.66	48.77	61.27	56.21	age 18
(8) Volume removd by the thinining.	22.51	21.89	19.42	13.24	27.13	24.35	3rd for 4.5△,□
(9) (%)	(34.5)	(35.1)	(33.1)	(27.1)	(44.3)	(43.3)	2nd for 6.0△,□
(10) Volume after thinniug.	42.77	40.51	39.24	35.53	34.14	31.86	1st for 8.0△,□
(11) Volume before thinning on October, 1926.	87.29	89.04	77.88	67.32	60.29	60.10	age 23
(12) Volume removed by the thinning.	23.43	26.32	-	-	-	-	4th for 4.5△,□
(13) (%)	(26.8)	(29.6)	-	-	-	-	
(14) Volume after thinning.	63.86	62.71	77.88	67.32	60.29	60.10	
(15) Volume before thinniug on October, 1930.	97.27	96.98	115.32	101.79	94.83	91.02	age 27
(16) Volume removed by the thinning.	-	-	35.70	31.65	-	-	3rd for 6.0△,□
(17) (%)	-	-	(31.0)	(31.1)	-	-	
(18) Volume after thinning.	97.27	96.98	79.62	70.14	94.83	91.06	
(19) Volume before thinning on March, 1933.	122.80	126.19	100.84	86.24	117.05	113.59	age 30

(20) Volume removed by the thinning.	-	-	-	-	29.86	21.67	2nd for 8.0△,□
(21) (%)	-	-	-	-	(25.5)	(19.1)	
(22) Volume after thinning.	122.80	126.19	100.84	86.24	87.19	91.92	
(23) Volume before thinning on May, 1943.	176.09	163.22	152.75	128.11	120.36	133.53	age 40
(24) Volume removed by the thinning.	25.75	23.55	28.51	20.86	8.87	18.02	5th for 4.5△,□
(25) (%)	(14.6)	(14.4)	(18.7)	(16.3)	(7.4)	(13.5)	4th for 6.0△,□
(26) Volume after thinning. (a)	150.34	139.67	124.24	107.25	111.49	115.51	3rd for 8.0△,□
(27) Sum of volume obtained from thinnings. (b)	87.96	89.20	97.94	76.88	65.86	64.05	
(28) Total yield during the period from begining 1904 to 1943, viz., (a) + (b)	238.30	228.87	222.18	184.13	177.35	179.56	

Table 25. (2). (b) Larch.

	4.5△	4.5□	6.0△	6.0□	8.0△	8.0□	Ages of forest and the No. of times of thinning
(1) Volume before thinning on April, 1914.	48.65	52.55	45.85	37.75	32.19	37.16	age 11
(2) Volume removed by the thinning.	10.46	12.37	7.87	4.80	0.52	0.06	1st thinning
(3) (%)	(21.5)	(23.6)	(17.2)	(12.7)	(1.6)	(0.0)	
(4) Volume after thinning.	38.19	40.18	37.98	32.95	31.67	37.16	
(5) Volume before thinning on August, 1919.	89.90	96.73	92.02	84.67	96.67	95.89	age 16
(6) Volume removed by the thinning.	33.33	38.36	28.95	26.51	24.25	21.47	2nd thinning
(7) (%)	(37.1)	(39.7)	(31.5)	(31.3)	(25.1)	(22.4)	
(8) Volume after thinning.	56.57	58.37	63.07	58.15	72.42	74.42	
(9) Volume before thinning on October, 1926.	118.43	124.00	139.74	123.01	153.76	143.26	age 23
(10) Volume removed by the thinning.	46.48	44.45	54.58	43.85	62.48	56.58	3rd thinning
(11) (%)	(39.2)	(35.8)	(39.1)	(35.6)	(40.6)	(39.5)	
(12) Volume after thinning.	71.95	79.55	85.16	79.17	91.28	86.68	
(13) Volume on October, 1930.	102.48	121.18	123.60	103.06	130.72	122.79	age 27

(14) Volume before thinning on November, 1933.	107.83	148.45	145.09	111.05	150.78	135.21	age 30
(15) Volume removed by the thinniug.	34.32	29.82	45.78	30.56	47.02	25.58	4th thinning
(16) (%)	(31.8)	(20.1)	(31.6)	(27.5)	(31.2)	(18.9)	
(17) Volume after thinning.	73.51	118.63	99.31	80.49	103.76	109.63	
(18) Volume on July, 1942. (a)	99.96	183.36	135.68	99.90	149.80	150.89	age 39
(19) Sum of volume obtained from thinnings. (b)	124.59	125.00	137.18	105.71	134.27	103.63	
(20) Total yield during the period from begining 1904 to 1942 viz., (a) + (b)	224.45	308.36	272.86	204.61	284.07	254.52	

Table 26. The volume of single tree on 1943 for pine aged 40, on 1942 for larch aged 39.

Pine (Pinus densiflora)	4.5 △	4.5 □	6.0 △	6.0 □	8.0 △	8.0 □
Volume on May, 1943 (before thinning).	176.41	163.48	152.54	127.23	120.43	133.35
Number of trees.	615	592	543	507	354	423
Volume of single tree.	0.287	0.276	0.280	0.251	0.340	0.315
Larch (Larix Kaempferi)	4.5△	4.5□	6.0△	6.0□	8.0△	8.0□
Volume on July, 1942.	100.39	179.36	135.22	98.98	149.28	154.87
Number of trees.	380	533	328	341	352	378
Volume of single tree.	0.264	0.337	0.412	0.290	0.424	0.410

Table 27. The moving courses of distribution of tree-numbers respecting to diameter with increase of ages of forest. (a) Pine.

	4.5△							4.5□							6.0△						
Age	12	16	18	23	27	30	40	12	16	18	23	27	30	40	12	16	18	23	27	30	40
Year / D(Sun)	1915	1919	1921	1926	1930	1933	1943	1915	1919	1921	1926	1930	1933	1943	1915	1919	1921	1926	1930	1933	1943
0.5	58							48							12	2					
1.0	273	1	1					184	10	1					119	22	2				
1.5	279	30	11					341	33	5					261	87	2				
2.0	377	93	27					383	101	27					309	177	30				
2.5	194	187	56	1				216	175	73	2				193	207	50	4	1		
3.0	62	203	124	5				74	183	118	4				72	191	95	5	2		
3.5	4	137	126	13	1			21	155	102	16	1			8	148	109	15	6	1	1
4.0	2	68	97	41	4	2			77	54	43	1	2	2	3	68	106	40	20	5	2
4.5		29	65	54	10	4	2		34	35	50	17	4	6		27	57	47	31	7	5
5.0		3	39	56	20	12	7		3	15	53	22	20	10		8	39	60	38	18	4
5.5		1	12	52	33	29	15		1	5	52	25	18	14		2	10	43	47	24	17
6.0			3	39	35	28	19		-	2	32	38	26	16			7	40	37	25	16
6.5			1	25	35	34	28		1		25	26	37	24				12	41	28	26
7.0				3	28	29	23		-		8	30	21	20				8	23	29	13
7.5				3	17	26	26		1		2	15	27	22				4	13	16	18
8.0					8	16	18					5	18	18				1	7	7	23
8.5					1	9	25					5	8	19					4	6	15
9.0					1	3	11					-	4	9					1	2	9
9.5						1	6					-	-	3					1	3	3
10.0							4					1	-	3						2	3
10.5							2						1	2							3
11.0							-							1							2
11.5							-							-							1
12.0							-							-							2
12.5							-							-							-
Sum	1349	752	562	292	193	193	186	1267	774	541	287	186	186	169	982	939	507	279	272	173	163
Something else		1	1	2	2	2	3				1	1		7							5
Total	1349	753	563	294	195	195	189	1267	774	541	288	187	186	176	982	939	507	279	272	173	168

6.0□								8.0△								8.0□							
12	16	18	23	27	30	40		12	16	18	23	27	30	40		12	16	18	23	27	30	40	Age
1915	1919	1921	1926	1930	1933	1943		1915	1919	1921	1926	1930	1933	1943		1915	1919	1921	1926	1930	1933	1943	Year / D(Sun)
17	1							11								14							0,5
104	16	2						53	4	2						56	3	12					1.0
242	59	10						132	12	12						133	17	23					1.5
238	127	23						137	30	32						163	37	36					2.0
147	182	50	1					115	83	68						97	63	55					2.5
53	158	91	7	4				47	89	72	1					39	105	66	2				3.0
6	127	74	17	5	2			12	111	77	13	5	2			5	117	75	9	3	2		3.5
	60	83	40	17	7	2		2	76	71	12	8	8	1			96	80	15	9	9		4.0
	25	60	48	30	13	4			61	53	29	10	7	1			40	75	30	17	9	4	4.5
	5	30	48	45	22	15			23	47	30	22	14	3			19	34	34	21	17	4	5.0
		13	44	44	24	11			-	27	29	24	21	5			4	22	35	27	24	9	5.5
		5	34	41	26	17			2	8	28	21	27	8				11	22	26	26	10	6.0
		2	9	31	27	22			1	3	20	23	17	12				3	21	27	28	20	6.5
			6	22	20	25				1	13	24	26	7				1	16	18	19	13	7.0
			1	10	13	12					6	11	15	11					5	12	11	12	7.5
			1	4	9	13					1	14	12	13					2	14	12	10	8.0
				4	2	18						8	9	11					1	12	12	12	8.5
				1	4	6						3	10	6						2	8	9	9.0
					1	4						2	4	3						3	7	4	9.5
						3							3	3						1	2	3	10.0
						2								2							2	3	10.5
						1								6								4	11.0
						-								6								4	11.5
						-								-								5	12.0
						-								-								1	12.5
807	760	443	256	258	170	155		509	492	473	182	175	175	98		507	504	493	193	192	189	127	Sum
			5			2						2		8								4	something else
807	760	443	261	258	170	157		509	492	473	182	177	175	106		507	504	493	193	192	189	131	Total

Notes : The unit of diameter is "Sun", $1^{Sun} = 1^{M}/33$. "Something else" includes trees having incomplete form of pole, e.g., trancated, damaged, forkshaped, etc.

Table 27. (b) Larch.

	4.5△						4.5□						6.0△					
Age	11	16	23	27	30	39	11	16	23	27	30	39	11	16	23	27	30	39
Year / D Sun	1914	1919	1926	1930	1933	1942	1914	1919	1926	1930	1933	1942	1914	1919	1926	1930	1933	1942
0.5	1						-						6					
1.0	48	6					5						15					
1.5	129	62					10	1					40	4				
2.0	173	68	1				26	3					69	16				
2.5	79	70	3				14	13					85	45	1			
3.0	14	37	13				3	5					47	37	1			
3.5		16	31	1	1	1		6	3				9	37	9			
4.0		3	23	7	8	-		5	4				2	32	14	2	2	
4.5		1	26	9	4	1		1	1	1				10	20	2	2	
5.0			15	13	13	1			4	-	1			3	17	5	1	
5.5			5	16	12	5			3	1	1	1			26	8	8	
6.0			1	5	12	6				4	1	-			4	18	9	
6.5			1	3	3	3				2	4	-			1	11	17	5
7.0				1	2	6					1	2			1	1	7	3
7.5				1		3						1				1	1	10
8.0						3						1				1	1	3
8.5						1						1					1	4
9.0						-						-						1
9.5						1						-						2
10.0						-						-						-
Total	444	263	119	56	55	31	58	34	15	8	8	6	273	184	94	49	49	28

6.0□						8.0△						8.0□						
11	16	23	27	30	39	11	16	23	27	30	39	11	16	23	27	30	39	Age
1914	1919	1926	1930	1933	1942	1914	1919	1926	1930	1933	1942	1914	1919	1926	1930	1933	1942	Year / D / Sun
3						1						-						0.5
22	2					12	6					-						1.0
35	7					17	4					5	1					1.5
100	12					37	11					5	4					2.0
72	39					48	25					7	4					2.5
30	51	5				49	24	2				9	5	1				3.0
5	39	14				11	29	3				8	2	2				3.5
1	28	14	3	3		-	35	14	2	1			9	-	1	1		4.0
	11	24	3	3	1	1	24	9	3	4			4	3	-	-		4.5
	3	21	12	7	3		5	27	2	1	1		5	2	-	-		5.0
	2	10	10	13	2		1	21	8	4	-			6	-	-		5.5
		6	10	7	5		1	12	12	10	1			4	4	3		6.0
		1	8	8	-			4	13	12	4			1	2	2		6.5
		2	1	3	6			1	6	12	4				2	2	2	7.0
			3	3	7				1	2	4				1	2	1	7.5
				3	2				2	1	5						2	8.0
					2					2	6						2	8.5
					2						2						-	9.0
					-						2						-	9.5
					-						1						-	10.0
268	194	97	50	50	30	176	165	93	49	49	30	34	34	19	10	10	7	Total

Table 28. The mean diameters (M.D), standard deviations (σD) , and coefficients of varation(c.v.)for each age of the forest.

	Year		4.5△	4.5□	6.0△	6.0□	8.0△	8.0□	Age
Pine (Pinus densiflora)	1915	M.D	1.72±0.01	1.83±0.01	1.92±0.01	1.86±0.01	1.98±0.01	1.90±0.02	12
		σ.D	0.59±0.01	0.66±0.01	0.66±0.01	0.60±0.01	0.64±0.01	0.62±0.01	
		c.v.D	34.3	36.1	34.4	32.3	32.3	32.6	
	1919	M.D	2.94±0.02	2.95±0.02	2.73±0.03	2.78±0.02	3.37±0.03	3.32±0.03	16
		σ.D	0.72±0.01	0.80±0.01	0.84±0.01	0.82±0.01	0.89±0.02	0.86±0.02	
		c.v.D	24.5	27.1	30.8	29.5	26.4	25.9	
	1921	M.D	3.54±0.03	3.55±0.03	3.61±0.03	3.53±0.03	3.72±0.03	3.57±0.04	18
		σ.D	0.89±0.02	0.91±0.02	0.90±0.02	0.96±0.02	1.10±0.02	1.18±0.03	
		c.v.D	25.1	25.6	24.9	27.2	29.6	33.1	
	1926	M.D	5.05±0.04	5.04±0.04	5.01±0.04	4.93±0.04	5.38±0.05	5.42±0.05	23
		σ.D	0.91±0.03	0.96±0.03	0.99±0.03	0.94±0.03	1.06±0.04	1.09±0.04	
		c.v.D	18.0	19.0	19.8	19.1	19.7	20.1	
	1930	M.D	6.16±0.05	6.15±0.05	5.71±0.05	5.62±0.05	6.22±0.07	6.22±0.07	27
		σ.D	0.99±0.03	1.06±0.04	1.18±0.03	1.15±0.03	1.32±0.05	1.39±0.05	
		c.v.D	16.1	17.2	20.7	20.5	21.2	22.3	
	1933	M.D	6.60±0.05	6.61±0.06	6.39±0.06	6.06±0.06	6.59±0.10	6.58±0.08	30
		σ.D	1.07±0.04	1.14±0.04	1.24±0.05	1.21±0.04	1.89±0.07	1.57±0.06	
		c.v.D	16.2	17.2	19.4	20.0	28.7	23.9	
	1943	M.D	7.27±0.06	7.08±0.07	7.23±0.08	6.98±0.08	7.90±0.12	7.74±0.12	40
		σ.D	1.29±0.06	1.41±0.05	1.59±0.06	1.44±0.06	1.82±0.09	1.96±0.08	
		c.v.D	17.7	19.9	22.0	20.6	23.0	25.3	

Larch (Larix Kaempferi)

1914	M.D	1.86±0.02	1.97±0.04	2.23±0.03	2.12±0.02	2.40±0.04	2.68±0.08	11
	σ.D	0.49±0.01	0.49±0.03	0.66±0.02	0.60±0.02	0.69±0.02	0.67±0.05	
	c.v.D	26.3	24.9	29.6	28.3	28.8	25.0	
1019	M.D	2.76±0.03	2.96±0.08	3.14±0.04	3.15±0.04	3.36±0.05	3.46±0.12	16
	σ.D	0.66±0.02	0.71±0.06	0.77±0.03	0.81±0.03	0.99±0.04	1.02±0.08	
	c.v.D	23.9	24.0	24.5	25.7	29.5	29.5	
1926	M.D	4.04±0.05	4.50±0.13	4.77±0.06	4.58±0.06	5.04±0.06	5.11±0.15	23
	σ.D	0.79±0.03	0.73±0.09	0.81±0.04	0.87±0.04	0.81±0.04	0.94±0.11	
	c.v.D	19.6	16.2	17.0	19.0	16.1	18.4	
1930	M.D	5.16±0.07	5.87±0.14	5.88±0.07	5.64±0.08	6.07±0.07	6.25±0.19	27
	σ.D	0.80±0.05	0.59±0.10	0.77±0.05	0.85±0.06	0.88±0.06	0.90±0.14	
	c.v.D	15.5	10.1	13.1	15.1	14.5	14.4	
1933	M.D	5.27±0.08	6.19±0.15	6.10±0.09	5.66±0.09	6.35±0.09	6.40±0.21	30
	σ.D	0.82±0.05	0.61±0.10	0.89±0.06	0.91±0.06	0.96±0.07	0.97±0.15	
	c.v.D	15.6	9.9	14.6	16.1	15.1	15.2	
1942	M.D	6.53±0.15	7.25±0.26	7.66±0.11	6.87±0.15	7.77±0.14	7.79±0.17	39
	σ.D	1.22±0.10	0.95±0.08	0.85±0.08	1.22±0.11	1.12±0.10	0.66±0.12	
	c.v.D	18.7	13.1	11.1	17.8	14.4	8.5	

Table 29. The index numbers and the mean diameters for each age of the forest. (Pine, Pinus densiflora)

Rank	Sample plot	4.5△	4.5□	6.0△	6.0□	8.0△	8.0□
1	Tree density (per Hek.)	6.393	5.628	3.495	3.023	1.847	1.744
2	Index number	100	88	55	47	29	27
3	1915 Age 12	1.72	1.83	1.92	1.86	1.98	1.90
4	1919 〃 16	2.94	2.95	2.73	2.78	3.37	3.32
5	1921 〃 18	3.54	3.55	3.61	3.53	3.72	3.57
6	1926 〃 23	5.05	5.04	5.01	4.93	5.38	5.42
7	1930 〃 27	6.16	6.15	5.71	5.62	6.22	6.22
8	1933 〃 30	6.60	6.61	6.39	6.06	6.59	6.58
9	1943 〃 40	7.27	7.08	7.23	6.98	7.90	7.74

Table 30. An illustration of computation of correlation coefficient (r) betwen the tree density and mean diameter. (Pine)

Sample plot	Tree density	Index number A	A-a x	x^2	MD	MD-b y	y^2	xy
4.5△	6,393	100	+42.3	1,789.29	1.72	−0.148	0.021904	−6.2604
4.5□	5,628	88	+30.3	918.09	1.83	−0.038	0.001444	−1.1514
6.0△	3,495	55	− 2.7	7.29	1.92	+0.052	0.002704	−0.1404
6.0□	3,023	47	−10.7	114.49	1.86	−0.008	0.000064	+0.0856
8.0△	1,847	29	−28.7	823.69	1.98	+0.112	0.012544	−3.2144
8.0□	1,744	27	−30.7	992.49	1.90	+0.032	0.001024	−0.9824

$\Sigma x^2 = 4,595.34$ $\Sigma y^2 = 0.039684$ $\Sigma xy = -11.6534$

Age=12 $n=6$ $\sigma_1 = \sqrt{\frac{4,595.34}{6}} = 27.67$ $\sigma_2 = \sqrt{\frac{0.039684}{6}} = 0,081$

$$r = \frac{\Sigma xy}{n \times \sigma_1 \times \sigma_2} = \frac{-11.6634}{6 \times 27.67 \times 0.081} = -0.87 \pm 0.07 \quad \text{P.E of } r = 0.6745 \times \frac{1-0.87^2}{\sqrt{6}} = 0.07$$

$$a = \frac{\Sigma A}{6} = 57.7 \qquad b = \frac{\Sigma MD}{6} = 1.868$$

Table 31. The correlation coefficients between tree-density and mean diameter. (Pine)

Age	12	16	18	23	27	30	40
Year	1915	1919	1921	1926	1930	1933	1943
r	-0.87±0.07	-0.53±0.20	-0.54±0.20	-0.63±0.17	+0.07±0.27	+0.38±0.24	-0.62±0.17

Table 32. The correlation coefficients between tree-density and mean diameter. (Larch)

Age	11	16	23	27	30	39
Year	1914	1919	1926	1930	1933	1942
r	−0.92±0.04	−0.97±0.02	−0.91±0.05	−0.77±0.11	−0.57±0.19	−0.59±0.18

Table 33. The index numbers and the mean diameters for each age of the forest. (Larch, Larix Kaempferi)

Rank	Sample plot	4.5△	4.5□	6.0△	6.0□	8.0△	8.0□
1	Tree density (per Hek)	6,878	6,273	3,835	3,227	2,200	1,895
2	Index number	100	91	56	47	32	28
3	1914 Age 11	1.86	1.97	2.23	2.12	2.40	2.68
4	1919 〃 16	2.76	2.96	3.14	3.15	3.36	3.46
5	1926 〃 23	4.04	4.50	4.77	4.58	5.04	5.11
6	1930 〃 27	5.16	5.87	5.88	5.64	6.07	6.25
7	1933 〃 30	5.27	6.19	6.10	5.66	6.35	6.40
8	1942 〃 39	6.53	7.25	7.66	6.87	7.77	7.79

Table 34. The moving courses of distribution of tree-numbers respecting to height with increase of ages of forest. (a) Pine.

	4.5△							4.5□							6.0△						
Age	12	16	18	23	27	30	40	12	16	18	23	27	30	40	12	16	18	23	27	30	40
Year / H (Shaku)	1915	1919	1921	1926	1930	1933	1943	1915	1919	1921	1926	1930	1933	1943	1915	1919	1921	1926	1930	1933	1943
4	2							5							-						
5	8							19							2						
6	12							20							8						
7	44							39							41						
8	71							40							47	1					
9	71							43	1						27	2					
10	330	1						121	2						163	8					
11	185	1						110	1						142	7					
12	149	3	1					104	5	1					93	14					
13	226	3	-					231	6	-					170	30	1				
14	188	15	1					217	15	1					124	34	2				
15	60	29	3					106	25	1					63	59	6				
16	78	30	3					138	34	4					86	81	5				
17	17	51	4					48	47	2					15	102	12				
18	7	91	10					19	83	6					1	128	8				
19	1	126	16					7	118	14						136	13				
20		141	25						117	23						158	38				
21		99	38						103	25	1					87	59	1			
22		78	60						110	42	-					47	72	1			
23		49	83	1					54	65	1					29	73	4			
24		20	108	4					27	89	1					15	92	5			
25		13	90	2					16	96	2					1	61	5			
26		2	69	3					10	83	2						36	10	4		
27			35	9						56	7						25	19	2	1	
28			13	17	1					22	12						4	25	6	-	
29			3	32	1					9	21							87	2	1	
30				50	-					1	28	1						36	10	3	
31				42	4					1	31	2						43	12	-	
32				39	8	1					59	6	1					32	20	5	
33				35	17	2					36	12	-					35	24	2	
34				31	19	8					34	12	4					11	27	6	1
35				17	24	8					22	17	2					10	32	9	-

36				7	27	10						12	21	6					5	27	9	-
37				1	15	12						13	18	11						39	12	1
38				2	27	16	1					4	35	11						31	20	-
39					19	14	-					1	26	11						21	17	1
40					9	20	3						7	18						5	22	1
41					13	25	2						11	19	1					7	19	5
42					6	25	2						5	31	4					2	19	2
43					2	18	6						9	20	1					-	13	5
44					1	8	1						3	20	3					1	5	6
45						17	10						-	11	4						4	8
46						2	6						-	5	11						3	11
47						7	8						-	5	7						1	13
48							13						-	4	6						1	13
49							13						1	6	14						-	11
50							17							-	10						1	12
51							14							-	19							18
52							22							-	17							13
53							14							1	13							11
54							14								9							9
55							9								14							8
56							7								9							7
57							8								12							2
58							10								7							-
59							3								2							2
60							2								1							1
61							1								2							2
62							-								1							-
63							-								-							-
64							-								1							-
65							-								1							-
66							-								-							-
67							-								-							-
Sum	1349	752	562	292	193	193	186	1267	774	541	287	186	186	169	982	939	507	279	272	173	163
Something else			1	2	2	2	3				1	1		7							5
Total	1349	752	563	294	195	195	189	1267	774	541	288	187	186	176	982	939	507	279	272	173	168

Table 34. (Continued)

6.0□							8.0△							8.0□							
12	16	18	23	27	30	40	12	16	18	23	27	30	40	12	16	18	23	27	30	40	Age
1915	1919	1921	1926	1930	1933	1943	1915	1919	1921	1926	1930	1933	1943	1915	1919	1921	1926	1930	1933	1943	Year / H(Shaku)
3							4							–							4
2							2							8							5
12							5							2							6
41							16							19	1						7
56							38	1						34	–						8
36	1						16	1						32	3						9
139	7						96	5	1					130	2	1					10
156	12						94	4	–					103	5	3					11
89	16						40	7	1					47	8	2					12
128	26	4					80	9	–					94	9	2					13
88	44	2					48	7	3					33	18	4					14
23	64	4					23	18	2					5	34	8					15
34	85	9					37	21	4					10	46	8					16
	115	15					7	49	7						54	18					17
	106	28					3	66	13						88	20					18
	116	34						55	25						89	39	1				19
	72	39						83	31	1					87	51	–				20
	57	67	1					53	32	1					36	50	1				21
	24	75	–			2		51	45	1					14	72	–	2	1		22
	8	51	5			–		32	55	1					7	67	4	1	–		23
	7	51	5	2		–		19	61	5					2	63	11	–	–		24
		24	12	–	1			10	66	4					1	55	8	2	2		25
		30	20	2	2			1	61	6	1					23	13	3	–		26
		10	30	5	–				36	7	3	1				5	28	5	2		27
			39	11	–				21	18	2	–				2	23	9	1		28
			30	6	1				8	10	3	1					21	2	1		29
			37	20	2				1	21	10	1					26	20	5		30
			28	25	5					16	13	5					22	18	6		31
			21	24	11					18	11	6					12	20	10		32
			14	35	6					26	12	1					10	18	5		33
			10	30	14	1				19	13	7					5	21	13		34
			3	20	3	1				13	12	10	1				5	17	19		35

				22	24	–				8	11	7	–				2	14	8		36
				28	17	3				–	19	12	–				1	12	23	1	37
				11	21	3				2	14	11	–					13	21	1	38
				6	20	5				3	11	14	–					6	18	5	39
				5	13	1				1	12	13	1					5	12	3	40
				4	5	4				–	7	17	–					3	11	9	41
				–	10	3				2	7	12	–					1	11	3	42
				1	4	14					4	11	4						5	11	43
				1	3	6					1	11	2						7	5	44
					4	11					2	9	5						3	5	45
					2	4					3	8	5						4	5	46
						15					2	5	6						1	12	47
						9					–	3	4							8	48
						12					2	3	11							15	49
						16						1	5							8	50
						11						3	7							7	51
						10						2	10							4	52
						9						1	4							9	53
						5							6							4	54
						5							4							1	55
						1							5							2	56
						2							5							4	57
						1							2							2	58
						1							3							–	59
						2							3							1	60
						–							1							2	61
						–							–							–	62
						–							–							–	63
						–							2							–	64
						–							–							–	65
						–							1							–	66
						–							1							–	67
807	760	443	256	258	170	155	509	492	473	182	175	175	98	507	504	493	193	192	189	127	Sum
			5			2					2		8							4	Something else
807	760	443	261	258	170	157	509	492	473	182	177	175	106	507	504	493	193	192	189	131	Total

Notes : The unit of height is "Shaku". 1Shaku = 10Sun = $^1/_{3.3}$ metre. "something else" includes the trees having incomplete form of trunk, e.g. trancated, damaged, fork shaped, etc.

Table 34. (b) Larch.

	4.5△						4.5□						6.0△						6.0□						8.0△						8.0□						
Age	11	16	23	27	30	39	11	16	23	27	30	39	11	16	23	27	30	39	11	16	23	27	30	39	11	16	23	27	30	39	11	16	23	27	30	39	Age
Year / H (Shaku)	1914	1919	1926	1930	1933	1942	1914	1919	1926	1930	1933	1942	1914	1919	1926	1930	1933	1942	1914	1919	1926	1930	1933	1942	1914	1919	1926	1930	1933	1942	1914	1919	1926	1930	1933	1942	year / H (Shaku)
7	–						–						2						–						–						–						7
8	–						1						2						2						1						–						8
9	–						–						2						1						–						–						9
10	2						–						2						3						2						–						10
11	1						–						1						1						6	1					–						11
12	5						1						4						6						1	1					1						12
13	11	1					–						4	1					–						8	1					1						13
14	20	–					2						9	–					11						3	1					–	1					14
15	23	–					4						9	–					7	4					1	–					1	–					15
16	25	3					1						8	–					9	–					7	–					–	1					16
17	35	2					3						17	–					13	2					3	–					1	–					17
18	60	6					12						14	–					17	2					16	3					1	–					18
19	49	3					8	1					19	–					29	2					15	1					3	–					19
20	59	9					9	1					24	2					46	1					19	2					4	1					20
21	41	5					6	–					11	1					21	–					13	2					–	1					21
22	46	7					6	–					30	1					32	6					20	2					4	–					22
23	29	11					1	2					29	5					19	7					21	2					1	–					23
24	14	16					3	1					16	2					12	4					12	–					–	1					24
25	18	13	1				1	2					37	4					18	7					18	4					6	4					25
26	3	19	–					6					19	7					10	11					5	3					6	1					26
27	1	26	–					1					9	5	1				4	11	2				1	4					3	–					27
28	2	18	1					5					3	8	–				4	16	–				3	6					1	2					28
29		20	1					2					2	8	1				2	10	–				1	9					1	–					29
30		21	1					2						8	–				–	15	1					11						1					30
31		17	1					6						8	–				1	15	–					20						2					31
32		15	2					–						16	–					11	–					7						1					32
33		8	2					1						13	–					15	–					13						1					33
34		14	1					2	2					9	–					18	1					7	1					1	1					34
35		7	6	1	1			1	3					12	1					7	3					10	1					1	1					35
36		10	6	–	–			1	1					13	–					7	3					16	1					2						36
37		4	4	–	–				–					17	3					10	1					4	–					4	–					37
38		5	5	1	1				1					14	2					5	4					11	2					3	–					38
39		–	12	–	2				1	2				4	–	1	1			1	7	1	1			7	1					2	–					39

40		1	7	3	2				2	–				9	2	–	–			1	5	–	–			5	2					2	–				40
41		1	9	2	1	1			2	–	1			10	1	–	–			1	3	2	1			5	–	2				2	–	1			41
42		1	11	2	1	–			–	1	1			1	6	–	–			1	6	1	–			7	3	–					1	–			42
43			14	3	1	–			–	1	–			3	5	–	–			2	6	2	2	1			7	2	2				–	–			43
44			8	1	–	–			2	–	–				3	1	1			1	7	2	4	–			5	–	–				2	–	1		44
45			5	4	6	–			1	–	–				3	1	–			1	8	1	1	1			7	–	1				1	1	–		45
46			4	3	4	–				–	–				10	–	–				10	7	1	1			11	–	1				3	–	–		46
47			5	4	2	1				2	–				11	1	1				5	–	1	1			5	2	–				2	–	–		47
48			4	5	4	–				–	1				3	–	–				5	5	3	1			7	1	–				1	–	1		48
49			4	2	5	1				2	1	1			10	2	2				5	4	6	–			9	3	2				1	–	–		49
50			3	2	1	–					2	–			9	2	1				6	1	–	–			11	–	1	1			2	–	–		50
51			2	8	2	4					–	–			11	1	–				1	4	3	1			5	2	1	–			1	2	–		51
52				2	3	1					2	–			8	1	2				1	6	2	–			10	3	1	–			2	–	–		52
53				2	4	4						–			2	4	2				4	6	4	1			1	2	3	–			1	–	–		53
54				4	3	4						–			1	6	–				3	1	4	2			1	5	5	–				1	3		54
55				4	4	–						–			1	7	4					2	5	2			2	2	4	–				1	–		55
56				1	1	2						–				4	4					1	2	1			1	5	3	–				2	–		56
57				2	2	1						–				6	2	1				1	3	3				9	–	1				1	–		57
58					–	2						2				5	5	4				1	–	4				4	2	1				–	1		58
59					2	1						1				4	5	–				2	–	2				4	2	1				1	2	1	59
60					–	2						–				–	5	1					1	1				2	3	2					1	1	60
61					–	–						–				2	1	–					2	3				–	6	1					1	–	61
62					1	–						1				1	3	–					4	1				1	3	–						1	62
63					1	3						–					–	5						–					3	1						–	63
64					–	3						–					6	3						1					4	1						2	64
65					1	–						1					1	1						2					2	1						–	65
66						–						–					2	1						1						3						–	66
67						1						–					1	4						–						5						–	67
68						–						–						2						–						3						2	68
69						–						–						1						–						3						–	69
70						–						–						1						–						3						–	70
71						–						–						2						–						–						–	71
72						–						–						–						–						–						–	72
73						–						–						2						–						2						–	73
74						–						–						–						–						–						–	74
75						–						–						–						–						–						–	75
76						–						–						–						–						–						–	76
77						–						–						–						–						1						–	77
Total	444	263	119	56	55	31	58	34	15	8	8	6	273	184	94	49	49	28	268	194	97	50	50	30	176	165	93	49	49	30	34	34	19	10	10	7	Total

Table 35. The mean heights (M.H) standard deviations (σH), and coefficients of variation (c.v) for each age of the forest.

	Year		4.5△	4.5□	6.0△	6.0□	8.0△	8.0□	Age
Pine (Pinus densiflora)	1915	M.H	11.79±0.05	12.56±0.05	12.03±0.05	11.29±0.06	11.61±0.08	10.99±0.06	12
		σH	2.49±0.03	2.87±0.04	2.53±0.04	2.36±0.04	2.60±0.05	2.09±0.04	
		c.v.H	21.1	22.9	21.0	20.9	22.4	19.0	
	1919	M.H	19.57±0.06	19.79±0.07	18.20±0.06	17.63±0.07	19.20±0.09	17.96±0.08	16
		σH	2.49±0.04	2.73±0.05	2.82±0.04	2.75±0.05	3.06±0.07	2.50±0.05	
		c.v.H	12.7	13.8	15.5	15.6	15.9	13.9	
	1921	M.H	23.55±0.07	24.14±0.08	22.73±0.08	21.61±0.09	23.37±0.10	21.65±0.09	18
		σH	2.51±0.05	2.60±0.05	2.63±0.06	2.79±0.06	3.10±0.07	3.02±0.06	
		c.v.H	10.7	10.8	11.6	12.9	13.3	13.9	
	1926	M.H	31.22±0.10	32.09±0.11	30.19±0.11	29.07±0.11	31.27±0.18	28.88±0.15	23
		σH	2.55±0.07	2.78±0.08	2.81±0.08	2.70±0.08	3.60±0.13	3.06±0.11	
		c.v.H	8.2	8.7	9.3	9.3	11.5	10.6	
	1930	M.H	36.54±0.14	37.41±0.15	35.12±0.13	33.59±0.14	36.11±0.24	33.24±0.18	27
		σH	2.95±0.10	3.02±0.11	3.27±0.09	3.41±0.10	4.62±0.17	3.78±0.13	
		c.v.H	8.1	8.1	9.3	10.2	12.8	11.4	
	1933	M.H	40.31±0.17	41.62±0.05	39.20±0.19	36.99±0.22	40.29±0.26	37.21±0.22	30
		σH	3.47±0.12	3.93±0.03	3.72±0.14	4.18±0.15	5.04±0.18	4.42±0.15	
		c.v.H	8.6	9.4	9.5	11.3	12.5	11.9	
	1943	M.H	50.95±0.23	51.81±0.23	49.49±0.25	47.74±0.28	51.49±0.38	47.77±0.32	40
		σH	4.58±0.16	4.52±0.17	4.70±0.18	5.15±0.20	5.62±0.27	5.27±0.22	
		c.v.H	9.0	8.7	9.5	10.8	10.9	11.0	

1914	M.H	19.22±0.11	18.98±0.27	20.80±0.18	20.21±0.16	20.39±0.21	22.56±0.49	11
	σH	3.34±0.08	3.03±0.19	4.44±0.13	3.91±0.19	4.15±0.15	4.24±0.35	
	c.v.H	17.4	16.0	21.3	19.3	20.4	18.8	
1919	M.H	28.06±0.21	28.18±0.46	33.07±0.27	30.03±0.27	32.20±0.33	31.68±0.85	16
	σH	5.16±0.15	3.94±0.32	5.40±0.19	5.60±0.19	6.29±0.23	7.31±0.60	
	c.v.H	18.4	14.0	16.3	18.6	19.5	23.1	
1926	M.H	41.08±0.35	38.73±0.64	46.66±0.35	43.82±0.38	47.07±0.31	46.87±0.78	23
	σH	5.60±0.25	3.68±0.45	5.07±0.25	5.62±0.27	4.38±0.22	5.03±0.55	
	c.v.H	13.6	9.5	10.9	12.8	9.3	10.7	
1930	M.H	48.21±0.47	44.38±0.93	54.55±0.43	49.54±0.45	53.96±0.48	52.50±1.15	27
	σH	5.21±0.33	3.90±0.66	4.42±0.32	4.75±0.32	5.00±0.35	5.37±0.81	
	c.v.H	10.8	8.8	8.1	9.6	9.3	10.2	
1933	M.H	49.50±0.58	48.00±0.95	57.57±0.56	51.82±0.56	56.86±0.56	55.10±1.12	30
	σH	6.42±0.41	3.97±0.67	5.81±0.40	5.86±0.40	5.79±0.39	5.24±0.39	
	c.v.H	13.0	8.3	10.1	11.3	10.2	9.5	
1942	M.H	55.90±0.70	58.50±1.35	64.93±0.58	56.43±0.73	65.80±0.66	63.57±0.85	39
	σH	5.77±0.49	4.92±0.96	4.57±0.41	5.95±0.52	5.39±0.47	3.34±0.60	
	c.v.H	10.3	8.4	7.0	10.5	8.2	5.3	

Table 36. The tree-density of plantation per "Hektar", index number for the 100 of 4.5△ of each tree-density, and the mean heights of each age of the forest.

	No. of Rank	Sample Plot	4.5△	4.5□	6.0△	6.0□	8.0△	8.0□
Pine (Pinus densiflora)	1	Tree-density of Plantation	6,393	5,628	3,495	3,023	1,847	1.744
	2	Index number for the 100 of 4.5△	100	88	55	47	29	27
	3	1915 age (12)	11.79	12.56	12.03	11.29	11.61	10.99
	4	1919 (16)	19.57	19.79	18.20	17.63	19.20	17.96
	5	1921 (18)	23.55	24.14	22.73	21.61	23.37	21.65
	6	1926 (23)	31.22	32.09	30.19	29.07	31.27	28.88
	7	1930 (27)	36.54	37.41	35.12	33.59	36.11	33.24
	8	1933 (30)	40.31	41.62	39.20	36.99	40.29	37.21
	9	1943 (40)	50.95	51.81	49.49	47.74	51.49	47.77
Larch (Larix Kaempferi)	1	Tree-density of Plantation	6,878	6,273	3,835	3,227	2,200	1,895
	2	Index number for the 100 of 4.5△	100	91	56	47	32	28
	3	1914 (11)	19.22	18.98	20.80	20.21	20.39	22.56
	4	1919 (16)	28.06	28.18	33.07	30.03	32.20	31.68
	5	1926 (23)	41.08	38.73	46.66	43.82	47.07	46.87
	6	1930 (27)	48.21	44.38	54.55	49.54	53.96	52.50
	7	1933 (30)	49.50	48.00	57.57	51.82	56.86	55.10
	8	1942 (39)	55.90	58.50	64.93	56.43	65.80	63.57

Notes : The unit of height is "Shaku"

1Shaku = $^{10}/_{33}$ metre.

Table 37. The correlation coefficients (r) between the tree-density and the mean height of forest for each age.

Pine	Age	12	16	18	23	27	30	40
	Year	1915	1919	1921	1926	1930	1933	1943
	r	+0.69±0.14	+0.67±0.15	+0.66±0.16	+0.62±0.17	+0.46±0.22	+0.90±0.05	+0.53±0.19
Larch	Age	11	16	–	23	27	30	39
	Year	1914	1919	–	1926	1930	1933	1942
	r	−0.82±0.09	−0.82±0.09	–	−0.88±0.06	−0.83±0.09	−0.79±0.10	−0.68±0.15

Table 38. The mean heights of trees with respect to diameters in each plot for each age of the forest.

(a) Pine (Pinus densiflora)

Year	D (Sun) / Plot	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10.0	10.5	11.0	11.5	12.0	12.5	Age
1915	4.5△	7.7	9.6	11.4	12.7	13.9	15 0	15.3	16.0																		
	4.5□	7.3	9.7	11.4	13.5	15.3	15.7	15.5	–																		
	6.0△	7.3	8.9	10.7	12.3	13.8	15.2	15.0	15.3																		
	6.0□	6.4	8 6	10.3	12.0	12.9	14.5	15.5	–																		12
	8.0△	6.5	9.1	10.2	11.5	13.5	14.5	15.3	15.0																		
	8.0□	6.1	8.5	10.1	11.4	12.7	12.9	16.6	–																		
	No.	1	2	3	4	5	6	7																			
1919	4.5△	–	12.0	15.4	17.2	19.0	20.0	20.8	21.5	21.9	21.7	20.0	–	–	–	–											
	4.5□	–	13.1	14.6	17.6	19.3	20.3	20.7	22.3	22.6	23.7	22.0	–	19.0	–	23.0											
	6.0△	10.0	11.8	14.6	16.7	18.1	19.2	20.1	20.8	21.5	21.3	22.0	–	–	–	–											
	6.0□	9.0	11.9	13.4	16.0	17.1	18.1	19.0	20.3	21.2	20.6	–	–	–	–	–											16
	8.0△	–	10.5	13.1	14.5	17.5	18.9	19.8	21.2	21.5	22.1	–	23.5	21.0	–	–											
	8.0□	–	10.7	11.3	14.9	17.0	17.3	18.8	19.5	20.0	20.3	22.3	–	–	–	–											
	No.		8	9	10	11	12	13	14	15	16																
1921	4.5△		12.0	16.0	20.1	21.8	23.1	23.7	24.5	25.0	25.6	25.6	27.7	26.0	–												
	4.5□		16.0	16.0	20.0	22.4	23.5	24.5	25.1	26.0	25.9	26.4	26.0	28.0	–												
	6.0△		14.5	16.5	18.5	20.3	22.0	22.7	23.8	24.2	25.4	25.3	25.3	–	–												
	6.0□		14.5	14.7	18.1	19.4	20.9	21.7	22.7	23.6	24.0	23.8	24.6	26.0	–												18
	8.0△		17.0	16.7	19.4	21.7	22.4	23.5	24.8	25.1	25.6	26.4	25.8	26.0	27.0												
	8.0□		14.2	16.1	18.8	19.8	20.8	22.0	22.8	23.6	24.0	24.4	25.2	26.3	27.0												
	No.		17	18	19	20	21	22	23	24	25	26	27														

1926	4.5△	24.0	26.4	29.4	29.5	30.7	31.7	31.8	32.3	32.9	32.7	34.3	–	–											23
	4.5□	22.5	26.5	29.0	31.2	31.5	31.8	32.9	33.7	33.8	35.3	37.5	–	–											
	6.0△	24.5	25.2	27.1	28.5	29.5	30.4	31.2	32.0	32.7	32.6	33.5	35.0	–											
	6.0□	28.0	24.1	26.6	27.6	28.4	29.5	29.5	30.8	32.3	30.8	30.0	33.0	–											
	8.0△	–	24.0	27.5	28.1	29.5	31.0	32.0	32.7	33.4	34.2	33.2	34.0	–											
	8.0□	–	24.0	24.0	25.7	27.9	28.0	29.7	29.8	31.6	31.1	32.6	32.7	29.0											
	No.		28	29	30	31	32	33	34	35	36	37													
1930	4.5△	–	–	32.0	33.8	35.2	34.2	35.7	36.0	37.3	38.1	38.2	38.4	44.0	39.0	–	–								27
	4.5□	–	–	31.0	33.0	35.2	35.5	36.6	36.8	38.0	38.8	40.6	38.8	40.2	–	–	49.0								
	6.0△	28.0	29.0	28.2	32.4	33.3	34.2	35.0	36.1	36.0	37.3	38.2	39.3	40.0	37.0	42.0	–								
	6.0□	–	26.5	29.4	30.6	31.5	32.7	33.8	34.2	35.1	36.7	36.2	38.0	36.5	40.0	–	–								
	8.0△	–	–	29.4	31.9	30.7	31.9	34.0	35.7	37.7	37.3	39.0	41.1	41.5	42.0	39.5	–								
	8.0□	–	–	27.0	27.7	29.6	31.4	32.4	33.6	33.7	35.2	34.4	36.6	36.7	39.5	37.5	39.0								
	No.			38	39	40	41	42	43	44	45	46	47	48											
1933	4.5△			–	35.5	37.5	28.3	38.7	40.0	39.9	40.8	41.9	42.5	42.8	43.3	46.0	–	–	–	–	–				30
	4.5□			–	36.5	36.3	39.5	39.9	40.3	41.6	41.9	43.1	44.9	44.4	44.7	–	–	53.0	–	–	–				
	6.0△			30.0	34.4	35.1	36.7	37.5	37.8	40.2	41.1	41.2	42.1	43.7	42.0	45.7	37.0	–	–	–	–				
	6.0□			28.0	27.7	32.5	35.5	36.1	38.2	38.1	39.3	39.6	41.3	43.5	39.0	42.0	–	–	–	–	–				
	8.0△			33.0	33.7	32.6	36.9	37.7	39.3	41.6	41.4	42.3	43.6	45.7	44.5	47.0	43.0	–	–	–	–				
	8.0□			29.0	30.4	33.6	33.6	35.1	36.8	37.6	38.7	38.7	38.1	42.1	41.6	42.1	43.0	45.0	–	–	41.0				
	No.				49	50	51	52	53	54	55	56	57	58	59										
1943	4.5△			–	–	47.5	47.1	46.3	47.8	49.0	50.4	51.8	52.7	53.9	54.5	55.8	56.0	57.5	–	–	–	–			40
	4.5□			–	46.0	45.5	47.1	48.9	48.8	51.3	52.2	52.0	53.7	55.5	54.9	57.3	57.7	57.0	62.0	–	–	–			
	6.0△			44.0	41.0	42.8	42.8	45.9	47.6	47.6	50.2	50.4	51.5	51.8	53.7	53.3	54.7	56.7	56.0	59.0	54.5	–			
	6.0□			–	35.5	40.0	41.5	44.1	46.5	47.0	48.6	49.8	49.7	52.8	50.7	49.5	52.7	55.5	55.0	–	–	–			
	8.0△			–	40.0	49.0	43.0	46.0	46.0	49.0	52.6	51.5	51.5	53.9	49.3	58.7	55.0	60.5	57.8	56.8	–	–			
	8.0□			–	–	40.3	41.0	43.9	45.9	45.6	45.2	46.7	48.0	50.7	49.0	54.0	50.3	53.0	57.5	54.8	54.2	53.0			
	No.					60	61	62	63	64	65	66	67	68	69	70	71	72							

Table 38. (b) Larch (Larix Kaempferi).

Year	Plot \ D(Sun)	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10.0	Age
1914	4.5 △	14.0	14.5	17.6	20.1	22.3	23.8	–	–	–												
	4.5 □	–	12.6	17.6	18.4	21.0	23.3	–	–	–												
	6.0 △	8.5	13.1	16.5	20.0	22.6	25.1	25.9	24.0	–												
	6.0 □	8.7	13.3	16.8	20.0	22.8	24.0	27.6	28.0	–												11
	8.0 △	11.0	12.0	16.4	18.7	21.3	23.5	24.4	–	28.0												
	8.0 □	–	–	15.4	19.4	21.4	25.1	26.9	–	–												
	No.			1	2	3	4															
1919	4.5 △		–	19.0	24.0	26.1	30.1	32.5	35.1	39.7	42.0	–	–									
	4.5 □		–	19.0	24.0	26.1	30.0	30.3	32.8	34.0	–	–	–									
	6.0 △		–	20.3	25.3	29.9	32.9	36.0	37.2	39.2	43.0	–	–									
	6.0 □		15.0	17.9	23.0	26.3	28.4	32.6	35.3	37.7	37.7	42.5	–									16
	8.0 △		14.3	19.3	24.2	28.9	31.8	34.0	35.9	36.4	39.8	40.0	42.0									
	8.0 □		–	16.0	24.3	28.0	32.0	36.7	36.8	39.6	–	–	–									
	No.			5	6	7	8	9	10	11												
1926	4.5 △				25.0	31.7	36.2	38.5	40.9	43.7	46.2	47.8	48.0	50.0	–							
	4.5 □				–	–	–	34.3	37.0	35.0	41.3	43.3	–	–	–							
	6.0 △				–	29.0	27.0	39.3	43.3	47.8	48.0	49.5	51.8	51.0	52.0							
	6.0 □				–	–	32.8	37.4	41.4	43.9	47.1	49.2	50.8	50.0	51.5							23
	8.0 △				–	–	37.5	35.7	43.1	44.9	47.4	49.9	50.5	51.5	49.0							
	8.0 □				–	–	34.0	38.5	–	46.0	45.5	47.2	51.3	53.0	–							
	No.							12		13	14	15										

1930	4.5 △	38.0	41.3	44.0	47.7	50.8	54.0	55.3	55.0	53.0	–								
	4.5 □	–	–	39.0	–	39.0	45.3	48.0	–	–	–								
	6.0 △	–	44.0	44.5	53.6	53.6	55.2	56.5	62.0	61.0	61.0								
	6.0 □	–	41.0	43.7	47.2	49.1	51.2	53.7	53.0	55.7	–								27
	8.0 △	–	41.0	44.3	48.0	53.9	54.4	55.8	58.2	60.0	57.0								
	8.0 □	–	41.0	–	–	–	50.3	56.0	57.0	57.0	–								
	No.						16	17											
1933	4.5 △	40.0	40.5	45.0	48.3	51.3	54.1	59.3	53.5	–	–	–							
	4.5 □	–	–	–	41.0	42.0	48.0	50.3	52.0	–	–	–							
	6.0 △	–	44.0	45.5	50.0	57.4	57.9	58.9	60.3	64.0	65.0	64.0							
	6.0 □	–	41.0	45.2	51.3	50.2	53.4	57.6	55.3	61.3	–	–							30
	8.0 △	–	43.0	45.8	49.0	52.0	56.5	59.8	58.7	63.0	64.0	66.5							
	8.0 □	–	44.0	–	–	–	52.0	58.5	59.5	57.5	–	–							
	No.						18	19	20										
1942	4.5 △	53.0	–	54.0	41.0	50.8	53.7	52.0	60.0	59.3	64.7	58.0	–	63.0	–				
	4.5 □	–	–	–	–	49.0	–	–	60.0	59.0	65.0	58.0	–	–	–				
	6.0 △	–	–	–	–	–	–	59.2	64.7	64.5	68.0	66.5	67.0	73.0	–				
	6.0 □	–	–	43.0	52.0	50.0	51.6	–	56.7	61.1	58.5	62.0	63.5	–	–				39
	8.0 △	–	–	–	50.0	–	58.0	60.8	63.0	66.5	68.8	68.8	68.0	69.5	73.0				
	8.0 □	–	–	–	–	–	–	–	59.5	62.0	64.0	68.0	–	–	–				
	No.								21	22	23	24							

Table 39. The correlation coefficients (r) between tree-density and mean heigt of

Year / Age	D (Sun)	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0
1915 12	No.	1	2	3	4	5	6	7			
	r	+0.90	+0.84	+0.95	+0.90	+0.85	+0.72	−0.41			
	P.E of r	±0.05	±0.08	±0.03	±0.05	±0.05	±0.13	±0.23			
1919 16	No.		8	9	10	11	12	13	14	15	16
	r		+0.82	+0.86	+0.82	+0.98	+0.85	+0.85	+0.74	+0.68	+0.57
	P.E of r		±0.09	±0.07	±0.09	±0.01	±0.07	±0.07	±0.12	±0.15	±0.19
1921 18	No.		17	18	19	20	21	22	23	24	25
	r		−0.47	−0.10	+0.67	+0.60	+0.77	+0.65	+0.53	+0.61	+0.59
	P.E of r		±0.21	±0.27	±0.15	±0.18	±0.11	±0.16	±0.20	±0.17	±0.18
1926 23	No.						28	29	30	31	32
	r						+0.96	+0.83	+0.83	+0.83	+0.74
	P.E of r						±0.02	±0.09	±0.09	±0.09	±0.12
1930 27	No.							38	39	40	41
	r							+0.86	+0.81	+0.98	+0.87
	P.E of r							±0.07	±0.09	±0.01	±0.07
1933 30	No.								49	50	51
	r								+0.64	+0.91	+0.81
	P.E of r								±0.16	±0.05	±0.09
1943 40	No.									60	61
	r									+0.37	+0.92
	P.E of r									±0.24	±0.04

Notes : The unit "Sun" = $^1/_{10}$ "Shaku" 1"S haku" = $^{10}/_{33}$ metre.

trees with respect to diameters for each age of the forest. (a)Pine(pinus densiflora)

5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10.0	10.5
26 +0.36 ±0.24	27 +0.74 ±0.12									
33 +0.58 ±0.18	34 +0.59 ±0.18	35 +0.50 ±0.21	36 +0.40 ±0.23	37 +0.57 ±0.19						
42 +0.88 ±0.06	43 +0.76 ±0.12	44 +0.58 ±0.18	45 +0.80 ±0.10	46 +0.57 ±0.19	47 −0.04 ±0.27	48 +0.52 ±0.20				
52 +0.79 ±0.10	53 +0.74 ±0.12	54 +0.36 ±0.24	55 +0.50 ±0.21	56 +0.59 ±0.18	57 +0.54 ±0.20	58 −0.12 ±0.27	59 +0.34 ±0.24			
62 +0.64 ±0.15	63 +0.89 ±0.06	64 +0.55 ±0.19	65 +0.42 ±0.23	66 +0.65 ±0.16	67 +0.78 ±0.11	68 +0.63 ±0.17	69 +0.92 ±0.04	70 +0.18 ±0.27	71 +0.75 ±0.12	72 +0.16 +0.27

P.E of r=Probable error of r

Table 39. (b) Larch

Year Age	D (Sun)	1.5	2.0	2.5	3.0	3.5	4.0
1914	No.	1	2	3	4		
11	r	+0.91	+0.06	+0.06	−0.45		
	P.E of r	±0.05	±0.27	±0.27	±0.22		
1919	No.	5	6	7	8	9	10
16	r	+0.38	−0.06	−0.60	−0.38	−0.70	−0.62
	P.E of r	±0.24	±0.27	±0.18	±0.24	±0.13	±0.17
1926	No.					12	
23	r					−0.17	
	P.E of r					±0.27	
1930	No.						
27	r						
	P.E of r						
1933	No.						
30	r						
	P.E of r						
1942	No.						
39	r						
	P.E of r						

(Larix Kaempferi)

4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
11 −0.19 ±0.27								
13 −0.57 ±0.19	14 −0.50 ±0.21	15 −0.55 ±0.19						
			16 −0.26 ±0.26	17 −0.51 ±0.20				
			18 −0.37 ±0.24	19 −0.48 +0.21	20 −0.80 ±0.10			
					21 −0.06 ±0.27	22 −0.73 ±0.13	23 −0.03 ±0.28	24 −0.91 ±0.05

Table 40. The moving courses of distribution of tree-numbers respecting to claer-length with increase of ages of forest. (a)Pine

	4.5△						4.5□						6.0△						6.0□						8.0△						8.0□					
Age	16	18	23	27	30	40	16	18	23	27	30	40	16	18	23	27	30	40	16	18	23	27	30	40	16	18	23	27	30	40	16	18	23	27	30	40
Year / c.l (shaku)	1919	1921	1626	1930	1933	1943	1919	1921	1926	1930	1933	1643	1919	1921	1926	1930	1933	1943	1919	1921	1926	1930	1933	1943	1919	1921	1926	1930	1933	1943	1919	1921	1926	1930	1933	1943
2	1						–						–						–						–						–					
3	–						–						–	1					–						11						11	2				
4	11						1						17	1					8						39	4					57	5				
5	32						22	2					54	9					64	12					77	22					134	15	1			
6	93	11	1				76	12					153	18	1				173	42					104	47	3				119	56	3			
7	125	25	2				136	28	1				192	31	1				199	62	4				91	61	5				123	74	3	2		
8	185	52	–				140	33	1	1			197	55	5				179	79	7				92	69	5	1			45	105	3	–		
9	171	78	1				231	66	1	1			178	81	4	1			98	82	16	3	1		55	77	11	2			7	94	13	3	1	
10	98	120	10	2			114	86	4	1			95	116	16	3			28	77	15	2	–		15	65	16	5	1		6	67	30	5	1	
11	29	97	7	–			33	100	6	1			41	67	14	4			8	54	32	8	–		6	52	15	6	–		2	42	29	9	–	
12	5	91	23	4			16	109	6	1	1		9	82	40	5			2	27	44	7	–		2	34	32	7	3			25	40	19	5	
13	2	49	27	11			5	53	17	9	1		2	27	47	7			1	6	44	9	3			22	22	22	3			6	35	23	1		
14		24	55	8	2			30	49	9	2		–	14	30	12	2			1	42	15	3			10	22	11	8			2	13	25	6	1	
15		12	37	25	2			4	28	7	3	1	1	2	41	33	9			1	26	28	4			6	19	11	10				15	29	6	–	
16		2	49	22	3			7	51	22	3	–		2	35	29	5				12	44	4			3	14	27	5	1			4	23	4	1	
17		1	38	26	6			1	43	32	7	–		1	27	47	13	1			6	37	16			1	12	27	7	–			3	23	20	1	
18			19	35	10				40	19	4	–			12	39	15	1			6	40	11				1	21	11	1			–	16	26	–	
19			13	20	27				21	30	11	–			4	22	15	–			2	25	30				2	13	15	–			–	8	25	2	
20			6	15	19	1			11	16	14	1			2	28	14	4				14	20	1			2	10	19	2			1	3	19	4	
21			3	13	25	1			7	20	18	2				16	21	–				14	28	2			1	4	18	–				2	15	3	
22			–	8	24	3			–	12	18	2				18	28	4				6	16	9				5	26	–				1	25	4	

23			1	3	21	4			1	2	27	1				4	22	7				4	19	6				2	10	1				–	16	4
24				1	19	1				2	26	3				3	11	9				2	11	3				–	14	3				1	7	9
25					15	2				1	25	5				1	11	11					2	20				–	7	4					6	13
26					10	7					11	4					3	11					1	16				1	6	8					2	12
27					7	10					7	6					2	8					–	22					4	10					2	9
28					2	9					1	9					1	17					–	14					2	11					2	11
29					1	11					3	12					1	16					–	17					2	4						10
30						25					1	18						14					–	16					3	8						12
31						19					1	10						18					–	11					1	7						7
32						22					2	13						10					1	7						11						7
33						18						23						13						7						8						4
34						17						15						8						2						3						5
35						19						8						6						2						3						4
36						8						8						3						–						3						3
37						4						15						1						–						4						–
38						1						4						1						–						5						–
39						1						5						–						–						1						–
40						2						2						–						–						–						1
41						1						1						–						–						–						–
42						–						1						–						–						–						–
43						–						–						–						–						–						–
Sum	752	562	292	193	193	186	774	541	287	186	186	169	939	507	279	272	173	163	760	443	256	258	170	155	492	473	182	175	175	98	504	493	193	192	189	127
some. else		1	2	2	2	3			1	1		7						5			5			2				2		8						4
Total	752	563	294	195	195	189	774	541	288	187	186	176	939	507	279	272	173	168	760	443	261	258	170	157	492	473	182	177	175	106	504	493	193	192	189	131

Notes : c.l = clear-length.   Unit 1 Shaku = $^{10}/_{33}$m.

Table 40. (b) Larch

	4.5△					4.5□					6.0△					6.0□					8.0△					8.0□				
Age	16	23	27	30	39	16	23	27	30	39	16	23	27	30	39	16	23	27	30	39	16	23	27	30	39	16	23	27	30	39
Year / c.l (Shaku)	1919	1926	1930	1933	1942	1919	1926	1930	1933	1942	1919	1926	1930	1933	1942	1919	1926	1930	1933	1942	1919	1926	1930	1933	1942	1919	1926	1930	1933	1942
4	–					–					–					–					2					–				
5	1					1	1				–					1					1					–				
6	3					–	–				7					1					9					–				
7	3					–	–				8					3					24					4				
8	5					1	–				5					12					14					4				
9	11					1	1				20					26					13					6				
10	17					1	–				6					20					17					2				
11	23					8	–				27					39					17					1				
12	28	1				8	–				25	1				29					19					5				
13	42	1				8	–				19	2				16					25	1				6				
14	28	–	1		1	2	1	2	1		18	2				21	3	1			14	–				–				
15	26	3	–		–	1	1	–	1		16	3		1		9	2	–			9	2				3				
16	36	4	–		–	1	–	–	–		16	2	1	–		13	–	1			–	4				1	1			
17	18	5	1	3	–	2	1	2	–		7	3	1	–		2	6	–		1	1	1	1			2	–			
18	8	5	1	1	–		5	1	–		6	1	1	–		1	5	2	2	–		4	–				2	1		
19	6	7	1	1	–		1	–	–		2	2	–	1			6	3	3	–		4	1	1			1	–		
20	2	11	3	–	1		2	–	1		–	9	4	2			14	2	1	–		11	1	1			–	–	1	
21	1	8	2	2	–		–	–	–		1	7	2	2			10	11	4	1		11	4	2			1	1	–	
22		12	8	5	2		1	–	2			8	–	3			17	5	5	2		7	–	2			2	–	1	
23		9	9	2	–		–	–	1	1		8	4	–			9	2	3	2		8	5	–			3	2	1	
24		17	6	3	3		1	–	–	–		14	5	1			15	3	6	–		16	7	3	1		4	3	2	

25		11	4	7	2			1	–	–		11	2	3	1		3	3	5	2		11	3	4	1		1	–	–	
26		9	6	7	3			2	–	1		5	6	6	2		4	4	6	5		6	6	5	5		2	2	1	2
27		5	3	5	3				–	–		7	5	6	1		3	2	6	3		4	4	4	–		2	–	1	–
28		4	4	5	2				–	–		2	7	5	1			2	5	5		2	1	4	–			1	–	–
29		4	3	5	1				2	–		1	2	3	3			–	3	3		1	4	7	2				2	–
30		2	3	3	2					–		3	3	5	1			1	–	1			8	2	1				1	1
31		1	–	3	3					–		1	3	–	3			1	–	2			2	5	4					2
32			–	2	3					1		1	–	5	4			–	–	–			1	3	2					1
33			1	1	1					1		1	1	3	3			1	1	1			–	5	2					–
34					–					–			1	2	1			–		1			–	1	2					1
35					2					–			1	1	1			1		1			1		–					–
36					–					1					–					–					2					–
37					1					–					2					–					2					–
38					–					–					1					–					2					–
39					–					1					–					–					3					–
40					–					–					2					–					1					–
41					–					–					1					–					–					–
42					–					–					–					–					–					–
43					–					–					1					–					–					–
Sum	258	119	56	55	30	34	15	8	8	6	183	94	49	49	30	193	97	50	50	30	165	93	49	49	30	34	19	10	10	7
Something else	5				1						1					1														
Total	263	119	56	55	31	34	15	8	8	6	184	94	49	49	28	194	97	50	50	30	165	93	49	49	30	34	19	10	10	7

Table 41. The mean clear-lengths (Mh) , standard deviations (σh) , and coefficients of variation (c.v.) for each age of the forest.

	year (age)		4.5△	4.5□	6.0△	6.0□	8.0△	8.0□
Pine (Pinus densiflora)	1919 16	Mh	8.04±0.04	8.37±0.04	7.80±0.04	7.24±0.03	6.72±0.05	5.97±0.03
		σh	1.61±0.03	1.57±0.03	1.69±0.03	1.41±0.02	1.75±0.04	1.39±0.03
		c.v	20.0	18.8	21.7	19.5	26.0	23.3
	1921 18	Mh	10.53±0.06	10.82±0.06	9.97±0,06	8.83±0.06	9.07±0.08	8.48±0.05
		σh	1.99±0.04	2.14±0.04	2.09±0.04	1.89±0.04	2.43±0.05	1.89±0.04
		c.v	18.9	19.8	21.0	21.4	26.8	22.3
	1926 23	Mh	15.01±0.10	15.98±0.10	13.91±0.10	12.69±0.09	12.77±0.15	11.82±0.11
		σh	2.54±0.07	2.47±0.07	2.52±0.07	2.15±0.06	2,90±0.10	2.23±0.08
		c.v	16.9	15.5	18.1	16.9	22.7	18.9
	1930 27	Mh	17.33±0.13	17.90±0.14	17.49±0.12	16.82±0.12	16.07±0.16	14.84±0.13
		σh	2.91±0.09	2.91±0.10	2.93±0.08	2.83±0.08	3.14±0.11	2.76±0.09
		c.v	15.3	16.3	16.7	16.8	19.5	18.6
	1933 30	Mh	21.68±0.14	22.50±0.17	20.75±0.16	20.22±0.15	20.57±0.21	19.61±0.16
		σh	2.92±0.10	3.45±0.12	3.05±0.11	2.90±0.11	4.04±0.15	3.35±0.12
		c.v	13.5	15.3	14.7	14.3	19.6	17.1
	1943 40	Mh	31.24±0.18	31.80±0.23	28.77±0.21	27.61±0.17	29.96±0.31	27.50±0.27
		σh	3.73±0.13	4.47±0.16	4.06±0.15	3.22±0.12	4.53±0.22	4.55±0.19
		c.v	11.9	14.1	14.1	11.7	15.1	16.5

Larch (Larix Kaempferi)	1919 16	Mh σh c.v	13.45±0.12 2.90±0.09 21.6	12.15±0.27 2.28±0.19 18.8	12.33±0.16 3.14±0.11 25.5	11.59±0.12 2.49±0.09 21.5	10.44±0.15 2.82±0.10 27.0	11.12±0.34 2.93±0.24 26.3
	1926 23	Mh σh c.v	22.45±0.24 3.85±0.17 17.1	17.00±0.81 4.63±0.57 27.2	22.74±0.27 3.89±0.19 17.1	21.33±0.20 2.93±0.14 13.7	22.25±0.23 3.24±0.16 14.6	22.74±0.47 3.06±0.33 13.5
	1930 27	Mh σh c.v	24.21±0.32 2.53±0.23 10.5	19.63±1.16 4.87±0.82 24.8	25.84±0.41 4.25±0.29 16.4	23.20±0.38 3,97±0.27 17.1	26.00±0.36 3.73±0.25 14.3	23.70±0.57 2.65±0.40 11.2
	1933 30	Mh ρh c.v	25.73±0.35 3.89±0.25 15.1	21.75±1.23 5.17±0.87 23.8	27.31±0.42 4.36±0.30 16.0	24.46±0.31 3.26±0.22 13.3	27.76±0.36 3.75±0.26 13.5	25.40±0.67 3.14±0.48 12.4
	1942 39	Mh ρh c.v	27.77±0.59 4.83±0.42 17.4	31.50±1.53 5.55±1.08 17.6	32.64±0.60 4.72±0.43 14.5	27.00±0.47 3.82±0.33 14.1	32.27±0.59 4.80±0.42 14.9	30.00±0.71 2.78±0.50 9.3

notes: The unit of Mh is "Shaku" 1 Shakn = 10/33 motre.

Table 42 The tree-densities, index-numbers, and the mean clear-lengths for each age of the forest.

			4.5△	4.5□	6.0△	6.0□	8.0△	8.0□
Pine (Pinus densiflora)	1	Tree-density	6,393	5,628	3,495	3,023	1,847	1,744
	2	Index-number	100	88	55	47	29	27
	3	1919 16	8.04	8.37	7.80	7.24	6.72	5.97
	4	1921 18	10.53	10.82	9.97	8.83	9.07	8,4[illegible]
	5	1926 23	15.01	15.98	13.91	12.69	12.77	11.8[illegible]
	6	1930 27	17.33	17.90	17.49	16.82	16.07	14.84
	7	1933 30	21.68	22.50	20.75	20.02	20.57	19.61
	8	1943 40	31.24	31.80	28.77	27.61	29.96	27.5[illegible]
Larch (Larix Kaempferi)	1	Tree-density	6,878	6.273	3,835	3,227	2,200	1.895
	2	Index-number	100	91	56	47	32	2[illegible]
	3	1919 16	13.45	12.15	12.33	11.59	10.44	11.1[illegible]
	4	1926 23	22.45	17.00	22.74	21.33	22.25	22.74
	5	1930 27	24.21	19.63	25.84	23.20	26.00	23.7[illegible]
	6	1933 30	25.73	21.75	27.31	24.46	27.76	25.4[illegible]
	7	1942 39	27.77	31.50	32.64	27.00	32.27	30.0[illegible]

Notes : The unit of clear-length is "Shaku". 1Shaku = $^{10}/_{33}$ mtre.

Table 43. The correlatien coefficients (r) between tree-density and clear-length for each age of the forest.

Pine	Age	16	18	23	27	30	40
	Year	1919	1921	1926	1930	1933	1943
	r	+0.88±0.06	+0.83±0.09	+0.92±0.04	+0.79±0.10	+0.87±0.07	+0.77±0.11
Larch	Age	16	-	23	27	30	39
	Year	1919		1926	1930	1933	1942
	r	+0.87±0.07		−0.45±0.22	−0.49±0.21	−0.45±0.22	−0.22±0.26

Table 44. The comparison with the heighest mean heigt in a plot to the lowest one in the other on each year.

		1914	1915	1919	1921	1926	1930	1933	1942	1943
Pine	The heighest	–	4.5□	4.5□	4.5□	4.5□	4.5□	4.5□	–	4.5□
	(A)	–	12.56	19.79	24.14	32.09	37.41	41.61	–	51.81
	The lowest	–	8.0□	6.0□	6.0□	8.0□	8.0□	6.0□	–	6.0□
	(B)	–	10.99	17.63	21.61	28.88	33.24	36.99	–	47.44
	B/A (%)	–	87.5	89.0	89.5	90.0	88.9	88.9	–	91.6
Larch	The heighest	8.0□	–	6.0△	–	8.0△	6.0△	6.0△	8.0△	–
	(A)	22.56	–	33.07	–	47.07	54.55	57.57	65.80	–
	The lowest	4.5□	–	4.5△	–	4.5□	4.5□	4.5□	4.5△	–
	(B)	18.98	–	28.06	–	38.73	44.38	48.00	55.90	–
	B/A (%)	84.1	–	84.9	–	82.3	81.4	83.4	85.0	–

Table 45. The mean clear-lengths with respect to diameters in each plot for each age of the forest. (a) Pine (Pinus densiflora)

	D(Sun) / Plot	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10.0	10.5	11.0	11.5	12.0	12.5
1919 (16)	4.5△	–	5.0	7.5	7.7	8.2	8.0	8.2	8.2	8.1	7.7	9.0	–	–	–	–										
	4.5□	–	7.2	7.3	7.8	8.4	8.7	8.8	8.1	8.4	7.0	7.0	–	8.0	–	8.0										
	6.0△	5.0	5.7	7.0	7.5	7.8	8.3	8.3	8.1	8.3	6.3	6.0	–	–	–	–										
	6.0□	7.0	6.7	6.7	7.2	7.4	7.5	7.3	6.9	7.3	7.0	–	–	–	–	–										
	8.0△	–	5.5	6.3	5.7	6.5	6.8	6.7	7.0	7.2	6.9	–	8.5	–	8.0	–										
	8.0□	–	3.7	4.8	5.3	6.0	5.9	6.4	6.3	6.2	6.1	6.3	–	–	–	–										
	No.		1	2	3	4	5	6	7	8	9															
1921 (18)	4.5△		6.0	9.1	10.4	10.4	10.9	10.7	10.6	10.5	10.0	9.6	9.3	10.0	–											
	4.5□		6.0	7.2	10.1	10.8	11.2	11.2	10.8	10.8	10.0	10.8	8.0	8.0	–											
	6.0△		8.0	9.0	8.7	9.6	10.2	10.2	10.0	10.3	10.2	8.5	9.0	–	–											
	6.0□		7.0	8.0	8.7	8.9	9.3	9.1	8.8	8.3	8.5	8.3	8.2	8.0	–											
	8.0△		9.0	8.1	7.8	9.8	9.3	9.3	9.4	8.8	8.6	9.5	7.8	10.0	6.0											
	8.0□		7.1	7.2	7.9	8.9	8.8	9.0	8.9	7.9	8.1	7.5	7.8	9.0	8.0											
	No.		10	11	12	13	14	15	16	17	18	19	20													
1926 (21)	4.5△					14.0	15.2	15.5	15.5	14.8	15.3	14.8	15.1	14.6	11.0	13.3	–	–								
	4.5□					14.0	16.0	16.9	16.5	16.6	15.8	15.6	15.7	15.0	15.9	15.5	–	–								
	6.0△					14.3	14.4	13.7	14.7	14.0	13.8	13.5	13.9	14.9	12.3	12.5	12.0	–								
	6.0□					10.0	11.7	13.1	13.1	12.5	13.0	12.4	12.6	12.9	12.0	10.0	14.0	–								
	8.0△					–	12.0	12.8	13.1	12.9	13.1	12.7	13.0	12.5	11.8	12.8	8.0	–								
	8.0□					–	12.5	11.4	12.3	12.2	12.1	12.2	11.5	11.2	10.6	12.0	11.3	11.0								
	No.						21	22	23	24	25	26	27	28	29	30										

1930 (27)	4.5△	-	-	17.0	20.3	18.6	17.1	17.7	17.4	17.3	17.3	17.1	17.4	16.0	15.0	-	-					
	4.5□	-	-	21.0	19.0	19.2	18.3	18.6	18.1	18.5	18.0	17.9	15.8	16.0	-	-	16.0					
	6.0△	17.0	15.5	17.5	19.1	17.9	18.3	17.6	17.1	16.5	16.9	18.2	17.3	14.8	15.0	16.0	-					
	6.0□	-	16.3	16.2	16.5	17.0	16.9	17.5	16.4	17.4	16.7	14.9	16.8	17.0	13.0	-	-					
	8.0△	-	-	16.0	17.6	15.6	15.7	15.9	16.1	17.0	15.7	16.4	18.1	13.9	12.0	10.5	-					
	8.0□	-	-	16.7	14.3	15.2	15.6	14.4	15.1	14.7	15.1	13.4	14.1	13.7	11.5	13.0	10.0					
	No.			31	32	33	34	35	36	37	38	39	40	41								
1933 (30)	4.5△			-	24.5	22.0	22.1	22.3	23.8	21.5	21.3	21.1	21.3	21.1	20.3	25.0	-	-	-	-	-	
	4.5□			-	21.5	23.0	23.3	22.7	22.6	22.4	22.5	22.9	21.8	20.6	22.0	-	-	23.0	-	-	-	
	6.0△			22.0	20.8	21.4	22.0	20.7	21.4	21.6	22.1	21.0	19.3	21.8	16.5	18.0	18.5	-	-	-	-	
	6.0□			18.0	19.6	20.2	20.9	20.3	20.2	21.6	20.1	19.2	18.9	18.0	17.5	15.0	-	-	-	-	-	
	8.0△			21.0	20.4	21.3	21.0	18.6	21.8	21.0	21.6	22.6	18.9	20.2	19.5	19.0	14.0	-	-	-	-	
	8.0□			17.0	19.2	21.0	19.3	20.9	20.2	20.1	19.1	19.8	18.9	20.0	17.9	18.1	14.5	17.5	-	-	19.0	
	No.				42	43	44	45	46	47	48	49	50	51	52							
1943 (40)	4.5△			-	-	30.5	31.4	30.9	31.4	30.6	30.0	31.7	32.8	31.1	31.2	29.5	33.3	38.0	-	-	-	-
	4.5□			-	30.0	29.5	31.4	32.2	29.7	32.1	31.4	31.9	32.4	32.6	32.7	32.7	34.0	31.5	40.0	-	-	-
	6.0△			31.0	31.5	29.2	30.0	28.1	29.5	29.3	28.1	28.2	29.2	28.5	30.4	25.7	32.0	26.3	25.0	20.0	23.5	-
	6.0□			-	26.5	25.3	27.3	27.6	28.3	27.3	27.8	27.5	28.6	28.4	26.2	25.5	27.3	27.0	27.0	-	-	-
	8.0△			-	29.0	36.0	18.3	27.6	28.9	28.8	33.6	29.8	29.8	31.5	27.5	35.0	25.7	31.0	31.7	29.0	-	-
	8.0□			-	-	24.8	27.8	29.4	29.9	28.1	26.8	26.3	27.4	27.8	27.6	28.8	22.7	27.3	26.0	26.3	27.8	24.0
	No.					53	54	55	56	57	58	59	60	61	62	63	64	65				

Table 45. (b) Larch (Larix Kaempferi)

	D (Sun) / Plot	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10.0
1919 (16)	4.5△	–	12.3	12.4	13.3	14.6	13.2	14.8	13.3	9.0	–	–								
	4.5□	–	12.0	11.3	12.6	13.0	11.2	12.4	9.0	–	–	–								
	6.0△	–	10.7	11.1	11.9	13.2	13.8	11.9	12.1	11.0	–	–								
	6.0□	9.0	9.7	10.9	11.9	11.5	12.2	11.6	10.9	12.3	8.0	–								
	8.0△	8.5	9.8	8.9	10.4	10.3	11.5	10.5	10.4	10.0	14.0	13.0								
	8.0□	–	7.0	9.0	9.3	10.8	13.0	12.3	10.8	12.8	–	–								
	No.		1	2	3	4	5	6	7											
1926 (23)	4.5△			12.0	21.0	21.8	24.0	21.7	21.3	23.9	24.2	24.0	13.0	–						
	4.5□			–	–	–	18.3	18.0	14.0	20.5	10.7	–	–	–						
	6.0△			–	17.0	14.0	22.1	22.6	24.6	23.6	21.5	24.8	20.0	22.0						
	6.0□			–	–	18.8	20.9	22.4	22.2	21.3	22.4	17.2	20.0	20.0						
	8.0△			–	–	20.0	17.3	22.1	21.2	22.7	22.5	22.2	21.3	25.0						
	8.0□			–	–	22.0	22.5	–	26.3	24.0	20.2	23.5	23.0	–						
	No.						8	–	9	10	11									
1930 (27)	4.5△						23.0	24.6	23.3	23.8	24.6	27.2	25.0	24.0	14.0	–				
	4.5□						–	–	17.0	–	17.0	22.8	16.0	–	–	–				
	6.0△						–	23.0	23.5	29.2	27.8	24.4	24.3	29.0	21.0	28.0				
	6.0□						–	22.3	23.0	24.0	23.3	24.0	22.8	14.0	22.0	–				
	8.0△						–	20.5	26.7	22.5	26.6	26.8	25.5	27.2	29.0	25.5				
	8.0□						–	26.0	–	–	–	22.3	24.5	26.0	21.0	–				
	No.											12	13							

1933 (30)	4.5△		26.0	25.8	26.0	24.5	24.4	28.1	25.3	27.5	–	–	–					
	4.5□		–	–	–	15.0	20.0	22.0	23.8	22.0	–	–	–					
	6.0△		–	22.0	24.0	28.0	30.6	27.3	27.4	25.6	29.0	26.0	28.0					
	6.0□		–	23.3	23.8	26.3	25.2	23.0	24.9	19.7	26.7	–	–					
	8.0△		–	20.0	29.0	25.0	25.5	29.0	28.5	27.9	27.0	27.0	24.5					
	8.0□		–	30.0	–	–	–	22.3	25.0	25.0	25.5	28.0	–					
	No.							14	15	16								
1942 (39)	4.5△		27.0	–	22.0	25.0	25.5	29.3	30.7	28.2	31.0	29.7	24.0	–	14.0	–		
	4.5□		–	–	–	–	33.0	–	–	31.0	32.0	39.0	23.0	–	–	–		
	6.0△		–	–	–	–	–	–	35.6	36.0	32.7	30.0	30.0	33.0	29.0	–		
	6.0□		–	–	22.0	28.7	29.5	25.4	–	28.2	28.4	22.0	28.5	23.5	–	–		
	8.0△		–	–	–	31.0	–	26.0	34.8	31.8	32.5	36.8	29.7	33.5	31.0	24.0		
	8.0□		–	–	–	–	–	–	–	28.0	26.0	33.0	31.0	–	–	–		
	No.									17	18	19	20					

Tabl 46. The correlation coefficients(r)between tree-density and mean clear-legth of

Year Age	D (Sun)	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0
1919	No.	1	2	3	4	5	6	7	8	9
	r	+0.38	+0.82	+0.85	+0.91	+0.79	+0.86	+0.79	+0.79	+0.83
16	P.E of r	±0.24	±0.09	±0.07	±0.05	±0.10	±0.07	±0.10	±0.10	±0.09
1921	No.	10	11	12	13	14	15	16	17	18
	r	−0.77	+0.33	+0.99	+0.80	+0.94	+0.90	+0.88	+0.85	+0.81
18	P.E of r	±0.11	±0.25	±0.01	±0.10	±0.03	±0.05	±0.06	±0.07	±0.09
1926	No.					21	22	23	24	25
	r					+0.87	+0.92	+0.91	+0.85	+0.94
23	P.E of r					±0.07	±0.04	±0.05	±0.07	±0.03
1930	No.						31	32	33	34
	r						+0.60	+0.79	+0.93	+0.67
27	P.E of r						±0.18	±0.10	±0.03	±0.15
1933	No.							42	43	44
	r							+0.87	+0.71	+0.82
30	P.E of r							±0.07	±0.13	±0.09
1943	No.								53	54
	r								+0.07	+0.72
40	P.E of r								±0.27	±0.13

Notes : The unit of diameter is "Sun", 1Sun=$^1/_{10}$ "Shaku".

trees with respect to diameters for each age of the forest.(a) Pine(Pinus densiflora)

5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10.0	10.5
19 +0.68 ±0.15	20 +0.74 ±0.12									
26 +0.92 ±0.04	27 +0.91 ±0.05	28 +0.82 ±0.09	29 +0.62 ±0.17	30 +0.58 ±0.18						
35 +0.79 ±0.10	36 +0.81 ±0.09	37 +0.66 ±0.16	38 +0.88 ±0.06	39 +0.63 ±0.17	40 +0.18 ±0.27	41 +0.62 ±0.17				
45 +0.84 ±0.08	46 +0.74 ±0.12	47 +0.72 ±0.13	48 +0.54 ±0.20	49 +0.32 ±0.25	50 +0.93 ±0.03	51 +0.39 ±0.23	52 +0.61 ±0.17			
55 +0.77 ±0.11	56 +0.65 ±0.16	57 +0.80 ±0.10	58 +0.17 ±0.27	59 +0.88 ±0.06	60 +0.90 ±0.05	61 +0.56 ±0.19	62 +0.83 ±0.09	63 +0.02 ±0.28	64 +0.91 ±0.05	65 +0.72 ±0.13

1Shaku = $^{10}/_{33}$ metre. P.E of r = Probable error of r.

Table 46 (b) Larch (Larix Kaempferi)

Year Age	D (Sun)	1.5	2.0	2.5	3.0	3.5	4.0
1919 16	No. r P.E of r	1 +0.89 ±0.06	2 +0.90 +0.05	3 +0.91 ±0.05	4 +0.91 ±0.05	5 −0.01 ±0.28	6 +0.76 ±0.12
1926 23	No. r P.E of r					8 +0.23 ±0.26	– – –
1930 27	No. r P.E of r						
1933 30	No. r P.E of r						
1942 39	No. r P.E of r						

4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
7 +0.23 ±0.26								
9 −0.64 ±0.16	10 −0.21 ±0.26	11 −0.32 ±0.25						
			12 +0.22 ±0.26	13 −0.47 ±0.21				
			14 +0.05 ±0.27	15 −0.44 ±0.22	16 −0.02 ±0.28			
					17 −0.05 ±0.27	18 +0.44 ±0.22	19 +0.10 ±0.27	20 −0.94 ±0.03

Table 47. The moving courses of distribution of tree-numbers respecting to branch-spread with increase of ages of forest.
(a) Pine (Pins densiflora)

	4.5△					4.5□					6.0△					6.0□					8.0△					8.0□				
Age	18	23	27	30	40	18	23	27	30	40	18	23	27	30	40	18	23	27	30	40	18	23	27	30	40	18	23	27	30	40
Year / b.s (Shaku)	1921	1926	1930	1933	1943	1921	1926	1930	1933	1943	1921	1926	1930	1933	1943	1921	1926	1930	1933	1943	1921	1926	1930	1933	1943	1921	1926	1930	1933	1943
3	–					–					–	2				–					1					–				
4	3	1			2	5	4			1	6	2	2	1	1	2	2	1		3	2			1		2		1	1	2
5	32	12	1		7	34	9	1	1	5	27	14	3	3	6	20	7	7	2	3	11	5	2	–	2	16	4	5	5	2
6	58	19	4	2	15	57	21	4	1	13	54	24	18	5	11	49	29	15	6	8	27	7	5	6	3	34	10	9	10	6
7	78	41	18	10	23	85	45	5	12	17	66	45	36	13	12	56	45	25	15	15	34	18	7	12	4	35	24	29	17	8
8	61	49	20	20	24	46	54	22	7	17	71	63	32	24	24	70	42	46	18	25	37	26	14	18	8	45	38	24	21	15
9	35	53	31	26	21	35	56	21	33	25	29	51	41	28	25	39	51	44	21	26	33	27	26	19	14	28	35	29	25	20
10	20	44	34	34	24	18	35	29	29	28	17	34	43	30	22	21	30	45	25	15	18	34	30	33	15	20	30	29	29	16
11	7	38	33	30	18	5	31	31	25	21	7	23	38	25	19	9	26	34	28	17	13	25	24	23	10	9	17	12	20	13
12		24	22	23	26	4	18	33	33	16	2	12	25	14	12	1	11	20	27	13	5	18	22	18	16	2	15	21	15	14
13		5	18	20	12	1	7	23	17	6		5	17	7	12		5	7	13	9	1	8	20	10	8	2	9	12	15	6
14		6	6	12	5	–	3	6	10	8		3	10	7	2		4	6	11	7		13	10	10	4		4	10	5	5
15			4	6	1	1	3	6	7	3		1	3	6	6		2	2	1	5		–	8	8	1		3	7	8	4
16			1	5	3		1	3	6	4			3	6	2		1	5	–	4		1	–	4	4		4	2	11	4
17			1	4	3			2	4	3			–	3	–		–	1	1	1			4	3	2			–	2	3
18				1	1				1	–			1	1	4		–		1	2			1	3	3			2	3	1
19					–					2					2		1		–	–			2	4	3				–	3
20					1					–					1				1	–				3	–				1	2
21					–					–					2					2					1				1	2
22					–					–					–					–					–					1
Sum	294	292	193	193	186	291	287	186	186	169	279	279	272	173	163	267	256	258	170	155	182	182	175	175	98	193	193	192	189	127
some. else		2	2	2	3		1	1		7					5		5			2			2		8					4
Total	294	294	195	195	189	291	288	187	186	176	279	279	272	173	168	267	261	258	170	157	182	182	177	175	106	193	193	192	189	131

Table 47. (b) Larch (Larix Kaempferi)

	4.5△					4.5□					6.0△					6.0□					8.0△					8.0□				
Age	16	23	27	30	39	16	23	27	30	39	16	23	27	30	39	16	23	27	30	39	16	23	27	30	39	16	23	27	30	39
Year / b.s Shaku	1919	1926	1930	1933	1942	1919	1926	1930	1933	1942	1919	1926	1930	1933	1942	1919	1926	1930	1933	1942	1919	1926	1930	1933	1942	1919	1926	1930	1933	1942
2	–	1				–					–					–					–					–				
3	–	2				–					–					–					–					–				
4	5	6	1			–					1	1		1		–	1		1		1		1			–				
5	42	17	3	4		4					9	4	1	–		9	8		–		3		–	1		–			1	
6	53	30	4	3	2	5			1		35	15	6	5		32	29	8	3	2	25	12	2	7		4	3	1	–	
7	17	21	18	8	1	4	8	1	–	1	32	30	7	4		38	17	10	9	2	34	23	6	3		10	7	–	–	
8	2	27	18	11	4	2	2	3	4	–	14	20	8	8		14	24	13	8	2	16	21	14	11	3	3	4	–	3	
9		9	10	21	8		2	2	2	3	3	14	14	9	5	4	12	9	17	5	13	22	13	15	6	1	3	7	3	1
10		4	1	7	4		1	1	1	–	2	8	10	11	7	1	4	8	8	4	2	9	7	5	11	1	1	2	2	1
11		1	–	1	5		1	1		–	–	2	2	8	6		2	2	3	7	1	4	4	7	4		1		–	1
12		–	–		4		1			–	1		1	2	5				1	4		2	2		–				1	3
13		1	1		1					–				1	3					4					3					1
14					–					–					2					–					2					–
15					–					1					–					–					1					–
16					1					1					–					–					–					–
Sum	119	119	56	55	30	15	15	8	8	6	97	94	49	49	28	98	97	50	50	30	95	93	49	49	30	19	19	10	10	7
s. e.																														
Total	119	119	56	55	31	15	15	8	8	6	97	94	49	49	28	98	97	50	50	30	95	93	49	49	30	19	19	10	10	7

Table 48. The mean branch-spreads (MR) standard deviations (σR) coefficients of variation (c.v) for each age of the forest.

			4.5△	4.5□	6.0△	6.0□	8.0△	8.0□
Pine (Pinus densiflara)	1921 18	MR	7.30±0.06	7.29±0.07	7.33±0.06	7.59±0.06	7.99±0.09	7.76±0.09
		σR	1.52±0.04	1.70±0.05	1.42±0.04	1.55±0.05	1.85±0.07	1.77±0.06
		c.v	20.8	23.3	19.4	20.4	23.2	22.8
	1926 23	MR	9.00±0.08	8.85±0.09	8.48±0.03	8.71±0.09	9.76±0.11	9.41±0.11
		σR	2.06±0.06	2.16±0.06	2.03±0.06	2.22±0.07	2.26±0.08	2.29±0.08
		c.v	22.9	21.8	21.6	25.5	23.2	24.3
	1930 27	MR	10.22±0.11	10.81±0.11	9.66±0.10	9.43±0.10	10.90±0.13	9.80±0.13
		σR	2.18±0.07	2.25±0.08	2.42±0.07	2.31±0.07	2.63±0.09	2.72±0.09
		c.v	21.3	20.8	25.1	24.5	24.1	27.8
	1933 30	MR	11.09±0.12	11.06±0.11	10.24±0.14	10.35±0.13	11.05±0.16	10.48±0.22
		σR	2.44±0.08	2.25±0.08	2.69±0.10	2.45±0.09	3.20±0.12	3.21±0.11
		c.v	22.0	20.3	26.3	23.7	29.0	30.6
	1943 40	MP	9.69±0.14	9.93±0.15	10.13±0.17	10.04±0.16	11.26±0.24	10.89±0.22
		σR	2.92±0.10	2.89±0.11	3.30±0.12	2.97±0.11	3.45±0.17	3.72±0.16
		c.v	30.1	29.1	32.6	29.6	30.6	34.2
Larch (Larix Kaempferi)	1919 16	MR	5.74±0.05	6.27±0.17	6.74±0.08	6.74±0.07	7.19±0.09	7.21±0.15
		σR	0.81±0.04	1.00±0.12	1.21±0.06	1.01±0.05	1.24±0.06	1.00±0.11
		c.v	14.1	15.9	18.0	15.0	17.2	13.9
	1926 23	MR	6.76±0.11	8.20±0.25	7.63±0.10	7.20±0.10	8.14±0.10	7.74±0.21
		σR	1.72±0.08	1.42±0.18	1.40±0.18	1.46±0.07	1.45±0.07	1.33±0.15
		c.v	25.4	17.3	18.4	20.3	17.7	17.2
	1930 27	MR	7.61±0.13	8.75±0.29	8.45±0.15	8.10±0.14	8.67±0.15	8.90±0.22
		σR	1.39±0.09	1.20±0.20	1.55±0.11	1.42±0.10	1.54±0.10	1.04±0.16
		c.v	18.5	13.7	18.3	17.5	17.8	11.7
	1933 30	MR	8.22±0.13	8.25±0.26	9.02±0.18	8.54±0.14	8.52±0.15	8.80±0.37
		σR	1.42±0.09	1.09±0.18	1.87±0.13	1.51±0.10	1.59±0.11	1.72±0.26
		c.v	17.3	13.2	20.7	17.7	18.7	19.5
	1942 39	MR	9.83±0.26	10.83±0.93	11.00±0.19	10.13±0.25	10.47±0.24	11.29±0.33
		σR	2.09±0.18	3.39±0.66	1.49±0.13	2.01±0.18	1.97±0.18	1.28±0.23
		c.v	21.26	31.30	13.55	19.84	18.82	11.34

Table 49. The tree-densities, index-numbers, and the mean branch-spreads for each age of the forest.

			4.5△	4.5□	6.0△	6.0□	8.0△	8.0□
Pine (P. densiflora)	1	Tree-density	6,393	5,628	3,495	3,023	1,847	1,744
	2	Index-number	100	88	55	47	29	27
	3	1921 18	7.30	7.29	7.33	7.59	7.99	7.76
	4	1926 23	9.00	8.85	8.48	8.71	9.76	9.41
	5	1930 27	10.22	10.81	9.66	9.43	10.90	9.80
	6	1933 30	11.09	11.06	10.24	10.35	11.05	10.48
	7	1943 40	9.69	9.93	10.13	10.04	11.26	10.89
Larch (L. Kaempferi)	1	Tree-density	6,878	6,273	3,835	3,227	2,200	1,895
	2	Index-number	100	91	56	47	32	28
	3	1919 16	5.74	6.27	6.74	6.74	7.19	7.21
	4	1926 23	6.76	8.20	7.63	7.20	8.14	7.74
	5	1930 27	7.61	8.75	8.45	8.10	8.67	8.90
	6	1933 30	8.22	8.25	9.02	8.54	8.53	8.80
	7	1942 39	9.83	10.83	11.00	15.13	10.47	11.29

Table 50. The correlation coefficients between tree-density and mean branch-spread for each age of the forest,

Year	1919	1921	1926	1930	1933	1942	1943
Age	16	18	23	27	30	39	40
Pine	–	-0.85 ± 0.07	-0.48 ± 0.21	$+0.23\pm0.26$	$+0.48\pm0.21$	–	-0.86 ± 0.07
Larch	-0.97 ± 0.02	–	-0.35 ± 0.24	-0.55 ± 0.19	-0.56 ± 0.19	-0.45 ± 0.22	–

Table 51. The mean branch-spreads with respect to diameters in each plot for each age of the forest. (a) Pine (Pinus densiflora).

	D(Sun) / Plot	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10.0	10.5	11.0	11.5	12.0	12.5
1921 (18)	4.5△	5.0	5.7	6.2	6.5	7.3	8.1	8.6	9.4	8.5	9.0	–											
	4.5□	5.0	5.4	6.0	6.6	7.2	8.0	9.0	9.2	9.8	11.5	–											
	6.0△	4.8	5.3	6.0	8.8	7.4	7.8	7.8	9.3	10.0	–	–											
	6.0□	5.5	5.9	6.5	7.2	7.6	8.4	7.8	8.6	10.0	10.0	–											
	8.0△	–	5.0	5.3	6.7	7.3	8.2	8.8	9.8	9.4	10.7	9.0											
	8.0□	–	4.0	5.6	6.3	7.3	8.0	8.8	9.8	9.9	9.7	12.0											
	No.		1	2	3	4	5	6	7	8													
1926 (21)	4.5△		5.0	5.4	6.2	7.3	8.3	9.0	10.0	10.3	10.9	9.7	12.3	–	–								
	4.5□		5.0	5.3	6.5	7.4	7.9	8.8	10.0	9.9	10.5	12.5	12.5	–	–								
	6.0△		3.8	5.4	6.5	6.8	7.9	8.6	9.3	9.4	10.8	11.3	12.5	14.0	–								
	6.0□		5.0	6.0	6.3	7.2	8.0	8.7	10.1	10.3	10.7	11.7	13.0	11.0	–								
	8.0△		–	5.0	6.3	8.4	8.9	9.1	10.0	10.3	11.9	12.0	12.7	13.0	–								
	8.0□		–	5.5	6.6	7.2	8.2	8.9	9.1	9.6	11.7	12.4	12.8	14.0	12.0								
	No.			9	10	11	12	13	14	15	16	17	18										
1926 (27)	4.5△		–	–	8.0	6.0	8.2	8.8	8.8	10.3	10.8	11.8	11.5	12.2	14.0	14.0	–	–					
	4.5□		–	–	7.0	8.0	8.1	9.1	10.1	10.8	12.3	11.7	11.8	12.6	14.4	–	–	11.0					
	6.0△		5.0	4.5	6.8	6.8	8.0	8.7	9.3	10.5	11.2	11.1	11.4	12.9	14.5	13.0	16.0	–					
	6.0□		–	5.3	6.2	6.9	8.1	8.7	9.9	9.8	10.5	10.7	12.2	11.5	13.8	14.0	–	–					
	8.0△		–	–	7.2	7.6	8.7	9.7	9.9	11.5	11.4	13.7	13.1	14.5	15.7	13.5	–	–					
	8.0□		–	–	6.3	6.0	6.9	8.1	8.6	9.8	10.5	10.9	11.7	12.4	13.1	12.5	14.7	15.0					
	No.				19	20	21	22	23	24	25	26	27	28	29								

1933 (30)	4.5△	–	7.5	7.3	9.1	9.1	10.3	10.0	11.6	12.4	12.9	14.4	14.7	10.0	–	–	–	–	–			
	4.5□	–	7.0	8.5	9.0	9.7	10.2	10.5	12.3	12.7	13.4	14.8	–	–	15.0	–	–	–	–			
	6.0△	7.0	5.8	7.4	8.2	9.3	10.4	9.8	11.8	12.4	12.4	12.7	16.0	15.7	14.5	–	–	–	–			
	6.0□	7.0	7.9	7.5	8.6	9.3	11.0	11.5	11.5	11.4	13.4	12.0	13.0	11.0	–	–	–	–	–			
	8.0△	5.0	7.4	8.8	9.0	9.4	9.9	11.1	11.2	10.6	13.6	14.6	15.2	17.0	17.3	–	–	–	–			
	8.0□	6.0	6.2	8.2	7.9	8.4	9.5	10.5	11.2	12.2	13.1	12.8	14.5	15.7	13.5	18.5	–	–	16.0			
	No.		31	32	33	34	35	36	37	38	39	40										
1943 (40)	4.5△	–	–	6.0	6.9	7.3	7.4	8.6	9.7	10.7	11.1	11.5	11.2	12.0	12.8	9.0	–	–	–	–		
	4.5□	–	5.5	7.2	6.8	8.2	9.3	8.7	10.1	10.1	10.9	11.7	12.4	13.7	15.0	16.0	13.0	–	–	–		
	6.0△	5.5	5.0	6.2	6.5	8.5	9.0	8.4	10.2	10.6	11.1	10.4	12.7	14.7	13.7	16.3	18.5	18.0	16.5	–		
	6.0□	–	5.0	6.8	6.8	8.8	8.4	9.7	10.4	10.3	11.2	10.6	14.7	13.8	14.7	18.5	21.0	–	–	–		
	8.0△	–	5.0	6.0	8.7	8.8	8.3	10.3	9.1	10.9	11.2	11.4	11.2	11.7	17.3	14.5	15.8	16.5	–	–		
	8.0□	–	–	5.8	7.8	7.9	8.5	8.7	10.1	10.2	10.1	12.0	11.9	15.0	14.0	16.0	17.8	16.5	18.0	17.0		
	No.			41	42	43	44	45	46	47	48	49	50	51	52	53						

Table 51. (b) Larch (Larix Kaempferi)

	Plot \ D(Sun)	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10.0
1919 (16)	4.5△	5.3	5.3	5.7	5.8	6.3	6.3	8.0	–	–								
	4.5□	–	5.5	5.0	6.0	7.2	7.0	–	–	–								
	6.0△	5.0	5.8	6.1	6.9	6.7	7.8	7.7	–	–								
	6.0□	–	5.9	6.3	6.6	7.2	7.6	6.7	8.0	–								
	8.0△	–	5.5	6.5	6.8	7.2	7.7	7.6	11.0	10.0								
	8.0□	–	7.0	6.0	–	7.3	7.5	7.4	–	–								
	No.		1	2	–	3	4											
1926 (21)	4.5△	6.0	4.3	5.5	6.1	6.8	7.5	7.6	7.8	8.0	13.0	–						
	4.5□	–	–	–	7.0	7.5	7.0	8.3	10.0	–	–	–						
	6.0△	–	5.0	9.0	6.1	6.8	7.3	7.8	8.4	7.8	10.0	9.0						
	6.0□	–	–	6.0	6.1	6.4	7.0	8.1	8.3	8.0	7.0	9.5						
	8.0△	–	–	6.0	7.3	7.3	7.3	7.9	8.7	9.0	10.3	10.0						
	8.0□	–	–	7.0	6.5	–	7.3	8.0	8.8	7.3	7.0	–						
	No.				5	–	6	7	8									
1926 (27)	4.5△				6.0	5.6	7.3	8.1	7.8	7.8	8.3	8.0	13.0	–				
	4.5□				–	–	9.0	–	7.0	8.3	10.5	–	–	–				
	6.0△				–	6.0	6.5	7.6	7.5	8.8	9.3	11.0	11.0	9.0				
	6.0□				–	6.7	6.7	7.0	8.1	9.0	8.9	9.0	10.0	–				
	8.0△				–	7.0	6.7	7.5	8.0	8.6	8.8	10.3	9.0	11.5				
	8.0□				–	6.0	–	–	–	8.3	9.0	9.5	9.0	–				
	No.									9	10							

1933 (30)	4.5△	6.0	6.1	7.5	8.5	8.7	8.9	9.0	9.5	-	-	-					
	4.5□	-	-	-	8.0	6.0	10.0	8.3	9.0	-	-	-					
	6.0△	-	6.0	8.0	11.0	8.4	8.4	9.3	9.8	11.0	12.0	5.0					
	6.0□	-	6.0	7.3	8.4	8.6	8.7	9.9	9.0	9.0	-	-					
	8.0△	-	6.0	6.8	6.0	8.0	8.3	8.8	9.3	9.5	10.0	9.5					
	8.0□	-	5.0	-	-	-	8.3	9.5	8.5	11.0	-	-					
	No.						11	12	13								
1942 (39)	4.5△	10.0	-	9.0	8.0	7.0	9.2	9.0	10.3	11.0	11.7	12.0	-	16.0	-		
	4.5□	-	-	-	-	7.0	-	-	12.5	9.0	9.0	15.0	-	-	-		
	6.0△	-	-	-	-	-	-	9.6	11.0	11.2	11.0	12.3	10.0	11.5	-		
	6.0□	-	-	6.0	8.0	8.0	9.2	-	10.8	11.1	12.0	10.5	12.0	-	-		
	8.0△	-	-	-	9.0	-	9.0	9.5	10.3	9.8	9.6	11.7	11.0	12.0	14.0		
	8.0□	-	-	-	-	-	-	-	9.5	12.0	11.5	12.5	-	-	-		
	No.								14	15	16	17					

Table 52. The correlation coefficients (r) between tree-density and mean branch-spread of trees with respect to diameters for each age of the forest. (a) Pine (Pinus densiflora).

Year Age	D (Sun)	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10.0	10.5
1921	No.	1	2	3	4	5	6	7	8									
18	r	+0.61	+0.55	−0.10	−0.31	−0.17	+0.14	−0.30	−0.55									
	P.E of r	±0.17	±0.19	±0.27	±0.25	±0.27	±0.27	±0.25	±0.19									
1926	No.		9	10	11	12	13	14	15	16	17	18						
23	r		−0.02	−0.34	−0.28	−0.38	−0.06	+0.43	+0.19	−0.72	−0.57	−0.76						
	P.E of r		±0.28	±0.24	±0.25	±0.24	±0.27	±0.22	±0.27	±0.13	±0.19	±0.12						
1930	No.			19	20	21	22	23	24	25	26	27	28	29				
27	r			+0.66	+0.27	+0.27	+0.08	+0.02	+0.01	+0.38	−0.10	−0.52	−0.30	−0.06				
	P.E of r			±0.16	±0.20	±0.26	±0.27	±0.28	±0.28	±0.24	±0.20	±0.20	±0.24	±0.27				
1933	No.				30	31	32	33	34	35	36	37	38	39	40			
30	r				+0.23	−0.38	+0.59	+0.43	+0.33	−0.48	+0.72	+0.58	−0.54	+0.27	+0.06			
	P.E of r				±0.26	±0.24	±0.18	±0.22	±0.25	±0.21	±0.13	±0.18	±0.20	±0.26	±0.27			
1943	No.					41	42	43	44	45	46	47	48	49	50	51	52	53
40	r					+0.40	−0.63	−0.60	−0.16	−0.52	+0.17	−0.03	+0.32	−0.06	−0.13	−0.28	−0.52	−0.57
	P.E of r					±0.23	±0.17	±0.18	±0.27	±0.20	±0.27	±0.28	±0.25	±0.27	±0.27	±0.25	±0.20	±0.19

Notes : The unit of diameter is "Sun" 1Sun=$^1/_{10}$ "Shaku", 1Shaku=$^{10}/_{33}$ metre. P.E of r=Probable error of r

Table 52. (b) Larch (Larix Kaempferi).

	D (Sun)	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
1919	No.	1	2	-	3	4								
	r	−0.65	−0.77	-	−0.65	−0.84								
16	P.E of r	±0.16	±0.11	-	±0.16	±0.08								
1926	No.			5	-	6	7	8						
	r			−0.20	-	+0.07	−0.04	+0.02						
23	P.E of r			±0.26	-	±0.27	±0.27	±0.28						
1930	No.								9	10				
	r								−0.89	+0.22				
27	P.E of r								±0.07	±0.26				
1933	No.								11	12	13			
	r								+0.76	−0.52	+0.38			
30	P.E of r								±0.12	±0.20	±0.24			
1942	No.										14	15	16	17
	r										+0.57	−0.39	−0.20	±0.47
39	P.E of r										±0.19	±0.23	±0.26	±0.21