林試研報 Bull. For. & For. Prod. Res. Inst. No. 314, 1981 27～37

Studies on Scolytidae XXIII

The Ambrosia Beetles of the Genus *Xylosandrus* REITTER from Japan (Coleoptera)

By

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Summary : Four species of the Japanese *Xylosandrus* REITTER are recognized. Their synonymies are *Xylosandrus brevis* (EICHHOFF) (=*Xyleborus cucullatus* BLANDFORD) and *Xylosandrus germanus* (BLANDFORD) (=*Xyleborus orbatus* BLANDFORD). *Xylosandrus borealis* NOBUCHI is described as new to science. A key to the known Japanese species is provided. A list of host trees, notes on geographical distribution and biology, and an illustration of four species are included.

The genus *Xylosandrus* was established by REITTER in 1913 and included *Xyleborus morigerus* BLANDFORD as the type-species. This genus belongs to the tribe Xyleborini of the subfamily Ipinae. It is closely allied to *Xyleborus* ERICHSON, but quite differs in the distinctly separated anterior coxae by a broad and obtuse prosternal process, which is a distinct character of the Coleoptera as well as the Scolytidae. The genus contained about 27 known species as of 1974, and generally ranges from the tropics to the temperate zones throughout the whole world.

The first Japanese species was described as *Xyleborus compactus* EICHHOFF (1875). In 1877, EICHHOFF described *Xyleborus brevis* from Hagi, Yamaguchi Prefecture. BLANDFORD described a new species, *Xyleborus germanus*, from Oyayama, Nikko, Subashiri, Kiga, and Miyanoshita in a paper "The Rynchophorous Coleoptera of Japan, Part III, Scolytidae". In 1927, EGGERS published the first part of "Japanishe Borkenkäfer" and in this paper he wrote a description of the male *Xyleborus germanus*. HOFFMAN (1941), NUNBERG (1959), and BROWNE (1965) had transferred *Xyleborus germanus*, *Xyleborus compactus*, and *Xyleborus brevis* to the genus *Xylosandrus* REITTER. In 1962, MURAYAMA and KALSHOVEN synonymized *Xyleborus morstatti* EICHHOFF with *Xyleborus compactus* EICHHOFF. NOBUCHI (1964) gave a description of the male form of *Xylosandrus compactus*.

The species of *Xylosandrus* are extremely polygamous ambrosia beetles, with a high ratio of females to males, and sexual dimorphism is very strongly developed. The males never leave the parent nest, and the care of the new generation is entirely the responsibility of the female. They breed in twigs, shoots, or small branches of numerous species of trees, but *Xylosandrus germanus* is commonly found in large timber. They have all the general biological characteristics of the tribe Xyleborini. The species are not host specific, for example *Xylosandrus germanus* has been found in the wood of 156 species in widely separated families in Japan.

The present study is an attempt to make a revision of *Xylosandrus* occuring in Japan with a description of a new species, *Xylosandrus borealis*. This study is based on an examina-

Received November 4, 1980 保 護—29 Forest Protection—29

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tion of 1,244 specimens, including the specimens of *Xyleborus cucullatus* Blandford and *Xyleborus orbatus* Blandford without type label at the British Museum. The specimens used in this study are held at the Forestry and Forest Products Research Institute.

The author expresses his special appreciation to the late Keijiro Takahashi for the gift of materials and to Dr. R. T. Thompson for examining the Blandford's specimens at the British Museum.

Xylosandrus Reitter

Xylosandrus Reitter, 1913, Wien. ent. Ztg. 32 : 83; Balachowsky, 1949, Faune de France 50 : 219; Wood, 1961, Coleopts. Bull. 15 : 47; Browne, 1963, Ent. Ber. 23 : 54; Schedl, 1964, Reichenbachia, Mus. Tierk. Dresden 2 : 213.

Type-species : *Xyleborus morigerus* Blandford (monobasic)

Key to Japanese species

1. Female. Body cylindrical ····· 2
- Male. Body not cylindrical, strongly convex····· 5
2. Frons covered with fine rounded granules. Base of pronotum finely punctured; elytral interstriae with uniserial row of punctures; elytral declivity gradually and roundly sloping, not bordered by an edge in upper half; declivital striae consist of punctures ····· 3
- Frons covered with longitudinal carina-like tubercles. Base of pronotum granulate, not punctured; elytral interstriae irregularly punctured; elytral declivity abruptly truncate, bordered by an edge in margin; declivital striae consist of minute granulate····· 4
3. Body large (2.05～2.55 mm). Lateral sides of pronotum weakly rounded; striae glabrous··· ····· *Xylosandrus germanus* (Blandford) ♀
- Body small (1.35～1.65 mm). Lateral sides of pronotum more strongly rounded. Each strial puncture of elytra bearing a rather long, nearly erected hair-like seta····· ·····*Xylosandrus compactus* (Eichhoff) ♀
4. Body large (2.50～3.0 mm), blackish brown to black. Strial setae on elytral declivity short, nearly as long as interstrial setae·····*Xylosandrus brevis* (Eichhoff) ♀
- Body small (1.9～2.1 mm), yellowish brown. Strial setae on elytral declivity long, two or three times as long as interstrial setae·····*Xylosandrus borealis* n. sp. ♀
5. Body dark brown in mature specimens and large (2.25～2.95 mm). Each elytral interstria with irregular row of punctures. Anterior margin of pronotum roundly produced with declivous surface into a transverse lobe and reflexed. Base of pronotum covered with large punctures. Striae of elytral declivity consist of numerous granules ····· ·····*Xylosandrus brevis* (Eichhoff) ♂
- Body yellowish to reddish brown and small (1.2～1.85 mm). Each elytral interstria with a regular row of punctures. Anterior margin of pronotum only broadly rounded and not reflexed. Base of pronotum covered with fine punctures. Striae of elytral declivity consist of punctures ····· 6
6. Body large (1.2～1.85 mm). Elytal declivity less convex, impressed along latero-apical margins, which are reflexed, its striae without uniseriate setae···*Xylosandrus germenus* (Blandford) ♂
- Body small (1.5 mm). Elytral declivity convex, not impressed along latero-apical margins, which are not reflexed, its striae with uniseriate short setae····· ·····*Xylosandrus compactus* (Eichhoff) ♂

Xylosandrus brevis (EICHHOFF) (Figs. 1～4)

Xyleborus brevis EICHHOFF, 1877, Dtsch. ent. Z. 21 : 121 (♀, Hagi) ; EICHHOFF, 1879, Ratio, descriptio, emendatio erorum Tomicinorum p. 319; BLANDFORD, 1894, Trans. ent. Soc. London 1894 : 104; MURAYAMA, 1930, J. Chôsen nat. Hist. Soc. 11 : 23; MURAYAMA, 1931, Ann. zool. Japon. 13(2) : 42; SCHEDL, 1930, Cat. Coleopt. Reg. palaearct. F. 1645; MURAYAMA, 1936, Tenthredo 1 : 131; INOUYE, 1953, A Detailed Book of the Forest Insect Control 2 : 224; MURAYAMA, 1953, Trans. Shikoku ent. Soc. 3 : 156; MURAYAMA, 1953, Bull. Fac. Agr. Yamaguti Univ. 4 : 17; MURAYAMA, 1954, ibid. 5 : 176; MURAYAMA, 1955, ibid. 6 : 99, 102; KABE, 1955, Studies on the Galleries of Bark Beetles and Ambrosia Beetles p. 85; HISAMATSU, 1958, Kaju Engei 11(11) : 2; MURAYAMA, 1959, Nipponsan Kikuimushirui Shokkon Zusetsu p. 178; MURAYAMA, 1961, Publ. Ent. Lab., Univ. Osaka Pref. 6 : 99, 109; MURAYAMA, 1965, Scolytid-beetles from Niigata Prefecture, Japan 2 : 29.

Xyleborus (s. str.) *brevis* : HAGEDORN, 1910, Coleopt. Cat. 4 : 99; HAGEDORN, 1910, Gen. Ins. 111 : 152.

Xylosandrus brevis : BROWNE, 1965, Zool. Meded. 40(22) : 205; NOBUCHI, 1967, Bull. Gov. For. Exp. Sta. 207 : 20; NOBUCHI, 1969, ibid. 224 : 63; KO, 1969, A List of Forest Insect Pests in Korea. p. 287.

Xyleborus cucullatus BLANDFORD, 1894, Trans. ent. Soc. London 1894 : 121 (♂, Kurigahara and Konose in Higo); SCHEDL, 1932, Coleopt. Cat. F. 1646.

Xyleborus (s. str.) *cucullatus* : HAGEDORN, 1910, Coleopt. Cat. 4 : 101; HAGEDORN, 1910, Gen. Ins. 111 : 153.

Hosts : —*Smilax china* L., *Quercus serrata* THUNB., *Q. glauca* THUNB., *Q. myrsinaefolia* BLUME. *Q. salicina* BLUME, *Broussonetia kazinoki* SIEB., *Cinnamomum japonicum* SIEB., *Machilus thunbergii* SIEB. et ZUCC., *Lindera erythrocarpa* MAKINO, *L. umbellata* THUNB., *L. umbellata* THUNB. subsp. *membranacea* (MAXIM.) KITAM., *Parabenzoin praecox* (SIEB. et ZUCC.) NAKAI, *Hamamelis japonica* SIEB. et ZUCC. var. *obtusata* MATSUM., *Meliosma myriantha* SIEB. et ZUCC., *Camellia japonica* L., *Maesa tenera* MEZ., *Diospyros kaki* THUNB., *Weigela hortensis* (SIEB. et ZUCC.) K. KOCH.

Distribution : —Japan (Honshu, Shikoku, Kyushu), Korea, China (Taiwan), Thailand.

Two hundred and thirty-seven females and twenty-one males were examined from the following localities. Iwate : Mt. Hayachine. Akita : Obonai. Yamagata : Tachiyazawa. Gunma : Kirizumi. Tokyo : Mt. Takao, Meguro, Miyake Isl. (Taroike, Tsubota), Mikura Isl. (Kawata, Myogaike, Sato). Chiba : Mt. Kiyosumi, Tosaki. Yamanashi : Okishinbata. Niigata : Komanoyu, Tainaigoya. Shizuoka : Ikeshiro, Amagitoge. Kyoto : Kibune. Nara : Ohdaigahara. Wakayama : Mt. Ohto, Misatocho. Kochi : Ashizuri-misaki. Ehime : Mt. Ishizuchi. Fukuoka : Inunakitoge. Kumamoto : Amakusa. Miyazaki : Mt. Kirishima. Kagoshima : Uchinoura, Takarabe, Sata-misaki, Amamioshima (Higashinakama). Taiwan : Funkiko, Kenting Park, Sungkang. Thailand : Mae Klong.

Japanese name : —Hanemijika-kikuimushi (Kanakugino-kokikuimushi, INOUYE, 1953).

This species is not uncommon in Japan as a pin-hole borer of small, cut poles and branches of about 1.5～4.0 cms. diameter, and apparently not highly selective in its choice of hosts, although the Lauraceae are evidently strongly attractive to it. *Xyleborus cucullatus* BLANDFORD at the British Museum is correctly the male of this species.

Xylosandrus germanus (BLANDFORD) (Figs. 5～7)

Xyleborus germanus BLANDFORD, 1894, Trans. ent. Soc. London, 1894 : 106 (♀, Oyayama, Nikko,

Subashiri, Kiga, Miyanoshita); Niijima, 1909, J. Coll. Agr. Tohoku Imp. Univ. 3 : 157; Niijima, 1910, Trans. Sapporo nat. Hist. Soc. 3 : 4, 13; Niijima, 1913, ibid. 5 : 5; Niijima, 1913, Forest Entomology p. 154; Eggers, 1926, Entom. Blätter 22 : 145 (♂); Murayama, 1930, J. Chôsen nat. Hist. Soc. 11 : 24; Murayama, 1931, Annot. zool. Japon. 13 : 45, Schedl, 1932, Cat. Coleopt. Reg. palaearct. F. 1646; Murayama, 1934, Annot zool. Japon. 14 : 299; Murayama, 1936, Tenthredo, 1 : 132; Kôno, 1938, Ins. Mats. 12 : 72; Felt, 1932, J. Econ. Entomol. 25 : 418; Chamberlin, 1939, The Bark and Timber Beetles of North America, North of Mexico p. 456; Sawamoto, 1940, Ins. Mats., 14 : 107; Murayama, 1949, Matsumushi 3 : 103; Murayama, 1950, Icon. Ins. Japon. p. 1296; Murayama, 1951, Bull. Fac. Agr. Yamaguti Univ. 2 : 6; Murayama, 1953, ibid. 4 : 19, Inouye, 1953, A Detailed Books of Forest Insect Control 2 : 211; Murayama, 1953, Trans. Shikoku ent. Soc. 3 : 145, 148; Murayama, 1954, Bull. Fac. Agr. Yamaguti Univ. 5 : 178; Murayama, 1954, Yamaguchiken no Kikuimushi p. 14; Murayama, 1955, Bull. Fac. Agr. Yamaguti Univ. 6 : 100, 102, 104; Schedl, 1955, Ent. Arb. Mus. Frey 6 : 273; Pfeffer, 1955, Fauna ČSR 6 : 194; Kabe, 1955, Studies on the Galleries of Bark Beetles and Ambrosia Beetles in Japan p. 69; Schedl, 1956, Entom. Blätter 51 : 45; Hisamatsu, 1958, Kaju Engei 11(11) : 3; Nishiguchi, 1959, J. Jap. For. Soc. 41 : 271; Kabe, 1959, Nipponsan Kikuimushirui Shokkon Zusetsu p. 184; Schedl, 1960, Entom. Blätter 56 : 172; Ueno, 1960, Jap. J. appl. Ent. Zool. 4 : 166～172; Gyotoku, 1961, Proc. Assoc. Pl. Prot. Kyushu 7 : 54; Fukuda, 1961, Kaju Gaichu Hen p. 174 : Murayama, 1961, Akitu 10 : 26; Murayama, 1961, Publ. Ent. Lab., Univ. Osaka Pref. 6 : 100; Gyotoku, 1962, Proc. Assoc. Pl. Prot. Kyushu 8 : 13; Murayama, 1963, Plant. Prot., 17 : 341～345; Sawada, 1963, ibid. 17 : 346～350; Hisamatsu, 1964, Shikkoku Tyûho 12 : 49, 50; Kaneko, Tamaki & Takagi, 1965, Jap. J. appl. Ent. Zool. 9 : 23～29; Kaneko, 1965, ibid. 9 : 211～216; Takagi & Kaneko, 1965, ibid. 9 : 247～248, 298～300; Kaneko & Takagi, 1965, ibid. 9 : 303～304; Murayama, 1965, Scolytid Beetles from Niigata Pref. Japan 2 : 31; Murayama, 1965, A commentary upon the Distribution and Characteristics of the Scolytid-beetles, Insect Enemies of the Chestnut Trees, p. 15; Krivolutzkaya, 1965, Фауна Короедов Южных Курильских Островов, p. 242; Krivolutzkaya, 1965, Лесоводственные Исследования на Дальнем Востоке, p. 241; Takagi & Kaneko, 1966, Appl. Ent. Zool. 1 : 29～31; Kaneko & Takagi, 1966, ibid. 1 : 173～176; Kaneko, 1966, Bull. Tea. Res. Sta. 3 : 3～24; Kaneko, 1967, Jap. Agr. Res. Quart. 2(2) : 19～21; Kaneko, 1968, Biological Studies on Scolytid Ambrosia Beetles attacking tea plant with special reference to their symbionts pp. 1～53.

Xyleborus (s. str.) *germanus* : Hagedorn, 1910, Coleopt. Cat. 4 : 105; Hagedorn, 1910, Gen. Ins. 111 : 154.

Xylosandrus germanus : Hoffman, 1941, J. econ. Entomol. 34 : 38; Groschke, 1952, Ztschr. angew. Entom. 38 : 250～258; Wichmann, 1957, ibid. 40 : 82～99; W. Schedl, 1962, Sitzungsberichte der Österr. Akademie der Wissenschaften, Mathem.-naturw. Kl., Abt. 1, 171 : 372; Balachowsky, 1963, Entomologie appliquée a l'Agriculture 1 : 1289～1236; Browne, 1963, Ent. Ber., Amst. 23 : 55; Nobuchi, 1964, Shinrin Boeki News 13 : 147～150; Gyotoku, 1965, Kita Kyushu no Kontyû 12 : 55; Nobuchi, 1966, Bull. Gov. For. Exp. Sta. 185 : 25; Yoshida & Fukami, 1973, Forest Pests 22 : 55～59; Yoshida et al., 1975, Jap. J. appl. Ent. Zool. 19 : 193～202; Sato, 1975, Res. Bull. Pl. Prot. Japan 12 : 22; Nobuchi, 1967, Bull. Gov. For. Exp. Sta. 207 : 21; Nobuchi, 1969, ibid. 224 : 63; Schneider & Farries, 1969, Can. Entomol. 101 : 412～415; Ko, 1969, A List of Forest Insect Pests in Korea, p. 287; Nobuchi, 1978, Bull. Gov. For. Exp. Sta. 301 : 11; Webber, 1978, USDA For. Ser., Gen. Tech. Rep. 52 : 63～67; Minamikawa & Keibe, 1979, Chajuno Gaityû, p. 208.

Xyleborus orbatus Blandford, 1984, Trans. ent. Soc. London 1894 : 123 (♂, Kurigahara); Schedl, 1934, Coleopt. Cat. Reg. palaearct. F. 1646; Murayama, 1954, Bull. Fac. Agr. Yamaguti Univ. 5 : 181.

Xyleborus (s. str.) *orbatus* : Hagedorn, 1910, Coleopt. Cat. 4 : 108; Hagedorn, 1910, Coleopt. Cat. 4 : 108; Hagedorn, 1910, Gen. Ins. 111 : 155.

Hosts : —*Torreya nucifera* Sieb. et Zucc. var. *radicans* Nakai, *Cephalotaxus harrigtonia* K. Koch subsp. *nana* (Nakai) Kitagawa, *Abies firma* Sieb. et Zucc., *Tsuga sieboldii* Carr., *Picea excelsa* Lk., *Larix leptolepis* Gord., *Pinus densiflora* Sieb. et Zucc., *P. pentaphylla* May, *Cryptomeria japonica* D. Don, *Chamaecyparis obtusa* Endl., *Chamaecyparis pisifera* Endl., *Thujopsis dolabrata* Sieb. et Zucc., *Myrica rubra* Sieb. et Zucc., *Juglans mandschurica* Maxim. subsp. *sieboldiana* (Maxim.) Kitam., *Pterocarya rhoifolia* Sieb. et Zucc., *Carpinus tschonoskii* Maxim., *Betula platyphylla* Sukatchev var. *japonica* (Miq.) Hara, *B. grossa* Sieb. et Zucc., *Alnus hirsuta* Turcz. var. *sibirica* C. K. Schneid, *A. japonica* Steud., *Fagus crenata* Blume, *F. japonica* Maxim., *Quercus dentata* Thunb., *Q. mongolica* Fisch. var. *grossesserrata* Rehd. et Wils., *Q. serrata* Thunb., *Q. sessilifolia* Blume, *Q. acuta* Thunb., *Q. myrsinaefolia* Blume, *Castanea crenata* Sieb. et Zucc., *Castanopsis cuspidata* (Thunb.) Schottky. *C. cuspidata* (Thunb.) Schottky var. *sieboldii* (Mak.) Nakai, *Ulmus davidiana* Planchcn var. *japonica* (Rhd.) Nakai, *U. laciniata* (Trautv.) Mayr, *Zelkova serrata* (Thunb.) Makino, *Celtis sinensis* Pers. var. *japonica* (Planch.) Nakai, *Aphananthe aspera* (Thunb.) Planch., *Morus alba* L., *M. bombycis* Kiodz., *Broussonetia kazinoki* Sieb., *Ficus carica* L. var. *johannis* Boiss., *Trochodendron aralioides* Sieb. et Zucc., *Cercidiphyllum japonicum* Sieb. et Zucc., *Magnolia obovata* Thunb., *M. kobus* DC., *Illicium religiosum* Sieb. et Zucc., *Cinnamomum camphora* (Linn.) Sieb., *C. japonicum* Sieb. et Zucc., *Machilus thunbergii* Sieb. et Zucc., *M. japonica* Sieb. et Zucc., *Lindera umbellata* Thunb., *L. umbellata* Thunb. subsp. *membranacea* (Maxim.) Kitam., *Parabenzoin praecox* (Sieb. et Zucc.) Nakai, *Neolitsea sericea* (Blume) Koidz., *Actinodaphne longifolia* (Blume) Nakai, *Litsea japonica* (Thunb.) Juss., *Hydrangea petiolans* Sieb. et Zucc., *H. paniculata* Sieb., *Deutia crenata* Sieb. et Zucc., *Hamamelis japonica* Sieb. et Zucc. var. *obtusata* Matsum., *Distylium racemosum* Sieb. et Zucc., *Rubus crataegifolius* Bunge, *R. palmatus* Thunb., *Prunus grayana* Maxim., *P. apetala* (Sieb. et Zucc.) Fr. et Sav. var. *pilosa* (Koidz.) Wilson, *P. sargentii* Rehd., *P. sargentii* Rehd. subsp. *jamasakura* (Sieb.) Ohwi, *P. lannesiana* (Carr.) Wils. subsp. *verecunda* (Koidz.) Ohwi, *Malus pumila* Mill., *Sorbus commixta* Hedl., *S. alnifolia* (Sieb. et Zucc.) C. Koch, *Albizzia julibrissin* Durazz., *Gleditsia japonica* Miq., *Wisteria floribunda* (Willd.), *Acasia mollisima* Willd., *Robinia pseudo-acacia* Linn., *Zanthoxylum piperitum* (Linn.) DC., *Z. schinifolium* Sieb. et Zucc., *Z. ailanthoides* Sieb. et Zucc., *Evodia glauca* Miq., *Phellodendron amurense* Rupr. var. *sachalinense* Fr. Schm., *Picrasma quassioides* (D. Don) Benn., *Melia azedarach* Linn. var. *subtripinnata* Miquel, *Mallotus japonicus* (Thunb.) Muell. Arg., *Rhus ambigua* Lav., *R. chinensis* Mill., *R. succedanea* Linn., *R. trichocarpa* Miq., *R. verniciflua* Stokes, *R. silvestris* Sieb. et Zucc., *Ilex macropoda* Miq., *I. pedunculosa* Miq., *Euonymus sieboldianus* Blume var. *sanguineus* Nakai, *Acer rufinerve* Sieb. et Zucc., *A. mono* Maxim., *A. japonicum* Thunb., *A. palmatum* Thunb. subsp. *matsumurae* Koidz., *A. micranthum* Sieb. et Zucc., *A. cissifolium* (Sieb. et Zucc.) K. Koch, *Aesculus turbinata* Blume, *Rhamnus crenata* Sieb. et Zucc., *Hovenia dulcis* Thunb., *Vitis vinifera* L., *V. coignetiae* Pulliat, *Ampelopsis brevipedunculata* (Maxim.) Trautv. var. *heterophylla* (Thunb.) Hara, *Tilia japonica* Simk., *Firmiana platanifolia* (Linn. f.) Schott et Endl., *Hibiscus syriacus* Linn., *Camellia japonica* L., *C. japonica* L. subsp. *rusticana* (Honda) Kitamura, *C. sinensis* (L.) O. Kuntze, *Stewartia monadelpha* Sieb. et Zucc., *Cleyera japonica* Thunb., *Eurya emarginata* (Thunb.) Makino, *Stachyurus praecox* Sieb. et Zucc., *Alangium premnifolium* Ohwi, *Schefflera octophylla* (Lour.) Harms., *Fatsia japonica* (Thunb.) Decne. et Planch., *Acanthopanax sciadophylloides* Fr. et Sav., *Evodiopanax innovans*

(Sieb. et Zucc.) Nakai, *Kalopanax septemlobus* (Thunb.) Koidz., *Aucuba japonica* Thunb., *Cornus controversa* Hemsl., *C. kousa* Buerg., *Clethra barbinervis* Sieb. et Zucc., *Rhododendron metternichii* Sieb. et Zucc., *R. nipponicum* Matsum., *R. macrosepalum* Maxim., *Lyonia elliptica* (Sieb. et Zucc.) Okuyama, *Vaccinium oldhami* Miq., *Maesa tenera* Mez., *Ardisia sieboldii* Miq. *Diospyros kaki* Thunb., *Styrax japonica* Sieb. et Zucc., *S. obassia* Sieb. et Zucc., *Fraxinus mandshurica* Rupr. var. *japonica* Maxim., *F. longicuspis* Sieb. et Zucc., *F. lanuginosa* Koidzumi var. *serrata* Nakai, *Callicarpa japonica* Thunb., *Clerodendron trichotomum* Thunb., *Premna japonica* Miq., *Paulownia tomentosa* (Thunb.) Steud., *Catalpa ovata* G. Don, *Sambucus racemosa* Linn. subsp. *sieboldiana* (Miq.) Hara, *Viburnum plicatum* Thunb. var. *tomentosum* (Thunb.) Maq., *V. dilatatum* Thunb., *Weigela hortensis* (Sieb. et Zucc.) K. Koch.

Distribution : —Japan (Hokkaido, Honshu, Shikoku, Kyushu, Okinawa), Kurils, Korea, China (North East, Fukien, Taiwan), Vietnam, United States (introduced), Central Europe (introduced).

Eight hundred and thirty females and twelve males were examined from the following localities. Hokkaido : Takinoue, Bibai Mt. Moiwa, Hokeikyo, Jyozankei, Muroran, Kanayama, Gamushi. Aomori : Mt. Hakkoda, Ohwani. Iwate : Mt. Hyachine. Akita : Shizukuishi. Yamagata : Iidagawa, Shinjo, Shirataka, Nukumidaira, Tachiyazawa, Hinatami. Gunma : Numaziri, Marunuma, Yunokoya, Kirizumi, Maebashi. Tokyo : Mt. Kumotori, Nippara, Itsukaichi, Mt. Takao, Asakawa, Miyake Isl. (Tsubota, Izu, Mt. Oyama), Mikura Isl. (Myogaike, Kawada, Akazawa, Nangoh). Chiba : Tosaki. Kanagawa : Yabitsutoge, Fudakake. Yamanashi : Masutomi, Saiko, Mt. Fuji, Okishinbata. Niigata : Komanoyu, Kurokawa, Muramatsu. Nagano : Shimajima. Shizuoka : Sengen, Ohdaru, Mt. Amagi, Ohsawaonsen, Yokokawa. Ishikawa : Hakusan. Kyoto : Ôhara, Kibune, Ashû. Nara : Tsuchiyabara. Wakayama : Kitayamamura, Mts. Hatenashi, Mt. Ohto, Masatocho, Hanadonomura, Shimizucho, Mt. Gomazan, Ohshima, Mt. Nachi, Mt. Myoko, Kozagawacho, Takimoto, Ohkawa, Hirase, Ohsugi, Ryujin-onsen, Shionomisaki. Hyogo : Sukazawa. Tottori : Mt. Daisen. Kochi : Murotomisaki, Yanase, Kochi, Ashizurimisaki. Ehime : Mt. Ishizuchi. Fukuoka : Inunakitoge, Miyata, Kumada, Ukiha, Biwamachi, Mt. Hiko. Nagasaki : Mt. Aoidake. Miyazaki : Mt. Aoidake, Aogashima. Kagoshima : Mt. Takakuma, Takarabe, Kôyama, Uchinoura, Satamisaki, Yakushima (Kosugidani, Kurio). Okinawa : Honto (Shuri, Kozadake, Arakawa), Ishigaki (Sakieda). Korea : Chunkng, Chung Puku, Wajun, Kunju, Zennan Koshu. Taiwan : Keelung, Wulai, Funkiko. Germany : Darmstaat. United States : Oakland.

Japanese name : —Hannoki-kikuimushi (Minashigo-kikuimushi for *orbatus*; Himetsutsukikui, Sawamoto 1940; Chano-koshinkui, Minamikawa 1957).

Remarks : —This species is probably the most abundant ambrosia beetle of the Japanese archipelago and usually breeds only in dying, cut, or recently dead trees in forests. The species is not very size-selective in its choice of a host, and will attack fairly small branches and poles as well as large logs, and has been found in seasoned sawn timber. In larger material, the entrance tunnel of the nest is more or less radial into the wood. At the end, the tunnel has a rather large brood chamber in the longitudinal plane, and this is usually markedly deeper above than below the tunnel. In twigs and small branches, the nest has a radial entrance tunnel and a longitudinal tunnel on each side of it in the pith. The frass is pushed out of the entrance hole in the form of compact cylinders.

The pin-holes of this beetle cause the reduction of an aesthetic value, and also the invasion of blue stain or wood-rooting fungi in the wood of broad-leaved trees. On some occasions the

heaviest damage to green logs results in the destruction of useful Japanese cedar (Sugi) and Japanese cypress (Hinoki) in logging area of Western Japan. The beetle sometimes attacks standing green fruit trees, such as chestunt and grapevine, and breeds for generation in living wood. In tea, the beetle seems to prefer roots to twigs in living trees, because roots are more moist than twigs or stems, and may be favorable for the growth of the ambrosia fungus spores on which the larvae feed.

Its biology and control has been described by Inouye (1953), Kabe (1955), Ueno (1960), Sawada (1963), Kaneko, Tamaki and Takagi (1965), Kaneko (1966), Takagi and Kaneko (1966), Kaneko (1967), Kaneko (1978) and Yoshida et al. (1975) in Japan. According to Takagi and Kaneko (1966), the sex determination in this beetle is of the haplo-diploid type. Virgin females lay only haploid eggs and produce parthenogenetically male progeny, when they are supplied with the ambrosia fungi. Mated females lay haploid and diploid eggs in the ratio of about 9 : 1 and produce adults in the sex-ratio 9 : 1 (♀ : ♂).

The artificial rearing of this species and *Xylosandrus compactus* was succeeded in test tubes containing stem-sterilized tea twigs, roots, and mulbery stems as food materials under the laboratory conditions.

Xyleborus orbatus Blandford at the British Museum is correctly the male of this species.

Xylosandrus compactus (Eichhoff) (Figs. 8～10)

Xyleborus compactus Eichhoff, 1875, Ann. Soc. ent. Belg. 18 : 202 (♀, Japan); Eichhoff, 1877, Dtsch. ent. Z., 21 : 123; Eichhoff, 1879, Ratio, descriptio, emendatio erorum Tomicinorum, p. 328; Blandford, 1894, Trans. ent. Soc. London 1894 : 107; Hagedorn, 1912, Entom. Blätter 2 : 39; Green, 1912, Trop. Agr. Trin. 38 : 39; Speyer, 1923, Bull. ent. Res. 14(16～17) : 22; Schedl, 1932. Cat. Coleopt. Reg. palaearct. F. 1646; Murayama, 1934, Annot. zool. Japon. 14 : 299; Murayama, 1949, Matsumushi 3 : 102; Murayama, 1952, Bull. Fac. Agr. Yamaguti Univ. 3 : 20; Murayama, 1953, Trans. Shikoku ent. Soc. 3 : 156; Inouye, 1953, A Detailed Book of the Forest Insect Control 2 : 224; Murayama, 1954, Bull. Fac. Agr. Yamaguti Univ. 5 : 176; Murayama, 1955, ibid. 6 : 99; Kabe, 1959, Nipponsan Kikuimushirui Shokkon Zusetsu p. 178; Schedl, 1959, Trans. Roy. ent. Soc. 3 : 470; Kabe, 1960, On the Hosts and Habits of the Scolytid and Platypodid Beetles from Japan p. 57; Murayama, 1961, Akitu 10 : 26; Murayama, 1961, Publ. Ent. Lab., Univ. Osaka Pref. 6 : 99; Murayama & Kalshoven, 1962, Ent. Ber., Amst. 22 : 247; Kaneko, Tamaki & Takagi, 1965, Jap. J. appl. Ent. Zool. 9 : 23～29; Kaneko, 1965, ibid. 9 : 211～216; Kaneko & Takagi, 1966, Appl. Ent. Zool. 1 : 173～176; Kaneko, 1967, Jap. Agric. Res. Quart. 2(2) : 19～21.

Xyleborus (s. str.) *compactus* : Hagedorn, 1910, Coleopt. Cat. 4 : 100; Hagedorn, 1910, Gen. Ins. 111 : 153.

Xylosandrus compactus : Nunberg, 1959, Beitr. Ent. 9 : 434; Browne, 1963, Ent. Ber., Amst. 23 : 55; Browne, 1963, Bull. ent. Res. 54 : 246; Nobuchi, 1964, Bull. Gov. For. Exp. Sta. 171 : 131 (♂); Gyotoku, 1965, Kita Kyushu no Kontyû 12 : 55; Bright, 1968, Can. Entomol. 100 : 1294; Schedl, 1969, Ent. Arb. Mus. Frey 18 : 101; Schedl, 1971, Ent. Scand. Suppl. 1 : 276; Schedl, 1971, Orient. Ins. 5 : 366, 367; Schedl, 1971, Opusc. Zool. Budapest 119 : 1, 3; Schedl, 1972, Ann. Hist.-nat. Mus. natn. Hungarici 64 : 284; Nobuchi, 1973, Kontyû 41 : 181; Browne, 1974, Commonw. For. Rev. 53 : 65; Schedl, 1975, Folia Ent. Hungarica 28 : 353; Beaver, 1976, Bull. ent. Res. 65 : 543; Minamikawa & Keibe, 1979, Chaju no Gaityû, p. 212.

Xyleborus morstatti Hagedorn, 1912, Entom. Blätter 8 : 37 (♀♂, Deutsch-Ostafrica); Murayama & Kalshoven, 1962, Ent. Ber., Amst. 22 : 247 (=*X. compactus*).

Hosts : —*Quercus glauca* Thunb., *Q. myrsinaefolia* Blume, *Castanopsis cuspidata* (Thunb.) Schottky, *C. cuspidata* (Thunb.) Schottky var. *sieboldii* (Mak.) Nakai, *Nandina domestica* Thunb., *Cinnamomum camphora* (Linn.) Sieb., *C. japonicum* Sieb., *Machilus thunbergii* Sieb. et Zucc., *Laurus nobilis* Linn., *Leucaena glauca* Benth., *Acasia mollisima* Willd., *Albizzia julibrissin* Durazz, *Prunus sargentii* Rehd. subsp. *jamasakura* (Sieb.) Ohwi, *Zanthoxylum piperitum* (Linn.) DC., *Elaeocarpus sylvestris* (Lour.) Poir. var. *ellipticus* (Thunb.) Hara, *Camellia sinensis* (L.) O. Kuntze, *Nissa sylvatica* Marshall, *Diospyros kaki* Thunb., *Olea europaea* Linn.

Distribution : —Japan (Honshu, Shikoku, Kyushu, Okinawa, Bonin Isls.), China (North East, Taiwan), Philippines, Tonkin, Indo-China, India, Ceylon, Malaya, Borneo, Sumatra, Java, Celebes, Fiji, Samoa, Hawaii, Seychelles, Mauritius, Madagascar, Africa, United States.

One hundred and thirty-four females and two males were examined from the following localities. Tokyo : Meguro, Sayama, Asakawa, Miyake Isl. (Tsubota, Mt. Oyama), Bonin Isls. Chiba : Tosaki. Wakayama : Ohshima. Fukuoka : Ukiha. Kagoshima : Ikeda, Satamisaki, Yakushima (Onoaida, Kurio), Amani Isls. (Sakasegawa). Okinawa : Honto (Nagodake, Nakizin, Ohozato, Yona), Ishigaki (Sakieda), Taiwan : Wulai.

Japanese name : Shiino-kokikuimushi.

Remarks : —This is a widely distributed species that is known chiefly as a pest of coffee in the tropics. The damage caused by the beetles for economically valuable plants occurs in the twigs of tea in Japan, and the beetles prefer to attack healthy twigs than dead or cut twigs.

The entrance of the nest runs radially to the pith, where a longitudinal tunnel is made on both sides of it, and here the young brood lives and pupates. Its biology has been reported by Kaneko, Tamaki, and Takagi (1965), Kaneko (1965), Kaneko and Takagi (1966), Kaneko (1967) in Japan.

Xyleborus borealis n. sp. (Figs. 11, 12)

Female. Body 1.9～2.1 mm long, short, cylindrical, about 2.08 times as long as wide, yellowish brown; mandibles and epistomal margin reddish to blackish brown; eyes black.

Frons shining, weakly convex, with a weak median longitudinal line, minutely reticulate, sparsely covered with longitudinal minute carina-like tubercles and rather long hair-like setae.

Pronotum shining, nearly as long as wide; base truncate; basal angles rounded; lateral sides gently rounded, widest in basal third of pronotal length, then roundly narrowing anteriorly, roundly connected with anterior margin, not forming antro-lateral angles; anterior margin broadly rounded, without marginal teeth; disc convex, without a distinct transverse elevation; the summit situated near basal third; its anterior area roundly sloping, rather coarsely covered with numerous asperities in concentric lines; interspaces of asperities finely reticulate, covered with long erect hair-like setae and short semi-decumbent hair-like setae; the posterior area finely reticulate and rather closely granulate, the granules denser in the middle, covered with short semi-decumbent hair-like setae which become dense, long and erect in the middle. Scutellum shining, large, nearly triangular. Elytra shining, somewhat longer than pronotum, about 1.08 times as long as wide, nearly as wide as base of pronotum; basal margin truncate, nearly straight; lateral margins nearly straight, slightly widened to declivital margin, forming postero-lateral angles; apical margin roundly constricted to suture, distinctly carinate; disc cylindrical, subvertically truncate behind from posterior two-fifths; striae nar-

row, not impressed, with uniserial row of small round punctures, which are separated by a distance greater than their own diameters, denser posteriorly, and usually bearing minute hair-like setae; interstriae wide, flat, irregularly covered with distinct punctures, which are somewhat smaller than strial punctures, bearing a long, erect, hair-like setae; all punctures become smaller towards apex. Declivity not shining, strongly abrupt, nearly circular, subconvex, edged all round, smooth and shining along suture, with four or five rows of granules, each of which bears rather short semi-decumbent hair-like seta; tubercles along suture very fine; interspaces of the rows irregularly covered with fine granules, each of which bears a long erect hair-like setae, carinate margins at under half of decliviy finely crenulate.

Male. Unknown.

Holotype : ♀, Mt. Takao, Tokyo, Nov. 17, 1953, K. Takahashi leg.

Paratypes : 5 ♀♀, the same data as the holotype; 1 ♀, Mt. Takao, Sept. 20, 1964, K. Takanashi leg; 1 ♀, Ikeda, Kagoshima, Jun. 4, 1964, K. Takahashi leg.

The holotype and paratypes are preserved in the collection of the Forestry and Forest Products Research Institute.

Host : —Unknown.

Distribution : —Japan (Honshu, Kyushu).

Japanese name. Hime-hanemizika-kikuimushi.

Remarks : —This new species is closely allied to *Xylosandrus brevis* (Eichhoff), but may be distinguished by the less weak and shorter median longitudinal line on the frons; by sparser, weak, and narrow asperate on the pronotum; by longer setae on the asperate area of the pronotum; and by sparser granules and distinctly sparser and longer setae on the interstriae of the elytral declivity.

Explanation of Figures

Figs. 1～4　*Xylosandrus brevis* (Eichhoff)

Fig. 1　Female, dorsal aspect.　Fig. 2　Female, ventral aspect, C : coxa.

Fig. 3　Male, dorsal aspect.　Fig. 4　Male, lateral aspect.

Figs. 5～7　*Xylosandrus germanus* (Blandford)

Fig. 5　Female, dorsal aspect.　Fig. 6　Male, dorsal aspect.

Fig. 7　Male, lateral aspect.

Figs. 8～10　*Xylosandrus compactus* (Eichhoff)

Fig. 8　Female, dorsal aspect.　Fig. 9　Male, dorsal aspect.

Fig. 10　Male, lateral aspect.

Figs. 11～12　*Xylosandrus borealis* n. sp.

Fig. 11　Female, dorsal aspect.　Fig. 12　Female, elytral declivity, caudal aspect.

キクイムシ科の研究　第23報

日本産 *Xylosandrus* 属（甲虫目）

野　淵　　輝[1]

Xylosandrus 属のキクイムシは Ipinae 亜科のザイノキクイムシ族に属し，材中に巣を作り，アンブロシア菌を食い生育する養菌性のキクイムシである。日本に分布する種類は，今回の研究で4種が判明した。

この属に含まれるハンノキキクイムシはスギ，ヒノキなどの針葉樹やブナなどの広葉樹の生丸太の害虫で，ピンホールによる直接的被害のほか，腐朽菌の侵入を促進させる間接的被害によって材質を著しく低下させている。この種類は，果樹園においてブドウ，カキ，クリに穿入し，致命的な被害をあたえ，茶園においてはチャノキの根部に穿孔食害して枯死に至らしめ，永年作物の害虫となっている。また，これは日本起源の種であるが，日本の輸出材に穿孔していた個体が戦前ドイツ，アメリカ合衆国に侵入定着し，カエデ，ニレ，クルミやカシの若齢造林木，ブドウなどの生立木や各種の生丸太を加害している。シイノコキクイムシは熱帯地方ではコーヒーの害虫として有名であるが，日本では茶園の小枝の害虫とされている。

この属は1913年に Reitter が，前肢の基節が互に離れていることを特徴としてザイノキクイムシ属 *Xyleborus* Erichson から分離独立させたもので，ザイノキクイムシ属と形態，生態ともに類似した小さな属であり，普通世界各地の温帯，熱帯に分布している。

筆者は大英博物館の標本，故高橋慶二郎氏収集の標本，ならびに筆者自身収集した標本1,244点について分類学的研究を実施した。その結果ヒメハネミジカキクイムシを新種として発見し，*Xyleborus cucullatus* Blandford がハネミジカキクイムシの雄で，ミナシゴキクイムシがハンノキキクイムシの雄であることが判明した。本報告は，これらの記載と同定を容易ならしめるため全種の検索表を作成し，全形図を図示した。また，記録された全種の加害樹種と分布を列記した。種名，加害樹種，分布は次の通りである。

1. ハネミジカキクイムシ *Xylosandrus brevis* (Eichhoff)

　異　　名：*Xyleborus cucullatus* Blandford

　加害樹種：サルトリイバラ，コナラ，アラカシ，シラカシ，ウラジロガシ，コウゾ，ヤブニッケイ，タブノキ，カナクギノキ，クロモジ，オオバクロモジ，アブラチャン，マルバマンサク，アワブキ，ツバキ，シマイズセンリョウ，カキ，タニウツギ。

　分　　布：日本（本州，四国，九州），朝鮮，支那（台湾省），タイ。

2. ハンノキキクイムシ *Xylosandrus germanus* (Blandford)

　異　　名：ミナシゴキクイムシ *Xyleborus orbatus* Blandford

　加害樹種：チャボガヤ，ハイイヌガヤ，モミ，ツガ，オウシュウトウヒ，カラマツ，アカマツ，ヒメコマツ，スギ，ヒノキ，サワラ，アスナロ，ヤマモモ，オニグルミ，サワグルミ，イ

1980年11月4日受理

(1) 保　護　部

ヌシデ，シラカンバ，ミズメ，ヤマハンノキ，ハンノキ，ブナ，イヌブナ，カシワ，ミズナラ，コナラ，ツクバネガシ，アカガシ，ウラジロガシ，クリ，ツブラジイ，スダジイ，ハルニレ，オヒョウ，ケヤキ，エノキ，ムクノキ，クワ，ヤマグワ，コウゾ，イチジク，ヤマグルマ，カツラ，ホオノキ，コブシ，シキミ，クスノキ，ヤブニッケイ，タブノキ，ホソバタブ，クロモジ，オオバクロモジ，アブラチャン，シロダモ，バリバリノキ，ハマビワ，ツルアジサイ，ノリウツギ，ウツギ，マルバマンサク，イスノキ，クマイチゴ，ナガバモミジイチゴ，ウワミズザクラ，チョウジザクラ，オオヤマザクラ，ヤマザクラ，カスミザクラ，セイヨウリンゴ，ナナカマド，アズキナシ，ネムノキ，サイカチ，アカシア，モリシマアカシア，ハリエンジュ，サンショウ，イヌザンショウ，カラスザンショウ，ハマセンダン，ヒロハノキハダ，ニガキ，センダン，アカメガシワ，ツタウルシ，ヌルデ，ハゼノキ，ヤマウルシ，ウルシ，ヤマハゼ，アオハダ，ソヨゴ，カントウマユミ，ウリハダカエデ，イタヤカエデ，ハウチワカエデ，ヤマモミジ，コミネカエデ，ミツカエデ，トチノキ，イソノキ，ケンポナシ，ブドウ，ヤマブドウ，ノブドウ，シナノキ，アオギリ，ムクゲ，ツバキ，ヤブツバキ，チャノキ，ヒメシャラ，サカキ，ハマヒサカキ，キブシ，シマウリノキ，フカノキ，ヤツデ，コシアブラ，タカノツメ，ハリギリ，アオキ，ミズキ，ヤマボウシ，リョウブ，ツクシシャクナゲ，オオバツツジ，モチツツジ，ネジキ，ナツハゼ，シマイズセンリョウ，モクタチバナ，カキ，エゴノキ，ハクウンボク，ヤチダモ，ヤマトアオダモ，コバノトネリコ，ムラサキシキブ，クサギ，ハマクサギ，キリ，キササゲ，ニワトコ，ヤブデマリ，ガマズミ，タニウツギ。

分　布：日本（北海道，本州，四国，九州，沖縄）クリル，朝鮮，支那（東北地方，福建省，台湾省），ベトナム，アメリカ合衆国，中央ヨーロッパ。

3. シイノコキクイムシ *Xylosandrus compactus* (Eichhoff)

異　名：*Xyleborus morstatii* Hagedorn

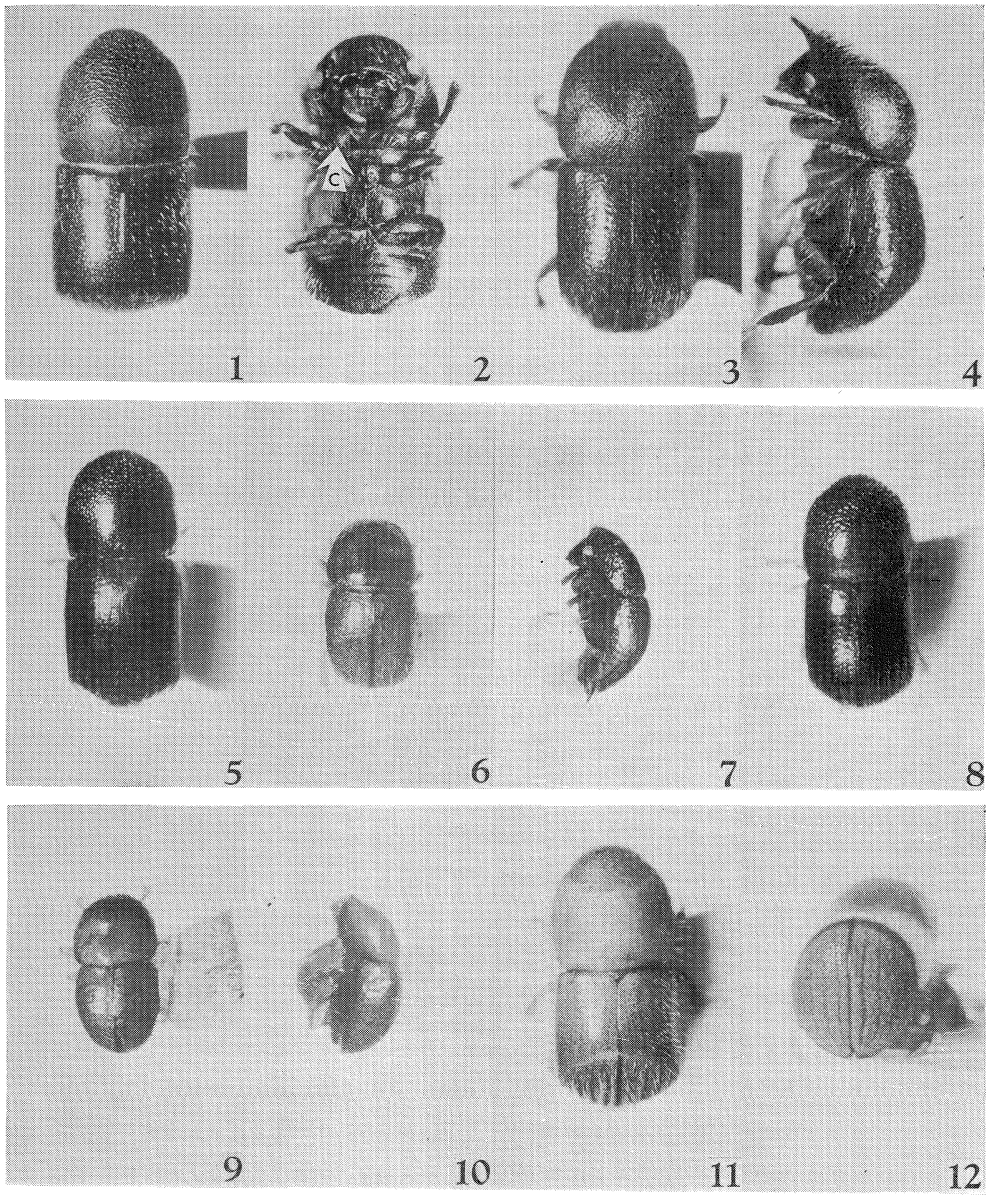
加害樹種：アラカシ，シラカシ，ツブラジイ，スダジイ，ナンテン，クスノキ，ヤブニッケイ，タブノキ，ゲッケイジュ，ギンネム，モリシマアカシア，ネムノキ，ヤマザクラ，サンショウ，ホルトノキ，チャノキ，ニッサ，カキ，オリーブ。

分　布：日本（本州，四国，九州，沖縄，小笠原），支那（東北地方，台湾省），フィリピン，トンキン，インドシナ，インド，セイロン，マラヤ，ボルネオ，スマトラ，ジャワ，セレベス，フィジー，サモア，ハワイ，セイチェルズ，マウリチャス，マダガスカル，アフリカ，アメリカ合衆国。

4. ヒメハネミジカキクイムシ（新種）*Xylosandrus borealis* Nobuchi n. sp.

加害樹種：不明。

分　布：日本（本州，九州）。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