A review of the weevil fauna (Coleoptera, Curculionoidea) of *Araucaria angustifolia* (Bert.) O. Kuntze (Araucariaceae) in South Brazil [1]

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ABSTRACT. The beetle superfamily Curculionoidea includes 43 species associated with *Araucaria angustifolia* trees in South Brazil. These weevil species belong to the families Nemonychidae (*Brarus* Kuschel, 1997, *Rhynchitoplesius* Voss, 1952), Brentidae (*Taphroderes* Schönherr, 1826) and Curculionidae, the latter including the subfamilies Curculioninae (*Heilipodus* Kuschel, 1955, *Spermologus* Schönherr, 1843), Cossoninae (*Araucarius* Kuschel, 1966, *Eurycorynophorus* Voss, 1964), Scolytinae (*Ambrosiodmus* Hopkins, 1915, *Araptus* Eichhoff, 1871, *Cnesinus* LeConte, 1868, *Corthylus* Erichson, 1836, *Cryptocarenus* Eggers, 1936, *Hypothenemus* Westwood, 1834, *Monarthrum* Kirsch, 1866, *Pagiocerus* Eichhoff, 1868, *Phloeotribus* Latreille, 1896, *Pityophthorus* Eichhoff, 1864, *Xylechinosomus* Schedl, 1963, *Xyleborus* Eichhoff, 1864, *Xyleborinus* Reitter, 1913) and Platypodinae (*Cenocephalus* Chapuis, 1865, *Platypus* Herbst, 1893, *Tesserocerus* Saunders, 1836). A checklist of all species including remarks on their life histories and taxonomic notes are presented. In addition, a key for the identification of adult Curculionoidea associated with *Araucaria angustifolia* to genus or species level is provided.
KEY WORDS. Key.

RESUMO. A superfamília Curculionoidea compreende 43 espécies associadas à *Araucaria angustifolia* no sul do Brasil. As espécies destes gorgulhos pertencem às famílias Nemonychidae (*Brarus* Kuschel, 1997, *Rhynchitoplesius* Voss, 1952), Brentidae (*Taphroderes* Schönherr, 1826) e Curculionidae, (Curculioninae: *Heilipodus* Kuschel, 1955, *Spermologus* Schönherr, 1843; Cossoninae: *Araucarius* Kuschel, 1966, *Eurycorynophorus* Voss, 1964; Scolytinae: *Ambrosiodmus* Hopkins, 1915, *Araptus* Eichhoff, 1871, *Cnesinus* LeConte, 1868, *Corthylus* Erichson, 1836, *Cryptocarenus* Eggers, 1936, *Hypothenemus* Westwood, 1834, *Monarthrum* Kirsch, 1866, *Pagiocerus* Eichhoff, 1868, *Phloeotribus* Latreille, 1896, *Pityophthorus* Eichhoff, 1864, *Xylechinosomus* Schedl, 1963, *Xyleborus* Eichhoff, 1864, *Xyleborinus* Reitter, 1913; Platypodinae: *Cenocephalus* Chapuis, 1865, *Platypus* Herbst, 1893, *Tesserocerus* Saunders, 1836). Apresenta-se uma lista de todas as espécies, bem como informações sobre biologia e taxonomia das mesmas. Adicionalmente, está incluída uma chave de identificação de gêneros e espécies dos adultos de Curculionoidea associados à *Araucaria angustifolia*.
PALAVRAS CHAVE. Brasil, chave de identificação.

Araucaria Jussieu, 1789 trees, the oldest extant conifers, have an evolutionary history stretching more than 200 Mio years. The 19 recent species of this genus have a disjunct distribution (South America and Oceania) and form, under natural conditions, highly diverse mixed forests in tropical and subtropical regions of the Southern Hemisphere. Both the high geological age and the disjunct distribution predestinate *Araucaria* trees for evolutionary biological studies of insect-plant relationships. Today, we know several insect groups restricted in their occurrence to recent Araucariaceae like the leaf beetle subfamily Palophaginae (Megalopodidae), the weevil tribe Araucariini (Cossoninae, Curculionidae) or the bark or ambrosia beetle genera *Hylurdrectonus* Schedl, 1938, *Hylurgonotus* Schedl, 1951, *Pachycotes* Sharp, 1877 and *Xylechinosomus* Schedl, 1963 (Scolytinae, Curculionidae) (Kuschel 1966, Kuschel & May 1996, Mecke 2000, Wood 1986). An important question is, if there already existed *Araucaria*-insect associations before the splitting of Gondwana began and the continents were completely separated and if so, how these insects evolved in their long distant biogeographical regions. To answer these ques-

tions first of all detailed descriptions of the entomofauna associated with *Araucaria* trees in South America and Oceania are required. Because of the strong relationship between weevils and their host plants, beetles of the superfamily Curculionoidea are perfectly suited to study the co-evolution of *Araucaria* trees and their insects.

A few years ago, Morrone (1997) and Kuschel (2000) listed the weevils associated with *Araucaria araucana* (Molina) C. Koch in Chile, one of the two South American *Araucaria* trees. To enable future comparisons between the weevil faunas of different *Araucaria* species, we present here an annotated list of the Curculionoidea associated with *Araucaria angustifolia* (Bert.) O. Kuntze in Brazil including a key to enable the identification of adult weevils found on this host tree.

MATERIAL AND METHODS

The data for this study were obtained from a bibliographic survey and own field collections. The field study was realized March 1997 through August 2000 in the *Araucaria* forest reserve Pró-Mata, located in the municipality of São Francisco de Paula, Rio Grande do Sul, Brazil. The collections were performed mainly using photoeclectors (emergence traps) filled with pieces of dead *Araucaria angustifolia* wood. A detailed description of the sampling methods is given in Mecke *et al.* (2001). All collected specimens are deposited in the entomological collections of the Laboratório de Pesquisas Biológicas, Pontifícia Universidade Católica, Porto Alegre, Rio Grande do Sul, Brazil (LPB) and the Museu de Ciências Naturais, Fundação Zoobotânica, Porto Alegre, Rio Grande do Sul, Brazil (MCNZ).

The classification of Curculionoidea families and subfamilies follows Kuschel (1995). The system (including all taxonomic information) of Curculionidae (except for Scolytinae and Platypodinae), Brentidae and Nemonychidae follows Alonso-Zarazaga & Lyal (1999), the system of Scolytinae and Platypodinae follows Bright & Skidmore (1997) and Wood & Bright (1992).

For the elaboration of the key specimens of our field study were used and the following literature was consulted: Eggers (1928), Kuschel (1966, 1995, 2000) Kuschel & May (1997), Mecke (2000, 2002, 2004), Schedl (1972), Wood (1982, 1986) and Wood & Bright (1992). Unless otherwise indicated measurements of body length exclude the rostrum. Rostrum length is measured laterally from the front margin of the eyes to the distal margin of the epistome.

RESULTS AND DISCUSSION

The currently known Curculionoidea associated with *Araucaria angustifolia* trees belong to 43 species of 23 genera of the families Nemonychidae, Brentidae and Curculionidae (Tab. I). Within the family Curculionidae the four subfamilies Curculioninae, Cossoninae, Scolytinae and Platypodinae are represented. The following key enables the identification of adult weevils found on this tree species.

Key to the genera or species of Curculionoidea associated with *Araucaria angustifolia*

1. Antennae straight 2
1′. Antennae geniculate 4
2. Pronotum as long as broad or broader than long, labrum not fused with clypeus 3
2′. Pronotum more than 1.5 x longer than broad, beetles very elongate. 5.0-7.5 mm (including rostrum) .... *Taphroderes sahlbergi*
3. Rostrum more than 3 x longer than its distal width. Head much narrower than pronotum. Antennae filiform, not distinctly enlarged at the end. 4.8 mm .... *Rhynchitoplesius eximius*
3′.Head not prolonged into rostrum. Head as broad as Pronotum. Three last antennal segments dilated, forming a divided club. 1.8-3.2 mm ..... *Brarus mystes*
4. Rostrum very short to nonexistent 5
4′. Rostrum long 23
5. First tarsal segment elongate, nearly as long as or even longer than 2-5 combined 6
5′. First tarsal segment not elongate 8
6. Head, pronotum and elytra with dense erect pilosity. First antennal segment with conspicuous long and dense hairs. 4-9 mm ..... *Tesserocerus* spp.
6′. Without conspicuous pilosity 7
7. Protibiae with a strong apical spine. Procoxae slightly separated. 4-9 mm ..... *Platypus* spp.
7′. Protibiae without strong apical spine. Procoxae contiguous. 4-5 mm ..... *Cenocephalus thoracicus*
8. Lateral margins of tibiae unarmed except for one apical spine-like process. Head, pronotum and elytra deeply punctuated. Elytra with rows of spikes directed backwards. 2.8-3.5 mm ..... *Eurycorynophorus scabriculus*
8′. Lateral margin of tibiae armed by more than one denticle. 9
9. Head partly visible from above. Third tarsal segment bilobed 10
9′. Head completely covered by pronotum, head invisible from above. Third tarsal segment not bilobed 13
10. Pronotum densely pubescent. Antennal funicle 7-segmented. 1.4-3.7 mm ..... *Xylechinosomus* spp.
10′. Pronotum shiny, without conspicuous pubescence. Antennal funicle 5-6-segmented 11
11. Antennal funicle 5-segmented, club strongly asymmetrical, deeply divided into three movable segments, 1.5-3.0 mm.. ..... *Phloeotribus* spp.
11′. Antennal funicle 6-segmented, club symetrical, moderately flattened 12

12. Body oval, about 2 x longer than wide. Pronotum wider than long. Declivity with very short hairs. 2.0-2.6 mm ... . *Pagiocerus punctatus*
12'. Body more elongate, about 3 x longer than wide. Pronotum as long as or longer as wide. Declivity with long erect hairs. 2.2-2.5 mm ..... *Cnesinus dividuus*
13. Antennal club obliquely truncate. Declivity often armed with tubercles. Elytral apex entire. 2.0-3.7 mm 14
13'. Antennal club strongly flattened. Declivity generally not armed with distinct tubercles (when armed, elytral apex divaricate) 16
14. Scutellar area of elytra distinctly emarginate, scutellum displaced slightly cephalad into a visible, conical process.. ..... *Xyleborinus* spp.
14'. Scutellar area of elytra not emarginated, suture of scutellum flush with adjacent surface of elytra 15
15. Body short, about 2.0-2.3 x longer than wide. Pronotum wider than long ..... *Ambrosiodmus catharinensis*
15'. Body more elongate, about 2.6-3.0 x longer than wide. Pronotum as long as or longer than wide .. *Xyleborus* spp.
16. Costal margin of elytra ascending from base of declivity to apex 17
16'. Costal margin of elytra descending towards apex 18
17. Elytra with sparse erect pilosity. Anterior margin of pronotum with 10-16 crenulations. 1.6-2.3 mm .... *Cryptocarenus seriatus*
17'. Elytra with conspicuous thick scale like hairs. Anterior margin of pronotum with 1-8 crenulations. 0.8-1.3 mm . ..... *Hypothenemus eruditus*
18. Funicle 5-segmented. Antennal club symmetrical. 1.4-1.8 mm 19
18'. Funicle 1 or 2-segmented. Antennal club asymmetrical. 2.4-4.0 mm 20
19. Reddish-brown, declivity without setae. 1.4-1.8 mm .... *Pityophthorus anticus*
19'. Reddish brown, declivity with small, erect setae. 1.6 mm.. ..... *Araptus araucariae*
20. Funicle 2-segmented. Declivity excavated and armed by distinct spines on lateral margin. Elytral apex divaricate. 2.6-3.1 mm ..... *Monarthrum brasiliensis*
20'. Funicle 1-segmented. Declivity convex or weakly excavated, without or with very minute spines. Elytral apex entire. 2.4-4.0 mm (*Corthylus* spp.) 21
21. Declivity very abrupt, vertical, concave with elevated margin all around (abdomen barrel shaped). 3.3-4.0 mm .... *Corthylus praealtus*
21'. Margin of declivity at least on upper side not elevated. Smaller species (2.4-3.0 mm) 22
22. Declivity nearly vertical, covered with long hairs, dull. Pronotum and elytra coarse punctate. 2.4-2.7 mm .... *C. rufopilosus*
22'. Declivity moderately descending, covered with fewer hairs, shiny. Pronotum and elytra very minute punctate. 2.9-3.0 mm ..... *C. papulans*
23. Larger species, tibiae without articulated spines (7-13 mm)..24
23'. Small species, tibiae with articulated spines (2.0-4.1 mm)..25
24. Uniformly dark reddish brown, elytra rounded, without declivity, 7-9 mm (Rostrum 2.1-2.8 mm)...*Spermologus rufus*
24'. White stripe (formed by scales) from middle of pronotum to scutellum. Pronotum and elytra with coarse granulation. Elytra with abrupt declivity. 10-13 mm (Rostrum 3.0-4.0 mm) ..... *Heilipodus tuberculatus*
25. Hind femur distinctly widened at base. Rostrum 3.3-4.7 x longer than distal width and 1.2-1.4 x shorter than prothorax. 3.1-4.1 mm ..... *Araucarius brasiliensis*
25'. Hind femur not widened at base 26
26. Small, 2.0-2.2 mm. Rostrum 2.5-2.8 x longer than its distal width, 1.4-1.6 x shorter than prothorax. Elytra and pronotum coarse and deep punctate ..... *A. kuscheli*
26'. Larger species, 2.4-3.1 mm 27
27. Elytra and pronotum very coarse and deep punctate. Rostrum 2.8-3.7 x longer than its distal width. 2.7-3.1 mm .. .. *A. crassipunctatus*
27'. Elytra only very shallow and fine punctate. Rostrum 3.1-4.0 x longer than its distal width. 2.4-2.9 mm ... *A. ruehmi*

Nemonychidae, Rhinorhynchinae, Mecomacerini

Brarus mystes Kuschel, 1997

Known from Paraná and Rio Grande do Sul (Kuschel & May 1997, Mecke *et al*. 2001). Very common and in high abundances on male cones of *Araucaria angustifolia*. Adults and larvae pollen-feeding (Kuschel & May 1997).

Rhynchitoplesius eximius (Voss, 1937)

Rhynchitomacer eximius Voss, 1937

Known from Paraná and São Paulo. Larvae develop in male cones of *Araucaria angustifolia* feeding on pollen. When male cone is liberating pollen, larvae leave the cone and hide themselves in the soil. Pupation 5-8 months later in the soil (Costa *et al*. 1988, Kuschel & May 1997).

Brentidae, Taphroderinae

Taphroderes sahlbergi (Sharp, 1895)

Abactrus sahlbergi Sharp, 1895

Known from Rio Grande do Sul (Mecke *et al*. 2001) and the city "Santa Rita" (Sharp 1895; we are not able to indicate the Brazilian federal state as there are about 15 Santa Rita in Brazil). Adults enter existing galleries (e.g. from bark beetle *Corthylus praealtus*) in dead *Araucaria angustifolia* branches to lay their eggs. Larval tunnels 3.5-4.5 cm long with increasing diameter. At the end, larvae turn back and pupate about 2 cm from the entrance of their own gallery. Galleries filled with a

Table I. Weevils (Curculionoidea) occurring on *Araucaria angustifolia* in South Brazil (Species with uncertain host relation to this tree species are given in squared brackets).

Family/Subfamily	Species
Nemonychidae	*Brarus mystes* Kuschel, 1997
	Rhynchitoplesius eximius (Voss, 1937)
Brentidae	*Taphroderes sahlbergi* (Sharp, 1895)
Curculionidae	
Curculioninae	*Heilipodus tuberculatus* (Boheman, 1836)
	Spermologus rufus Boheman, 1843
Cossoninae	*Araucarius brasiliensis* Kuschel, 1966
	A. crassipunctatus Mecke, 2000
	A. kuscheli Mecke, 2000
	A. ruehmi Kuschel, 1966
	Eurycorynophorus scabriculus Voss, 1964
Scolytinae	*Ambrosiodmus catharinensis* (Eggers, 1928)
	Araptus araucariae (Schedl, 1966)
	Cnesinus dividuus Schedl, 1938
	Corthylus papulans Eichhoff, 1868
	C. praealtus Schedl, 1976
	C. rufopilosus Eggers, 1931
	Cryptocarenus seriatus Eggers, 1933
	Hypothenemus eruditus Westwood, 1836
	Monarthrum brasiliensis (Schedl, 1936)
	Pagiocerus punctatus Eggers, 1928
	Phloeotribus argentinensis (Schedl, 1951)
	P. cylindricus Schedl, 1951
	Pityophthorus anticus Schedl, 1976
	Xylechinosomus brasiliensis (Schedl, 1951)
	X. contractus (Chapuis, 1873)
	X. hirsutus Schedl, 1963
	X. lucianae Mecke, 2004
	X. minimus Schedl, 1963
	X. paranaensis (Schönherr, 1994)
	X. pilosus Wood, 1985
	[*X. sachtebeni* Schedl, 1963]
	Xyleborus adelographus Eichhoff, 1868
	X. affinis Eichhoff, 1867
	X. ferrugineus (Fabricius, 1801)
	X. volvulus (Fabricius, 1775)
	Xyleborinus linearicollis (Schedl, 1937)
	X. sentosus (Eichhoff, 1868)
Platypodinae	*Cenocephalus thoracicus* Chapuis, 1865
	Platypus araucariae Schedl, 1966
	P. mutatus Chapuis, 1865
	P. parallelus (Fabricius, 1801)
	[*Tesserocerus guerini* Chapuis, 1865]
	T. insignis Saunders, 1936

clear and strongly compressed frass. Emerging adults pass through the existing gallery to escape (Mecke *et al*. 2001).

Curculionidae, Curculioninae, Hylobiini

Heilipodus tuberculatus (Boheman, 1836)

Heilipus tuberculatus Boheman, 1836

Known from Rio Grande do Sul (Mecke *et al*. 2000, 2001). Since *H. tuberculatus* was formerly placed into the genus *Heilipus* Germar, 1824 (Wibmer & O'Brien 1986), it might be the same species mentioned by Zajciw (1962) as "*Heilipus* sp." from *Araucaria angustifolia* in Santa Catarina and Rio Grande do Sul. The larvae developed under the bark of felled *Araucaria* trees, shrubs or dead branches, adults emerged from December-June (Mecke *et al*. 2001, Zajciw 1962).

Curculionidae, Curculioninae, Petalochilini

Spermologus rufus Boheman, 1843

Known from Brazil (Minas Gerais) and Argentina (Barreto *et al*. 1999, Wibmer & O'Brien 1986). Larvae develop inside the seeds of *Araucaria angustifolia* and seeds of several other plants like *Theobroma cacao* Linné (Sterculiaceae) or *Virola oleifera* Schott (Myristicaceae) (Barreto & dos Anjos 2002, Barreto *et al*. 1999, Bondar 1943).

Curculionidae, Cossoninae, Araucariini

Araucarius brasiliensis Kuschel, 1966

Known from Santa Catarina and Rio Grande do Sul (Mecke *et al*. 2000, Kuschel 1966). Adults and larvae in the phloem of dead *Araucaria angustifolia* branches, rarely found in the phloem of dead trunks. Larvae and adults phloeophagous, for pupation larvae drill a short tunnel into the wood. Pupae found in sealed holes with head towards exit. Adults emerged across the whole year with a maximum from November to January (Mecke *et al*. 2000, 2001).

Araucarius crassipunctatus Mecke, 2000

Known from Rio Grande do Sul. Adults and larvae in the phloem of dead *Araucaria angustifolia* branches, rarely found in the phloem of dead trunks. Larvae and adults phloeophagous. Adults emerged from October – February with a maximum in December (Mecke 2000, Mecke *et al*. 2000, 2001).

Araucarius kuscheli Mecke, 2000

Known from Rio Grande do Sul. Adults and larvae in the phloem of dead *Araucaria angustifolia* branches. Larvae and adults phloeophagous. Adults emerged across the whole year with maximums in October and January/February (Mecke 2000, Mecke *et al*. 2000, 2001).

Araucarius ruehmi Kuschel, 1966

Known from Santa Catarina and Rio Grande do Sul (Mecke *et al*. 2000, Kuschel 1966). Adults and larvae in the

phloem of dead *Araucaria angustifolia* branches, rarely found in the phloem of dead trunks. Larvae and adults phloeophagous. Adults emerged from October to February (Mecke *et al*. 2000, 2001).

Curculionidae, Cossoninae, Onycholipini

Eurycorynophorus scabriculus Voss, 1964

Known from Paraná and Rio Grande do Sul (Mecke *et al*. 2000, Voss 1964). Adults and larvae mine in the wood of dead branches, probably xylomycetophagous. Galleries very similar to those of Scolytinae, comprising a parental gallery, egg-niches and larval tunnels. Adults emerged from *Araucaria angustifolia* wood samples (branches) from August to February (Mecke *et al*. 2000, 2001).

Curculionidae, Scolytinae, Tomicini

Several authors included the following species of the genus *Xylechinosomus* Schedl, 1963 into *Pteleobius* Bedel, 1888 and most records relate to that genus (Schedl 1966a, b, 1976, Schönherr 1994, Schönherr & Pedrosa-Macedo 1981, Pedrosa-Macedo & Schönherr 1985). However, according to Wood & Bright (1992) the correct position of these species is in the genus *Xylechinosomus*.

Xylechinosomus brasiliensis (Schedl, 1951)

Pseudohylesinus brasiliensis Schedl, 1951

Synonym: *Xylechinosomus araucariae* Schedl, 1963.

Known from Paraná, Rio Grande do Sul and Santa Catarina (Mecke *et al*. 2000, Schedl 1963, 1976). Monogamous and phloeophagous (Wood 1986). Galleries in the phloem of *Araucaria angustifolia* branches (Mecke *et al*. 2000, 2001, Schedl 1966a).

Xylechinosomus contractus (Chapuis, 1873)

Hylastes contractus Chapuis, 1873

Synonym: *Xylechinus taunayi* Eggers, 1928.

Known from Mato Grosso, Minas Gerais, Paraná, Rio Grande do Sul, Santa Catarina and São Paulo (Eggers 1928, Mecke *et al*. 2000, 2001, Schedl 1966b, 1976, Schönherr & Pedrosa-Macedo 1981). Monogamous and phloeophagous (Wood 1986). Galleries in the phloem of branches or dead trunks or inside of seeds (Mecke *et al*. 2001, Schönherr & Pedrosa-Macedo 1981). It has been also found in the bark of Pinaceae (*Pinus* spp.) (Schönherr & Pedrosa-Macedo 1981), Ulmaceae (*Trema* sp.), Phytolaccaceae (*Phytolacca dioica* Linné) (Schedl 1966b).

Xylechinosomus hirsutus Schedl, 1963

Known from Paraná, Rio Grande do Sul and Santa Catarina (Mecke *et al*. 2000, 2001, Schedl 1963, Schönherr & Pedrosa-Macedo 1981). Monogamous and phloeophagous (Wood 1986). Galleries in the phloem of *Araucaria angustifolia* branches or inside of buds or seeds (Mecke *et al*. 2001, Schönherr & Pedrosa-Macedo 1981).

Xylechinosomus lucianae Mecke, 2004

Known from Rio Grande do Sul, where it was very abundant under the bark of small branches and twigs of *Araucaria angustifolia* (Mecke *et al*. 2001, Mecke 2004).

Xylechinosomus minimus Schedl, 1963

Known from Minas Gerais, Paraná, Rio Grande do Sul, Santa Catarina, São Paulo (Mecke *et al*. 2000, 2001, Pedrosa-Macedo & Schönherr 1985, Schedl 1963, 1976). Monogamous and phloeophagous (Wood 1986). Galleries mostly in the phloem of branches, sometimes also in the phloem of dead trunks, inside of seeds or in male cones (Mecke *et al*. 2001, Schönherr & Pedrosa-Macedo 1981).

Xylechinosomus paranaensis (Schönherr, 1994)

Pteleobius paranaensis Schönherr, 1994

Known from Paraná and Rio Grande do Sul (Mecke *et al*. 2001, Schönherr 1994) Monogamous and phloeophagous (Wood 1986). Galleries mostly in the phloem of branches, sometimes also in the bark of dead trunks (Mecke *et al*. 2001, Schönherr 1994).

Xylechinosomus pilosus Wood, 1985

Known from Paraná, where two specimens, the holo- and one allotype were taken in *Araucaria angustifolia* bark (Wood 1985).

Xylechinosomus sachtlebeni Schedl, 1963

Known from Santa Catarina (Schedl 1963). Monogamous and phloeophagous (Wood 1986). Schönherr (1994) and Wood (1986) affirmed that all *Xylechinosomus* species are phloeophagous in *Araucaria* species (*A. angustifolia* in Brazil/Argentina and *A. araucana* in Chile/Argentina) but there is no confirmed host record for *X. sachtlebeni*.

Curculionidae, Scolytinae, Bothrosternini

Cnesinus dividuus Schedl, 1938

Synonyms: *Cnesinus dryographus* Schedl, 1951; *C. laevicollis* Schedl, 1951.

Known from Bahia, Minas Gerais, Paraná and Santa Catarina (Pedrosa-Macedo & Schönherr 1985, Schedl 1951a, 1976, Wood & Bright 1992). Wood (1986) indicates, that most species of *Cnesinus* LeConte, 1868 are "myelophagous except that one is partly phloeophagous". Pedrosa-Macedo & Schönherr (1985) found beetles of *C. dividuus* "in *Araucaria angustifolia*". It is also known from Malvaceae (*Gossypium* sp.) (Schedl 1966b) and has been caught in *Eucalyptus dunii* Maiden (Myrtaceae) and *Pinus caribea* Linné (Pinaceae) reforestations (Pedrosa-Macedo & Schönherr 1985).

Pagiocerus punctatus Eggers, 1928

Known from Mato Grosso, Paraná and Santa Catarina (Eggers 1928, Schedl 1966b, 1976). Wood (1986) indicates, that

all species of *Pagiocerus* Eichhoff, 1868 are spermophagous but Schönherr & Pedrosa-Macedo (1981) found *P. punctatus* developing in male cones of *Araucaria angustifolia*. It is also known from trunks of *Luehea divaricata* Martius (Tiliaceae) and from trunks and seeds of *Ocotea porosa* Nees & Martius and *O. puberula* Rich. (Lauraceae) (Schönherr & Pedrosa-Macedo 1981).

Curculionidae, Scolytinae, Phloeotribini

Phloeotribus argentinensis (Schedl, 1951)

Phthorophloeus argentinensis Schedl, 1951

Known from Santa Catarina, Brazil and Misiones, Argentina (Schedl 1977, Viana 1965, Wood & Bright 1992). According to Wood (1986) all Phloeotribini are monogamous and phloeophagous, but Viana (1965) recorded this species feeding on seeds of *Araucaria angustifolia*.

Phloeotribus cylindricus Schedl, 1951

Known from Santa Catarina, Brazil and Misiones, Argentina and (Viana 1965, Schedl 1951a, 1958). Viana (1965) found *P. cylindricus* in branches of *Araucaria angustifolia*.

Curculionidae, Scolytinae, Xyleborini

Ambrosiodmus catharinensis (Eggers, 1928)

Xyleborus catharinensis Eggers, 1928

Known from Paraná, Rio Grande do Sul, Santa Catarina and São Paulo (Eggers 1928, Mecke *et al*. 2001, Schönherr & Pedrosa-Macedo 1981). Mecke *et al*. (2001) recorded this xylomycetophagous species from *Araucaria angustifolia* branches in Rio Grande do Sul, Schönherr & Pedrosa-Macedo (1981) from *Cedrela fissilis* Vellozo (Meliaceae) and *Pinus elliottii* Engelm. (Pinaceae).

Xyleborinus linearicollis (Schedl, 1937)

Xyleborus linearicollis Schedl, 1937

Known from Minas Gerais, Paraná, Santa Catarina, São Paulo and from Buenos Aires, Argentina (Schedl 1958, 1966b, 1976, Pedrosa-Macedo & Schönherr 1985). Galleries in branches of *Araucaria angustifolia* and in *Eucalyptus robusta* Smith, *E. camaldulensis* Dehnh., *E. tereticornis* Smith (Myrtaceae) and *Pinus elliottii* (Pinaceae) (Bright & Skidmore 1997, Schedl 1966b, Schönherr & Pedrosa-Macedo 1981).

Xyleborinus sentosus (Eichhoff, 1868)

Xyleborus sentosus Eichhoff, 1868

Known from Argentina (Misiones), Brazil (Ceará, Mato Grosso, Minas Gerais, Paraná, Rio Grande do Sul, Santa Catarina, São Paulo), Paraguay and Peru (Schedl 1951b, 1966b, 1976, Wood & Bright 1992). Schedl (1966a) recorded this species from *Araucaria angustifolia* in Santa Catarina, Schönherr & Pedrosa-Macedo (1981) from *Cedrela fissilis*.

Xyleborus Eichhoff, 1864

All of the several hundred species belonging to the genus *Xyleborus* are consanguineously polygynous and xylomycetophagous (Wood 1986). Therefore, all species are at least oligo- or even polyphagous.

Wood & Bright (1992) listed in their catalog *Araucaria angustifolia* as a host for *Xyleborus perforans* (Wollaston, 1857). But as this bark beetle species has never been recorded from South America (Bright & Skidmore 1997, Wood & Bright 1992), it has been cited erroneously in the host list or has been found on planted trees.

Xyleborus adelographus Eichhoff, 1868

Synonyms: *Xyleborus vitiosus* Schedl, 1940; *X. accomodatus* Schedl, 1966.

Known from Argentina, Brazil, Cayenne, Colombia, Guyana, Paraguay (Wood & Bright 1992). Developing in seeds of *Araucaria angustifolia*. Also recorded from *Pinus elliottii* (Pinaceae) (Schönherr & Pedrosa-Macedo 1981) and *Couma macrocarpa* Barb. Rodr. (Apocynaceae) (Wood & Bright 1992).

Xyleborus affinis Eichhoff, 1867

Synonyms: *Xyleborus sacchari* Hopkins, 1915; *X. subaffinis* Eggers, 1933; *X. societatis* Beeson, 1935; *X. proximus* Eggers, 1943.

Nearly worldwide distributed (except for Europe) and extremely polyphagous with over 270 angio- and gymnospermous host species (Wood 1982, Wood & Bright 1992). Schedl (1976) recorded this species from *Araucaria angustifolia* in Paraná.

Xyleborus ferrugineus (Fabricius, 1801)

Bostrichus ferrugineus Fabricius, 1801

Synonyms: *Xyleborus fuscatus* Eichhoff, 1868; *X. impressus* Eichhoff, 1868; *X. confusus* Eichhoff, 1868; *X. retusicollis* Zimmermann, 1868; *X. bispinatus* Eichhoff, 1868; *X. amplicollis* Eichhoff, 1869; *X. insularis* Sharp, 1885; *X. tanganus Hagedorn*, 1910; *X. soltaui* Hopkins, 1915; *X. nyssae* Hopkins, 1915; *X. hopkinsi* Beeson, 1929; *X. argentinensis* Schedl, 1931; *X. rufopiceus* Eggers, 1932; *X. schedli* Eggers, 1934; *X. nesianus* Beeson, 1940; *X. notatus* Eggers, 1941; *X. subitus* Schedl, 1948.

Widely distributed in tropical and subtropical American and African regions. Polyphagous with about 200 host species and considered to be one of the most destructive bark beetle species in tropical regions (Wood 1982). The beetles prefer angiospermous host trees but were also found in conifers like *Araucaria angustifolia* and *Pinus elliottii*. In *Araucaria* trees the galleries were in the branches and inside of female cones (Schönherr & Pedrosa-Macedo 1981).

Xyleborus volvulus (Fabricius, 1775)

Bostrichus volvulus Fabricius, 1775

Synonyms: *Xyleborus torquatus* Eichhoff, 1868; *X. alternans* Eichhoff, 1869; *X. badius* Eichhoff, 1869; *X. interstitialis* Eichhoff, 1878; *X. guanaguatensis* Duges, 1887; *X. hubbardi* Hopkins, 1915; *X. schwarzi* Hopkins, 1915; *X. rileyi* Hopkins,

1915; *X. grenadensis* Hopkins, 1915; *X. silvestris* Beeson, 1929; *X. vagabundus* Schedl, 1948; *X. granularis* Schedl, 1950.

Worldwide distributed and polyphagous with about 160 gymnospermous and angiospermous host species (Wood 1982, Wood & Bright 1992).

Curculionidae, Scolytinae, Cryphalini

Cryptocarenus seriatus Eggers, 1933

Synonyms: *Cryptocarenus adustus* Eggers, 1933; *Tachyderes floridensis* Blackman, 1943; *Cryptocarenus bolivianus* Eggers, 1943.

Known from North and South America from about 20 host trees (Bright & Skidmore 1997, Wood & Bright 1992). Schönherr & Pedrosa-Macedo (1981) found the beetles inside of thin *Araucaria angustifolia* twigs.

Hypothenemus eruditus Westwood, 1836

This is a very common and worldwide distributed bark beetle, with several hundred known hosts including fungi, grasses, weeds and trees and with about 70 synonyms (Wood 1982, Wood & Bright 1992). The beetles and larvae were also found inside of thin twigs of *Araucaria angustifolia* (Schedl 1976, Schönherr & Pedrosa-Macedo 1981).

Curculionidae, Scolytinae, Corthylini

Araptus araucariae (Schedl, 1966)

Conophthocranulus araucariae Schedl, 1966

Schedl (1966b) recorded this species from seeds of *Araucaria angustifolia* in Misiones (Argentina).

Corthylus papulans Eichhoff, 1869

Synonyms: *Corthylus affinis* Fonseca, 1925; *C. guayanensis* Eggers, 1933; *C. tomentosus* Schedl, 1940.

Known from Antilles Islands, North and South America (Mecke *et al.* 2000, Pedrosa-Macedo & Schönherr 1985, Schedl 1967, Wood & Bright 1992). Polyphagous in several angiospermous host trees (Bright & Skidmore 1997, Wood & Bright 1992). Found also in the wood of *Araucaria angustifolia* branches (Mecke *et al.* 2001).

Corthylus praealtus Schedl, 1976

Known from Paraná and Rio Grande do Sul (Mecke *et al.* 2000, Schedl 1976). Galleries in branches of *Araucaria angustifolia*. Parental tunnel circling around the centre of the branch, larval tunnels branching off parallel to the surface. Males building the entrance tunnel, females enter later and help to remove the frass. Immature adults with their heads to the closed ends of the larval cradles, emerging backwards through the parental tunnel (Mecke *et al.* 2001).

Corthylus rufopilosus Eggers, 1931

Known from Santa Catarina, São Paulo and Rio Grande do Sul (Eggers 1931, Mecke *et al.* 2000, Schedl 1954). Galleries in branches of *Araucaria angustifolia*. Parental tunnel circling around the centre of the branch, larval tunnels branching off parallel to the surface. Immature adults with their heads at the closed ends of the larval cradles, emerging backwards through the parental tunnel. Galleries very similar to those of *C. praealtus* but with smaller diameter (Mecke *et al.* 2001).

Monarthrum brasiliensis (Schedl, 1936)

Anchonocerus brasiliensis Schedl, 1936

Known from Paraná and Santa Catarina. Larval development inside of female cones of *Araucaria angustifolia*. (Pedrosa-Macedo & Schönherr 1985, Schönherr & Pedrosa-Macedo 1981).

Pityophthorus anticus Schedl, 1976

Known from Paraná and Rio Grande do Sul (Mecke *et al.* 2001, Schedl 1976). Larvae develop in branches of young *Araucaria angustifolia* trees as well as inside of male and female cones. Also found in branches of *Ocotea puberula* and *Pinus elliottii* (Mecke *et al.* 2001, Pedrosa-Macedo & Schönherr 1985, Schedl 1976).

Curculionidae, Platypodinae, Tesserocerini

Cenocephalus thoracicus Chapuis, 1865

Known from Rio de Janeiro and Santa Catarina (Chapuis 1865). Schedl (1966a) recorded this species from trunks of *Araucaria angustifolia* in Santa Catarina.

Tesserocerus guerini Chapuis, 1865

Known from Argentina, Bolivia, Brazil, Cayenne and French Guyana (Schedl 1970, 1972, Wood & Bright 1992). According to Schönherr & Pedrosa-Macedo (1981) it is "probable", that this species also develops in *Araucaria angustifolia* and Wood & Bright (1992) listed *A. angustifolia* as a host for *T. guerini* but were supposedly referring to Schönherr & Pedrosa Macedo (1981). Therefore it remains doubtful whether *T. guerini* accepts *Araucaria angustifolia* as a host tree or not. Confirmed hosts for this species are *Cedrela fissilis* (Meliaceae), *Eschweilera sagotiana* Miers (Lecythidaceae) and *Ocotea* sp. (Lauraceae) (Wood & Bright 1992).

Tesserocerus insignis Saunders, 1936

Synonyms: *Tesserocerus bihamatus* Guérin-Meneville, 1838; *Tesseroplatypus ursus* Schedl, 1935.

Known from Argentina, Bolivia, Brazil, Paraguay and Uruguay (Schedl 1966a, b, 1970, 1972, Wood & Bright 1992). Schedl (1966a) recorded this species from trunks of *Araucaria angustifolia* in Santa Catarina. Another host is *Cedrela fissilis* (Meliaceae) (Schedl 1976, Schönherr & Pedrosa-Macedo 1981).

Curculionidae, Platypodinae, Platypodini

Platypus araucariae Schedl, 1966

Known from Amazonas, Paraná, Santa Catarina and Rio Grande do Sul (Schedl 1966a, Schönherr & Pedrosa-Macedo 1981). Galleries in trunks of *Araucaria angustifolia* and *Anacar-*

dium occidentale Linné (Anacardiaceae) (Schedl 1966a, b). Parental galleries horizontally, deep in the wood, larval tunnels vertically (Schönherr & Pedrosa-Macedo 1981).

Platypus mutatus Chapuis, 1865

Synonyms: *Platypus sulcatus* Chapuis, 1865; *P. plicatus* Brèthes, 1909.

Known from Argentina, Bolivia, Brazil, Cayenne, Paraguay, Peru, Uruguay and Venzuela (Schedl 1950, 1951b, 1966b, 1976, 1977, Wood & Bright 1992). Mostly angiospermous hosts (Schedl 1950, Schönherr & Pedrosa-Macedo 1981, Wood & Bright 1992). Schönherr & Pedrosa-Macedo (1981) recorded this species from trunks of *Araucaria angustifolia* in Paraná. The galleries with a diameter of 2.5-3 mm are organized in horizontal systems.

Platypus parallelus (Fabricius, 1801)

Bostrichus parallelus Fabricius, 1801

Synonyms: *Platypus linearis* Stephens, 1830; *P. poeyi* Guerin-Meneville, 1838; *P. subcostatus* Jacquelin-Duval, 1857; *P. dejeani* Chapuis, 1865; *P. marseuli* Chapuis, 1865; *P. proximus* Chapuis, 1865; *P. compressus* Chapuis, 1865; *P. regularis* Chapuis, 1865; *P. rugulosus* Chapuis, 1865; *P. reticulatus* Chapuis, 1865; *P. rotundatus* Chapuis, 1865; *P. kraatzi* Chapuis, 1865; *P. lebasi* Chapuis, 1865; *P. emarginatus* Chapuis, 1865; *P. punctulatus* Chapuis, 1865; *P. subaequalis* Chapuis, 1865; *P. wesmaeli* Chapuis, 1865; *P. oblongus* Chapuis, 1865; *P. difficilis* Chapuis, 1865; *P. praevius* Chapuis, 1865; *P. maeklini* Chapuis, 1865; *P. erichsoni* Chapuis, 1865; *P. laevicollis* Chapuis, 1865; *P. congoanus* Duvivier, 1891; *P. triquetrus* Brèthes, 1909; *P. mattai* Brèthes, 1921.

Known from Africa, South and North America (Schedl 1966b, 1970, 1972, 1976, Wood & Bright 1992). Polyphagous, angio- and gymnospermous hosts (Schedl 1976, Schönherr & Pedrosa-Macedo 1981). Schönherr & Pedrosa-Macedo (1981) recorded this species from *Araucaria angustifolia* in São Paulo and Paraná. Also found in female cones of *A. angustifolia* inside the seeds (Schönherr & Pedrosa-Macedo 1981).

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