A REVISION OF THE GENUS *ELEPHASTOMUS* MACLEAY (COLEOPTERA: GEOTRUPIDAE)

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[*Manuscript received January* 15, 1965]

Abstract

The genus *Elephastomus* Macleay is revised, and the biology and distribution of its species discussed briefly. *E. kirbyi* Westw. is regarded as a subspecies of *E. proboscideus* (Schreib.) but, as Westwood's name is preoccupied, is given the new name *E. proboscideus kirbyanus*. Two new species are described: *E. gellarus* from northern New South Wales and Queensland, and *E. meraldus* from New South Wales and Victoria; the former species is commonly misidentified as *E. kirbyi* Westw. The validity of *E. terraereginae* (Blackb.) is confirmed. Plesioallotypes of *E. p. kirbyanus* and *E. terraereginae* are designated.

INTRODUCTION

Our knowledge of the taxonomy of the Australian Geotrupidae is far from satisfactory, and revisional studies are badly needed. In the most recent catalogue of the family, Boucomont (1912) placed 75 of the 81 species then recognised in *Bolboceras* Kirby, but Howden (1954) has shown that no Australian species can be referred to that northern hemisphere genus. Howden proposed the elevation to generic rank of 3 of Boucomont's subgenera for the several phylogenetic lines discernible in the Australian fauna, which belongs wholly to the subfamily Bolboceratinae. It should be noted that the author differs from Howden and follows Crowson (1955) in treating the Geotrupidae as an independent scarabaeoid family, not as a subfamily of the Scarabaeidae.

As a contribution towards a review of the Australian Bolboceratinae, this paper discusses the small genus *Elephastomus* Macleay. Examination of the literature, and of the types of species referred to this genus has shown that problems of both homonymy and synonymy require solution, while museum collections were found to contain several undescribed species.

SOURCES OF MATERIAL

The museums from which material was borrowed for study are listed below, together with the abbreviations used for them in the text.

AM—Australian Museum, Sydney, N.S.W.
ANIC—Australian National Insect Collection, C.S.I.R.O., Canberra, A.C.T.
BM—British Museum (Nat. Hist.), London.
HFH—Dr. H. F. Howden, Dept. Agriculture, Ottawa, Canada. (Private collection.)
JGB—Mr. J. G. Brooks, Cairns, Queensland. (Private collection.)
MM—Macleay Museum, University of Sydney, N.S.W.
NM—National Museum of Victoria, Melbourne.
QM—Queensland Museum, Brisbane.
QU—Queensland University, Dept. Entomology, Brisbane.
SAM—South Australian Museum, Adelaide.
TDA—Tasmanian Dept. of Agriculture, Hobart.
TM—Tasmanian Museum, Hobart.

DISTRIBUTION

The genus *Elephastomus* is virtually restricted to the coastal plains and adjacent tablelands of eastern and southern Australia. The locality data of the specimens examined are plotted in Figure 1.

E. terraereginae (Blackb.) and *E. gellarus*, sp.n. (a species commonly misidentified as *E. kirbyi* Westw.) occur in tropical and subtropical Queensland, the latter species also occurring in northern New South Wales. The type species, *E. proboscideus* Schreib., is represented by two apparently allopatric subspecies. The nominate subspecies occurs in the extreme south-east of Queensland, and southward down the New South Wales coast almost to the Victorian border; *E. proboscideus kirbyanus* appears to be centred in Victoria, but occurs also in South Australia, Tasmania, and the southern tablelands of New South Wales. As the subspecies can be distinguished only by characters of the male, collections consisting of females only could not be fully identified, and are shown in Figure 1 by a separate symbol. *E. meraldus* sp. n. (usually misindentified as a variety of *E. proboscideus*) has its distribution centred on the southern tablelands of New South Wales.

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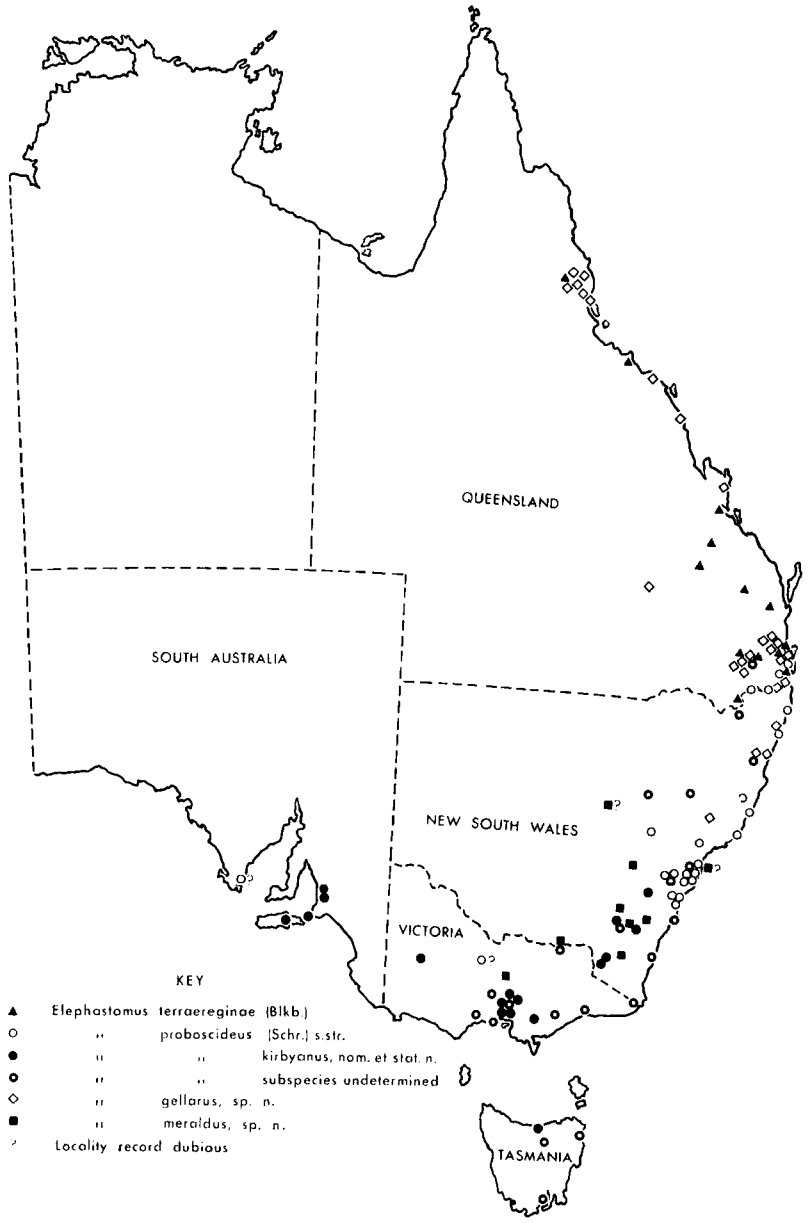


FIG. 1.—Map of eastern Australia, showing distribution of *Elaphastomus* spp.

BIOLOGY

In an excellent review of the biology of Geotrupidae, Howden (1955) noted that, in those few instances where biological information was available, adults of Bolboceratinae are feeders on fungi or decaying vegetable matter, although they provision their larval cells with finely-divided humus from the soil surface. In the Geotrupinae, Howden reported a variety of adult and larval foods, including dung.

Although Australia has an extensive Bolboceratine fauna, almost nothing is known of its ecological function, nor have any larval stages been described. The generally poor adaptation of the endemic coprophagous fauna to cattle and sheep dung, and the weed-like character of cattle dung on permanent pasture, have been discussed by Bornemissza (1960). However, at least one species of *Elephastomus* differs from exotic Bolboceratines in that it buries large quantities of dung in its oviposition burrows. *E. meraldus* is common in the Australian Capital Territory, and the author observed dense populations in cattle- and horse-grazed pastures near Canberra in the period 1947-1951. Flights of adults occurred in late afternoon and after dusk, the beetles burrowing to a foot or more in soil beside or beneath fresh droppings, which virtually disappeared within 4-5 days. Such beneficial activity was restricted to a short period each year. Light trap catches began each year in late September, rose to a peak in October, declined almost to zero in January and February, but increased to a second peak in March and April. Recently-emerged specimens predominated at the beginning, and abraded specimens at the end of each flight period, suggesting the passage of two generations annually.

Elephastomus Macleay

Elephastomus Macleay, 1819, *Horae Ent.* I: 122; Westwood, 1852, *Trans. Linn. Soc. Lond.* **21:** 12; Boucomont, 1911, *Ann. Soc. Ent. France* **79:** 334; *ibid, Col. Cat.* **19:** part 46; Howden, 1954, *Proc. Linn. Soc. N.S.W.* **79:** 142.

Scarabaeus Schreibers, 1802, *Trans. Linn. Soc. Lond.* **1802:** 189 (part).

Bolboceras Kirby, 1818, *Trans. Linn. Soc. Lond.* **1818:** 462 (part).

Type species.—*Scarabaeus proboscideum* Schreibers 1802 (by original designation).

Reddish black to brownish yellow Bolboceratinae, 15-24 mm in length; ventrally with abundant vestiture, dorsally glabrous except at elytral apices. Eyes, lateral margins and armature of head, and foretibial teeth reddish black to black. Ocular margins of frons terminating, adjacent to anterior margin of pronotum, in small tubercles.

Pronotum unarmed, but with transverse impressed or flattened area occupying central third to two-thirds of anterior surface. The surface with coarse, often confluent, punctures interspersed with smaller discrete punctures, the latter always predominating on a median longitudinal zone extending from impression toward posterior ridge; with a pair of circular lateral foveae, but without fossae near anterior ridge. Scutellum broadly triangular.

Elytron with 7 dorsal striae between suture and humeral umbone; sutural stria not extending anteriorily beyond apex of scutellum; intermediate striae sometime subobsolete near elytral apices; 4th stria from epipleuron branching and forming a closed (or nearly closed) cell; epipleural setae migrating to dorsal surface of elytron near its apex. Middle coxae subcontiguous; metasternum linear between coxae.

♂ Clypeus greatly produced, mouth inferior. Dorsal surface of head bearing transverse ridge or bituberculate process, this often arising markedly distal to ocular canthi.

Pronotum with coarse punctures dominant on postero-lateral areas of disc, and on surface adjacent to lateral and posterior ridges; with finer punctures predominating or occurring alone on anterolateral areas adjacent to impression, on posterior margin of latter, and on narrow transverse zones lying between coarsely punctate posterior ridge and main areas of coarse punctation.

♀ Clypeus short, more or less evenly rounded, mouth not inferior; head with armature less well-developed, always arising behind anterior margin of ocular canthi.

Pronotum less strongly impressed or flattened, but with surface more heavily sculptured than in ♂; coarse punctures predominating over most of disc, frequently distorted and confluent; finer punctures coarser than in male, usually predominant only along median longitudinal zone; the latter with a very narrow central impunctate stripe.

Elephastomus spp. are distinguishable from other Australian Bolboceratinae by having the mouth below and far behind the apex of the clypeus in the male. In both sexes they are distinguished from *Stenaspidius* by having a broad, triangular, not elongate scutellum, from *Bolbapium*, *Blackburnium* and *Bolborhachium* by having the middle coxae subcontiguous, not separated by an anterior lobe of the metasternal plate, and from *Eucanthus* by having 7, not 5 dorsal elytral striae between the suture and humeral umbone.

Definition of Terms

In the keys and descriptions that follow four classes of punctures are recognized. Their diameters fall within the ranges indicated:

Very fine punctures	$<20\mu$	Moderate punctures	$>50<100\mu$
Fine punctures	$>20<50\mu$	Coarse punctures	$>100\mu$

The apical width of the cephalic ridge or tubercle is given as a ratio to that of the frons. The width of the frons was measured level with the posterior margin of the ocular canthi.

The term "elytral cell" is applied to a closed or nearly-closed loop arising, apparently, from a double branching of the 4th stria from the lateral margin of each elytron.

Body lengths are measured from the clypeal apex to elytral apices.

KEYS TO MALES AND FEMALES OF *Elephastomus* Macl.

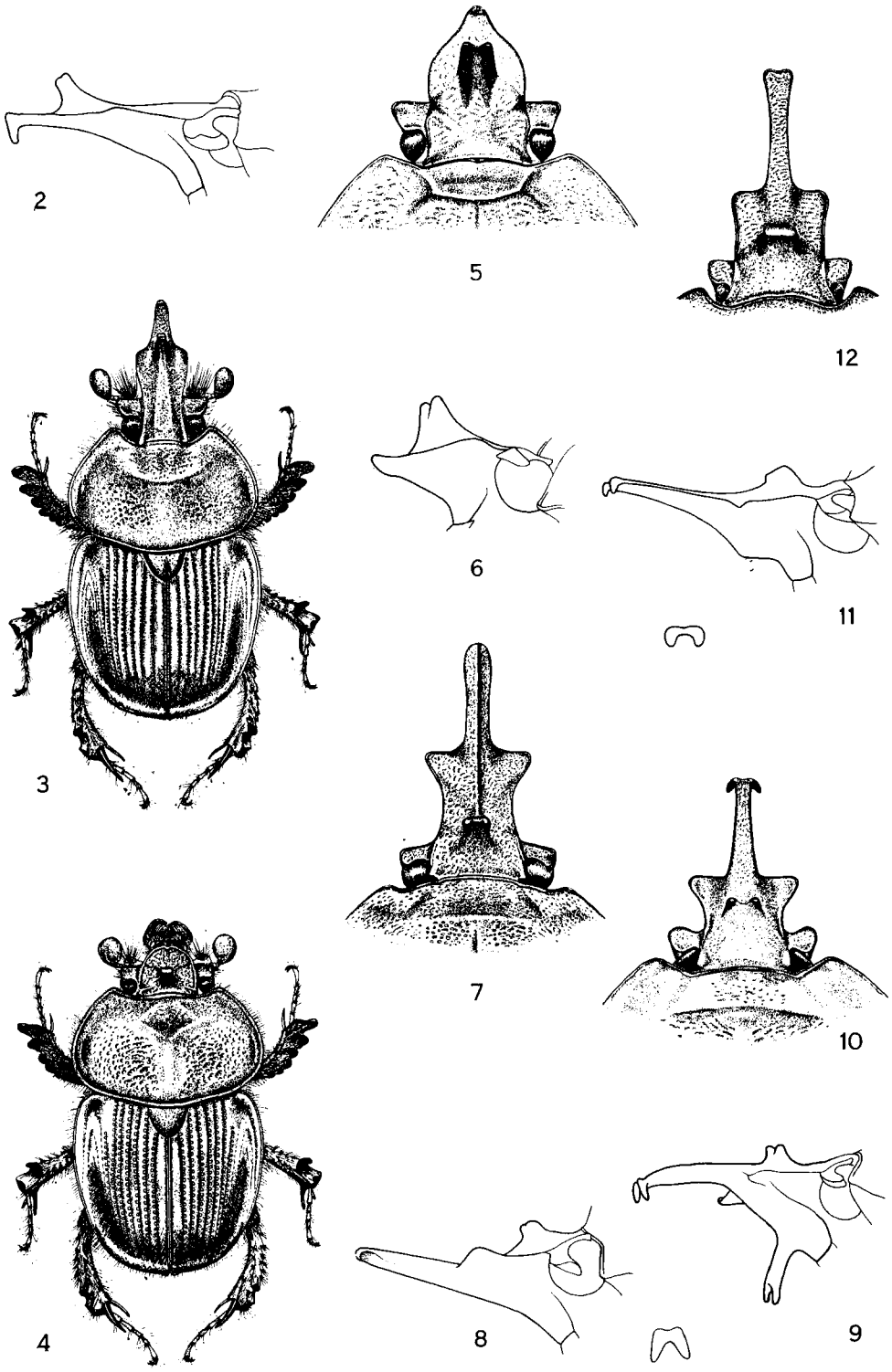
Males (Clypeus strongly produced anteriorily, and with a strong dorsal tubercle.)

1. Clypeus with a strong, forwardly-sloping median tubercle or process with apex far anterior to ocular canthi (Figs. 2, 6), foretibiae 7-dentate .. 2
   Clypeus with tubercle or ridge with apex between, or slightly anterior to the ocular canthi (Figs. 8, 9, 11), foretibiae 6-, rarely 7-dentate 3
2. Clypeus as in Figs. 2 & 3, with a ventrally-directed apical tooth; dorsal armature in form of a simple tuberculate process; elytral cell with surface somewhat wrinkled, punctation often subobsolete. Victoria, southern N.S.W. .. .. **meraldus** sp. n.
   Clypeus as in Figs. 5 & 6, apex smoothly rounded; dorsal armature in form of a stout bituberculate process; elytral cell with surface smooth and punctation distinct. Queensland .. .. .. **terraereginae** (Blackb.)
3. Apex of clypeus bidentate, elytral cell usually with at least a few punctures .. .. **proboscideus** (Schreib.) .. 4
   Apex of clypeus rounded, hollowed out ventrally, (Fig. 8); elytral cell almost invariably impunctate. Northern N.S.W. and Qld. coastal areas .. .. **gellarus** sp. n.
4. Cephalic armature in form of a pair of conjoined tubercles (Fig. 10), apical teeth as in Fig. 9, inset. Undersurface of head sometimes with stout bifurcate process projecting ventrally anterior to the mouth (Fig. 9), and with distal portion of clypeus deflexed. When process is lacking, clypeus shorter, not or only slightly deflexed, and with ventral surface slightly swollen at level of ocular canthi. N.S.W., S. Qld. coastal areas, possibly Vic. and S.A. .. **proboscideus proboscideus** (Schreib.)
   Cephalic armature in form of a blunt transverse ridge (Fig. 12), apical teeth as in Fig. 11, inset; undersurface of head never with a process above mouth, but always markedly swollen (Fig. 11), clypeus not deflexed. Vic., S. Aust., Tas., inland N.S.W.
   proboscideus kirbyanus nom. et stat. nov.

Females (Clypeus short, rounded; labrum and mandibles fully exposed.)

1. Foretibiae 7-dentate; cephalic armature in form of a pair of conjoined tubercles, their apices heavily sclerotized, 0.25-0.33 times width of frons; elytral cell 1.0-1.5 mm in width, usually containing 15-20 punctures 2
   Foretibiae 6-dentate; cephalic armature in form of an unsclerotized, blunt, transverse ridge, 0.40-0.55 times width of frons; elytral cell 0.5-0.8 mm in width, usually containing less than 10 punctures 3
2. Pronotal impression with surface evenly curved .. .. **meraldus** sp. n.
   Pronotal impression with surface interrupted by a pair of conspicuous declivities arising close to centre of anterior ridge .. **terraereginae** (Blackb.)
3. Pronotal impression with a pair of paramedian declivities near its posterior limit; surface anterior to declivities finely punctate
   proboscideus (Schreib.)*
   Pronotal impression with surface evenly curved; adjacent surface coarsely punctate .. .. **gellarus** sp. n.

*Subspecies not determinable in this sex.



FIGS. 2-12.—(2-4) *Elaphastomus meraldus* sp.n.: (2) ♂ head, lateral; (3) ♂, dorsal; (4) ♀, dorsal. (5, 6) *E. terraereginae* (Blackb.): (5) ♂ head, dorsal; (6) ♂ head, lateral. (7, 8) *E. gellarus* sp.n.: (7) ♂ head, dorsal; (8) ♂ head, ventrolateral. (9, 10) *E. proboscideus proboscideus* (Schreib.): (9) ♂ head, ventrolateral—inset, clypeal apex, anterior; (10) ♂ head, dorsal. (11, 12) *E. proboscideus kirbyanus*, nom. et stat. nov.: (11) ♂ head, ventrolateral—inset, clypeal apex, anterior; (12) ♂ head, dorsal.

Variation

In all species other than *E. terraereginae*, the development of secondary sexual characters varies considerably. The illustrations of *E. meraldus*, *E. gellarus*, and of both subspecies of *E. proboscideus* show the maximum development of these characters in the male. In all three species, specimens showing lesser degrees of secondary sexual structures were found.

It will be noted (see Figs. 3, 7, 10, 12) that the clypeus has two parts: a broad proximal portion which bears the cephalic ridge or tubercles, and a narrower distal portion from which the type species takes its name. Variation consists essentially of different degrees of development of this distal portion, the proximal portion remaining nearly constant in length. Shortening of the clypeal prolongation is associated with some changes in the profile of the ventral surface of the clypeus, particularly of the abruptness of the concavity between the clypeal apex and the clypeolabral suture. In *E. proboscideus* s. str., the ventral bifurcate process (Fig. 9) is lacking, or is rudimentary, other than in those specimens having the clypeus fully developed. The range in body size of the specimens available for study was slight and no correlation could be demonstrated between it and the degree of development of secondary sexual characters.

Elephastomus meraldus sp. n. (Figs. 2-4)

From an aboriginal word "meralde"—a barbed spear—referring to the shape of the ♂ clypeus.

Holotype ♂: AUSTRALIAN CAPITAL TERRITORY: Black Mt. light trap, A.C.T., 11.iii.56, P. B. Carne (ANIC).

Allotype ♀: as for holotype but date of collection 19.ii.55.

Paratypes: 20♂, 35♀ from light trap at type locality or other parts of Canberra, dated between 1946 and 1956, collected by P. B. Carne or, in 1952, by L. J. Chinnick. AM: ANIC: BM: HFH: NM: QM: SAM.

Other specimens examined: NEW SOUTH WALES and AUSTRALIAN CAPITAL TERRITORY: Boro, 1♂, 20.iii.94, Froggatt; Canberra, 36♂♀ of data similar to type series; 2♂ 4♀, G. Sackelariou; 1♂, Dec. '31, J. W. Evans; Cooma, 1♂, 15.xi.53, J. Sedlacek (ANIC); Forest Reefs, 1♂, A. M. Lea (SAM); Gosford 1♀, Feb. '49; Trangie, 1♂, 7.v.52, B. Cameron; Yass, 1♂, 18.ii.28, K. English (ANIC): VICTORIA: Broadford, 1♂, Feb. '50 (ANIC): Wodonga, 1♀ 20.viii.09 (NM).

Male (Fig. 3). — Length 17-24 mm. Dorsal surface of head with confluent moderate punctures, bearing a strong, forwardly-directed, weakly-bituberculate process terminating far anterior to ocular canthi, at apex 0.2 times width of frons; proximal portion of clypeus with pair of obscure ridges extending to vertex. Ventral surface of clypeus (Fig. 2) virtually impunctate, with barb-like tubercle at apex; surface, in lateral profile, gently concave to mouth.

Pronotum with conspicuous impression, coarsely punctate in anterior half; median longitudinal zone finely punctate, as wide or wider than base of scutellum. Foretibiae 7-dentate.

Elytra with intermediate striae subobsolete beyond apical calli; cell broad (*ca.* 1 mm), surface irregular, punctures subobsolete or, if distinct, 15-20 forming secondary loop within cell.

Female (Fig. 4).—Length 17-19 mm. Head with stout, erect process, apically 0.25-0.32 times width of frons.

Pronotum with median longitudinal zone of moderate punctures, narrower than base of scutellum; extension of this zone parallel to posterior ridge very narrow, sometimes scarcely discernible; moderate punctures predominating on anterolateral surface adjacent to coarsely punctate impression.

Elephastomus terraereginae (Blackburn) (Figs. 5, 6, 13)

♂, *Bolboceras terraereginae* Blackburn, 1899, *Trans. R. Soc. S. Aust.* **23**: 25.
♂, *Bolboceras proboscideus* var *terraereginae* Blackburn, 1904, *Proc. Linn. Soc. N.S.W.* **29**: 483.

Following his description of the holotype, Blackburn mentioned several characters that distinguished what he considered to be its female. The identity of the specimen he examined is doubtful but it was certainly not a female of *terraereginae*. In comparing it to the female of *proboscideus*, Blackburn made no mention of differences of cephalic armature as he must have done had he a female of *terraereginae* before him.

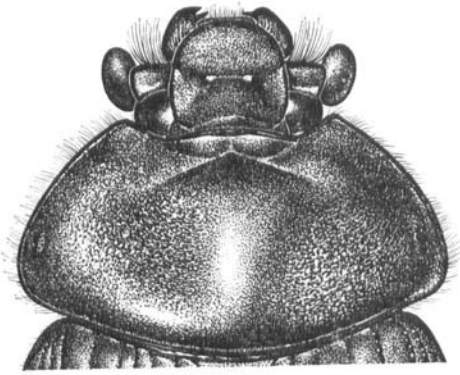
The latter has a comparatively narrow, distinctly bituberculate process whereas the former has an obtuse transverse ridge.

Plesio allotype ♀: "St. Lucia, 10.1952, Y. S. Chang" (QU).

Specimens examined: QUEENSLAND: Ayr, 1♂, Oct. '61, B. Champ; Biloela, 1♂, 26.ii.54, O. R. Byrne (QU); Brisbane, 1♂ (SAM); 1♂, 24.i.59, A. Diatloff; 1♂ Mar. '54, C. Flynn; 1♀, Mar. '55, J. Thapa (QU); Carnarvon Rge, 1♀, 12.xii.38, N. Geary (AM); Dawson R., 1♂ (SAM); Eight-Mile Plain, 1♂, 9.x.55, F. R. From; Gayndah, 1♂, 26.ii.58, M. W. Cull; 1♂, 17.i.63, 1♂, 13.iv.63, R. J. Elder; Highvale, 1♂, 26.iii.60, C. J. Paull; Ladybrook, 1♂, 15.ii.52, D. J. T.; Lawes, 1♂, 12.i.57, W. F. Wildin (QU); Moreton Bay, 1♀ (BM), "Northern district", 1♀ (SAM); Rockhampton, 1♂, 7.xi.53, A. N. Burns (NM); 1♀, Jan. '52, L. M. Rule; Toowoomba, 1♀, 14.xi.59, D. McLean (QU); 3♂, (BM); Woolooga, 1♂, 11.xi.61, J. W. Turner (QU); no locality 1♀, det as *proboscideus* by A. M. Lea (NM); 1♂ (comp. with type) (HFH); 1♂ 1♀ (NM); 1♂ (ANIC); 3♀ (BM).

Male.—Length 19-22 mm. Head with dorsal surface with moderate confluent punctures; bearing strong bituberculate process arising anterior to ocular canthi (Fig. 5). Ventral surface in profile strongly concave from clypeal apex to mouth (Fig. 6).

Pronotum with deep lunate impression, with its peripheral surface flattened; floor of impression impunctate; flattened area very finely to finely punctate except for two paramedian extensions of coarse punctation from posterolateral areas; median longitudinal zone finely punctate, narrow anteriorly but broadening posteriorly almost to width of scutellum, extending in broad zone parallel to posterior ridge. Foretibiae 7-dentate.



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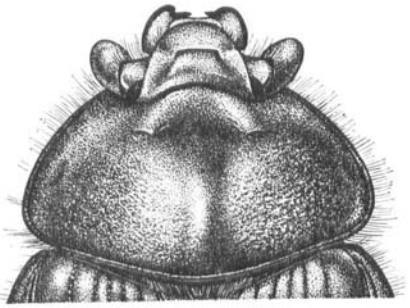

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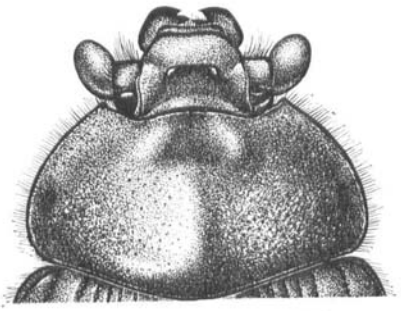

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FIGS. 13-15.—Head and anterior portion of pronotum of ♀ *Elephastomus* spp.: (13) *E. terraereginae* (Blackb.); (14) *E. proboscideus* (Schreib.); (15) *E. gellarus* sp.n.

Elytra with striae well-defined; cell broad (1.0-1.5 mm), surface smooth, with 7-25 (usually > 15) punctures, these often forming a partial secondary loop.

Female.—Length 19-21 mm. Head (Fig. 13) with short, distinctly bituberculate process at apex 0.30-0.33 times width of frons.

Pronotal impression shallower than in ♂, transverse, with pair of paramedian declivities; coarse punctures predominant over whole disc except on moderately punctate median longitudinal zone (narrower than scutellum), and on narrow impunctate zones parallel to posterior ridge.

Elytral striae subobsolete near apical calli.

Elephastomus proboscideus proboscideus (Schreibers) (Figs. 9, 10, 14)

♂, *Scarabaeus proboscideum* Schreib., 1802, *Trans. Linn. Soc. Lond.* **1802:** 189; pl. 20, fig. 2.
♀, *Bolboceras australasiae* (Kirby) Klug, 1843, *Abh. Berl. Akad.*, pp. 21-36; Westwood, 1852, *Trans. Linn. Soc. Lond.* **21:** 13, pl. 3, fig. 1.
♂, *Elephastomus proboscideus* (Schreib.) Macleay, 1819, *Horae Ent.* **1** (1): 121-2 (in Appdx.); Griffith, 1862, *in* Cuvier, *Anim. Kingd. Ins.*, **14:** 465, pl. 40, fig. 4.

Types: location of *proboscideus*, unknown; of *australasiae*, in B.M.

Specimens examined:* NEW SOUTH WALES: Acacia Plateau, 4♂ 2♀, H. Davidson (ANIC); 1♂ (HFH); Blackheath, 1♂, 3.xii.46, A. N. Burns (NM); Bombah Pt., Myall Lakes, 1♂, 29.viii.28, E. L. Troughton (AM); Clarence R., 2♂ 2♀ (MM); 1♀, 28.viii.89, Ayers (NM); Colovale, 1♂ 1♀, 25.ii.28, A. L. Dyce; 1♂, 14.x.58; 1♂, 12.iii.57, D. Beardsmore; Comboyne, 1♂, H. Davidson; 1♀, W. Heron (ANIC); Dee Why, 1♂ 1♀, Nov. '25, B. Bertram (AM); Dorrigo, 1♂ 1♀, C. F. Deuquet (NM); Galston, 1♂ 1♀, Dumbrell (AM); 1♂ (SAM); Glenbrook, 1♂ ,14.i.43, T. McBride (AM); Illawarra, 1♂ 1♀ (MM); 2♂, 1.x.08, G. E. Bryant; 2♂ 1♀, 14.x.08; 1♀, 29.ix.08 (BM); 1♂ (ANIC); Katoomba, 1♂, 15.ii.57, G. Hardy (ANIC); Lawson, 1♂ 1♀ (MM); Manly, 1♂, 7.ii.21 (QU); Manning R., 3♂ 1♀; Mudgee, 2♂ 1♀ (MM); Newport, 1♂, 13.x.08, G. E. Bryant (BM); Patonga, 1♂, H. Davidson (ANIC); Richmond R., 1♂ 3♀ (MM); 1♂ (AM); Singleton, 26m. S. of, 2♂, 23.iii.57, E. F. Riek (ANIC); St. Leonards, 1♂, June, 1925 (AM); Sydney, 1♂, 20.xi.10; 2♀, 21.ix.08 (ANIC); 2♂ (SAM); 2♂ 2♀ (TDA), 1♂ (QU); Tuggerah Lakes, 2♂ Dec. 1952, Mrs. E. Hunter (AM, ANIC); Wahroonga, 1♂ 1♀, Sept. 1923, H. J. Carter (ANIC): QUEENSLAND: Brisbane, 1♀, 9.ii.63, B. Ross; Middle Range, 1♂, 20.ii.62, A. MacQueen (QU); National Pk., 1♀, Dec. 1919, H. Hacker; 1♂ 1♀, Nov. 1920 (QM); Tambourine Mt., 1♂, 2-9.iv.35, R. E. Turner (BM): VICTORIA: Bendigo, 1♂, C. Oke (NM): SOUTH AUSTRALIA: Pt. Lincoln, 1♂ (AM); 1♂ (NM): TASMANIA: 1♂ 1♀ (ANIC).

Male.—Length 19-21 mm. Dorsal surface of head (Fig. 10) with confluent moderate punctures; bearing a bituberculate ridge just anterior to ocular canthi, at apex 0.3-0.4 times width of frons. Distal portion of clypeus triangular in section, gently deflexed, terminating in a pair of ventral projections (Fig. 9); ventral surface with median longitudinal ridge extending from apex to a stout bifurcate process anterior to the mouth; in profile, with slight convexity below ocular canthi. In some specimens, bifurcate process lacking and longitudinal ridge poorly defined.

Pronotum with anteromedian flattening; whole anterior surface, other than extreme lateral margins and central portion of flattening, very finely punctate; centre of flattening and posterolateral areas of disc with coarse punctures discrete in former, subconfluent and interspersed with fine punctures in latter; with a pair of paramedian declivities delimiting coarsely-punctate zone anteriorly; median longitudinal zone finely punctate, broadening posteriorly, extending as a broad zone parallel to coarsely-punctate posterior ridge. Foretibiae 6-dentate.

Elytra with intermediate striae subobsolete beyond apical calli; cell narrow (*ca.* 0.7 mm) containing 0-10 punctures.

Female.—Length 15-19 mm. Head (Fig. 14) bearing obtuse, weakly-pigmented transverse ridge, 0.40-0.50 items width of frons.

Pronotum with shallow, coarsely-punctate impression, on either side of which, near anterior margin, lie small areas of predominantly fine punctation; the latter separated from coarsely-punctate

*No characters could be found that separated the females of the two subspecies of *E. proboscideus*. The females here listed were taken in association with males of *E. p. proboscideus*, or came from localities where this subspecies, but not *E. p. kirbyanus*, had been collected on other occasions.

posterolateral zones by transverse declivities; anterior to these, surface slightly elevated, giving appearance of a pair of slight bosses. Median longitudinal zone finely punctate, extending irregularly and narrowly parallel to posterior ridge. Foretibiae 6-, very rarely 7-dentate.

Elytral striae continuous; cell 0.5-0.8 mm in width, containing 8-14 (usually <10) punctures.

Although the whereabouts of Schreiber's type was not discovered, the figure accompanying his original description of *proboscideus* places the identification of this species beyond doubt.

Elephastomus proboscideus kirbyanus **nom. et. stat. nov.** (Figs. 11, 12)

♂, *Elephastomus proboscideus* (Schreib.) Macleay, 1819, *Horae Ent.* I(1): 121-2 (in Appdx.) Specimen seen by Macleay but described by him as ♀ of *proboscideus* Schreib.

♂, *Bolboceras proboscideus* (Schreib.) var. Klug, 1843, *Abh. Berl. Akad.*, pp. 21-36.

♂, *Bolboceras kirbii* Westw., 1852, *Trans. Linn. Soc. Lond.* **21**: 13; pl. 3, figs. 2 a-f; *loc. cit.* footnote; Blackburn, 1888, *Proc. Linn. Soc. N.S.W.*, **3**: 842; 1904, *op. cit.* **29**: 482.

Type: ♂ type of *Bolboceras kirbii* Westw. from Tasmania in Hope Museum, Oxford. Klug referred to a form of *proboscideus* which he placed as a variety of that species. Westwood realized that his *kirbii* was probably not a distinct species, and added a footnote to this effect. Blackburn regarded *kirbii* as a variety of *proboscideus*, but Boucomont, in his 1912 catalogue, treated it as a distinct species.

The name *kirbii* is doubly preoccupied (as noted by Blackburn 1904), and no junior synonyms are available; in treating this form as a subspecies of *proboscideus*, a new name is therefore required.

Plesio allotype ♀: Laggan, N.S.W., 13.x.59, F. Gay (ANIC).

Specimens examined:* NEW SOUTH WALES and AUSTRALIAN CAPITAL TERRITORY: Black Mt., 1♂, 17.x.54, P. B. Carne; 1♂, 2.ii.55; 1♂, 23.i.56; Blundell's Farm, 1♂ 1♀ Oct. 1934, M. Fuller; Boro, 1♂ 1♀, 20.iii.94, Froggatt; Canberra, 1♂, 17.x.54, P. B. Carne; 1♂, 23.i.56; 1♀, 11.iii.55; Island Bend, 1♂ 1♀, 4.ii.58, W. J. Vestjens; Laggan, 20♂ 3♀, 13.x.59, F. Gay (ANIC); Mt. Kosciusko 5000 ft., 1♂, G. M. Goldfinch (AM): VICTORIA: Beaconsfield, 1♂, Dec. 1928, A. Wade; 1♂, Nov. 1918, I. Wilson; Carrum 1♂; Caulfield, 1♂♀, July, C. Oke; Chelsea, 1♀, 28.ix.19, F. E. Wilson; Cheltenham, 1♂, C. Oke (NM); Grampians, 1♂ (BM); Healesville, 1♂ 2♀, 29.ix.21, C. French; 1♀, 25.xi.11, J. A. K.; Moe, 1♂, 12.x.21 (NM); Monbulk, 1♂, Aug. 1907, Jarvis (QU); 1♀, 23.xi.02, Jarvis (NM); Mordialloc, 1♂ 2♀, 14.viii.08, G. E. Bryant (BM), 1♂, 28.vii.93; 1♂, Jan. 1898 (NM); N. Melbourne, 1♂, 26.xii.12 (ANIC); Nunawading, 1♂, 14.i.56, A. N. Burns; 1♀, 27.i.56; 1♀, 5.xii.54; Oakleigh, 1♂ 1♀; Warrandyte, 1♂, 7.ix.35, A. Tubb (NM): SOUTH AUSTRALIA: Kangaroo Island, 1♂ (SAM); Scott's Ck., 1♂, Nov. 1928 (AM); Summerton, 1♂ 1♀, 1.ii.88; 1♂ Tapanappa, 5-9 Dec. 1919, N. B. Tindale (SAM): TASMANIA: Green's Beach, West Tamar, 1♂, 28.xii.61 (TDA).

Male.—Length 17-24 mm. Clypeus (Fig. 12) finely rugulose distally, very finely punctate toward vertex; with a strong blunt transverse ridge (not showing separation into two tubercles) just anterior to ocular canthi, its apex 0.4 times width of frons. Distal portion of clypeus semicircular in section, not deflexed, apex with pair of ventral processes. Ventral surface (Fig. 11) impunctate, conspicuously swollen but without median longitudinal ridge; in profile, strongly convex in region of swelling, thence concave to mouth.

Pronotum with anteromedian area flattened centrally, depressed laterally, surface very finely punctate; posterolateral areas with interspersed coarse and fine punctures, the anterior limits defined by a pair of paramedian declivities; median longitudinal zone finely punctate anteriorly, very finely punctate posteriorly, extending as a broad, transverse, impunctate zone parallel to posterior ridge. Foretibiae 6-dentate.

Elytra with striae not becoming obsolete at apical calli; cell *ca.* 0.5 mm in width, with fewer than 10, often no punctures.

Female.—Indistinguishable from that of *proboscideus proboscideus.*

*No characters could be found which separated the females of the two subspecies of *E. proboscideus.* The females here listed were taken in association with males of *E. p. kirbyanus*, or came from localities where this, but not the nominate, subspecies had been collected on other occasions.

Subspecies undetermined:* NEW SOUTH WALES and AUSTRALIAN CAPITAL TERRITORY: Barber's Ck., 2000ft. (BM); Binnaway, 26m N.E. of, 3♀, Nov. 1931, A. Musgrave; 1♀ 14.xii.35, C. F. Garnsey (AM); Blue Mts., 1♀; Cordeaux, 1♀; Fairfield, 1♀, Oct. 1923, M. E. Fuller; Huskisson, 1♀, 20.x.55, P. B. Carne (ANIC); Narara, 1♀, 29.xi.46, C. Oke; Pilot Hill, nr. Batlow, 1♀, 1.iii.57, T. G. Campbell; Tenterfield, 1♀ (NM); Tubrabucca, 1♀, 9.i.48, A. Musgrave & party ; Tuross, 1♀, 17-22 Jan. 1936, K. McKeown; Warrah, 1♀, Sept. 1952, D. K. McAlpine (AM): VICTORIA: Broadford, 1♀, Jan. 1950, Wylie (ANIC); Dandenongs, 1♀, Dec. 1908, C. French; Emerald, 1♀, 6.x.07, Jarvis; Geelong, 1♀, Dec. 1931; Lake's Entrance, 1♀, Oct. 1919, F. E. Wilson; Macedon, 1♀; Mallacoota Inlet, 1♀, 22.iii.34 (NM); Mt. Drummer, 1♀, 4.xii.56, E. F. Riek (ANIC); Pt. Nepean, 1♀, Dec. 1909; Traralgon, 1♀, J. Galbraith; Walsh Ck., 1♀, 29.i.11; 1♀, 1922; Wodonga, 1♀, 20.viii.09 (NM): TASMANIA: Cressy, 1♀, 15.xi.54 (TDA); George's Bay, N. Tas., 1♀ (BM); Kingston, 1♀, 10.xi.45; 2♀, 25.v.51 (TM); Ouse, 1♀, 10.xii.62 (TDA): SOUTH AUSTRALIA: 1♀, Bakewell (compared with type of *B. australasiae* Kirby by G. J. Arrow) (BM): QUEENSLAND: Toowoomba, 3♀ (BM).

Elephastomus gellarus sp. n. (Figs. 7, 8, 15)

From an aboriginal word "gellari", meaning elder brother.

Holotype ♂ and *allotype* ♀: NEW SOUTH WALES: Grafton, 21.i.59, F. Paul, (ANIC).

Paratypes: QUEENSLAND: Bowen, 2♂ (NM); 1♂, A Simson (SAM); Brisbane, 1♀, 25.ii.53, J. Whittaker, T.6289 (QM); 1♀, Jan. '98 (BM); 1♂, Feb. '20, H. Pottinger (NM); 1♂, 10.iii.62, T. Brooks; 1♂, 18.xii.26; 1♂, 21.ix.50, Foggon; 1♂, 27.x.47, J. W. Littler; 1♂, 6.viii.61, P. A. Richards; 2♂ 1♀; 1♂, 13.i.55, D. Griffith; 1♀, Illidge; 1♂, 22.iii.61, R. G. O'Brien; 1♀, 3.iii.60, K. Korboot; 1♀, 9.iii.61, M. Dowe; 1♀, 10.ii.58, B. R. Schaffer; 1♀, Nov. '62, N. Heather; 1♀, 5.iii.62, C. H. Hew; 1♀, 15.iv.52, Urquahart; 1♀, May '57, R. Cullinane; 1♀, 18.vii.61, M. J. Aherne; 1♀, 23.iii.63, B. Venz; 1♀, 22.iv.47, B. C. Dodd; 1♀,16.iii.61, G. Saunders; 1♀, 20.iii.62, J. F. Monaghan (QU); Bunya Mt., 2♀, Mar. '31, A. J. Turner, T.6290/1 (QM); Byfield, 1♀ (ANIC); Canungra, 1♂, 23.xi.43, A. Blomberg (AM); Carina, 1♂, Jan. '63; 1♀, Feb. '63, P. Brennan (QU); Carnarvon Rge., 1♂, Dec. '38, N. Geary (AM); Chelmer, 1♂, Feb. '42, H. A. Longman, T.6292 (QM); Clump Pt., 1♀, 23.vi.49, J. O. Campbell (HFH); Corinda, 1♂, 9.ii.58, E. Bernays; d'Aguilar, 1♂, 29.i.61, M. Ludlow; Dakabin, 1♀, 20.i.61, M. Wegener; Darlington, 1♀, 2.ii.59, E. J. Weston (QU); Dunk Is., 2♂, 21-27 May, A. J. Turner, T.6293/4 (QM); Gatton, 1♂, 5.i.63, T. K. Wan (QU); Herberton, 1♂ 1♀, Mar. '11, F. P. Dodd (BM); 1♀ (HFH); Ipswich, 1♀, Oct. '60, B. Sadine; Kallangur, 2 m. E. of, 1♀, 20.iii.60, R. Atkinson; Kilcoy, 1♀, 22.i.30; Kureen, 1♂, 7.i.30; Lawes, 1♂, 14.iii.53, N. D. Young; 1♀, 7.i.57, W. F. Wildin (QU); Mackay, 2♂ (NM); Milmerran, 2♂ (ANIC, MM); Moreton Bay, 2♂ (BM); Mt. Nebo, 1♂, 23.iv.61, G. C. Grigg (QU); National Pk., 1♂, 10.xi.34, A. Blomberg (AM); Ravenshoe, 1♂ (MM); 1♂ 1♀, 29.xi.35 (JGB); 1♂, F. H. Taylor (ANIC); Stanthorpe, 1♂, 11.xii.22 (QU); Toowong, 1♀, Feb. '98 (BM); Toowoomba, 1♂, (HFH); Woodford, 1♂, 4.iv.63, F. D. Page (QU); Wyreema, 1♂ 1♀, O. W. Tiegs, T.6288, 6295 (QM); NEW SOUTH WALES: Clarence R., 1♂ (SAM), 1♂, 29.viii.'98, Ayers (NM); 1♂; Grafton, 2♂, 21.i.59, F. S. Paul (ANIC); Orara R., 1♂ (MM); 1♂ (ANIC); Tyringham, 1♂, H. Davidson (ANIC); no locality, 1♂ (SAM); 4♂ 6♀ (NM).

Male.—Length 15-21 mm. Head (Fig. 7) with confluent fine punctures, bearing a strongly-elevated, weakly-bidentate transverse ridge arising between ocular canthi, at apex 0.4 times width of frons. Clypeus with distal portion slightly and upwardly angulate with respect to plane of proximal portion; ventral surface (Fig. 8) very finely punctate, hollowed out beneath rounded apex, in profile varying from shallowly to strongly concave.

Pronotum with surface flattened on either side of slight anteromedian impression; posterolateral zones with interspersed coarse and very fine punctures; coarse punctures also occurring in anterior part of impression; median longitudinal zone very finely punctate, extending laterally parallel to posterior ridge and becoming almost impunctate. Foretibiae 6-dentate.

*Female specimens which could not be identified to subspecies for lack of associated males, or lack of records of males from the same localities on other occasions.

Elytra with striae not becoming obsolete at apical calli; cell *ca.* 0.4-0.7 mm in width, usually impunctate, very rarely with more than 3-4 punctures.

Female.—Length 15-18 mm. Head (Fig. 15) bearing an obtuse transverse ridge level with anterior margin of eyes, at apex 0.45-0.55 times width of frons.

Pronotum with coarse punctures extending over most of surface, usually distorted and often confluent, interspersed with fine punctures; impression shallow, without very finely punctate flattened areas at sides; median longitudinal zone narrow, finely punctate, surface adjacent to posterior ridge very finely punctate.

In four unusually large ♂ specimens (from Carnarvon Range, Stanthorpe and Toowoomba), the foretibiae bore 7 teeth, and the elytral cells contained more than 12 punctures forming partial loops.

ACKNOWLEDGMENTS

The author is indebted to his colleague Dr. E. B. Britton, for much detailed information concerning specimens of *Elephastomus* in the British Museum, and to Dr. H. F. Howden, Canada Department of Agriculture, for the loan of specimens compared by him with several types. Thanks are also offered to the Museum entomologists and private collectors who lent specimens for study.

The illustrations were prepared by Mrs. G. Palmer (Fig. 1), Mrs. E. J. Williams (Figs. 2-12), and Mr. F. Manning (Figs. 13-15).

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ABSTRACTS FROM PAST PROCEEDINGS

This abstract was prepared for the Minutes of the Meeting of the date given and the speaker mentioned is the authority for facts.

MICROPTERYGIDAE BREEDING IN KAURI PINE SEED

September 10, 1951.—MR. A. R. BRIMBLECOMBE exhibited kauri pine seeds infested by a species of Micropterygidae (Lepidoptera).

In 1936 the Forestry Department submitted seeds of both southern and northern kauri pine infested by grubs. The grubs had already spun cocoons but even after several years no emergence occurred. Further material was obtained in 1941 and placed in various humidities. No emergence occurred within twelve months but examination of the material in 1950 showed that a few moths had emerged.

In 1947 Mr. Dumbleton received grub infested kauri pine seed from Fiji. His attempts to breed the adult failed but he was able to determine the insect as belonging to Micropterygidae. Having heard of similarly infested kauri pine seed in Queensland, he requested material and determined it as also belonging to the Micropterygoidea. He has now erected the genus *Agathiphaga* and called the Queensland species *queenslandensis* and the Fijian species *vitiensis.*

Infested seed can be separated by a harder resistance to touch by the tip of the finger than is shown by normal fertile seed because of the hard cocoons spun by the larvae. Records over the past fifteen years show that infestation varied from 2 to 48%, but would average less than 10%. Infestation occurs in the seed of the southern and northern kauri pine. These are widely separated in distribution but it has not yet been determined whether the same or different species of *Agathiphaga* attacks the seed of the two kauri pines.