SOME NEW SPECIES OF *TELENOMUS* (HYM., *SCELIONIDAE*)
EGG-PARASITOIDS OF TROPICAL PYRALID PESTS
(*LEP., PYRALIDAE*)

The ecology of tropical pyralid stem borers and their relationship with wild and cultivated graminaceous plants has long been an area of intensive research (Patman, 1968 and references therein). Several species of stem borers have shifted from wild to cultivated host plants, and in the process have become serious pests of their new hosts, e.g., sugarcane borers in the New World, maize borers in the Old World. Parasitoids of the borers have also shifted to the new host-plant environment, sometimes to the extent that borer populations are effectively controlled (Yamamoto & Torii, 1986). The situations that the parasitoids encounter and the population density of both the borers and parasitoids have not changed, and nuclear (compare, e.g., with Cochlearia, 1980).

The biological control of these pests from the economic point of view, may be more effective in the future because of the cultural techniques used in raising the hosts. Several projects are presently being carried out using biological control at various locations using egg parasitoids of the genus Telenomus (Hym., *Scelionidae*) with promising results, for example, in the Ivory Coast against *Eldana saccharina* (Wlk.), *Maruca vitrata* (Fabric., Rag.), and *Scirpophaga incertulas* (Mej.); on sugarcane, rice and maize (Cochlearia, in litt.); in India against *Chilo saccharum* (Boyer) on sugarcane (David, in litt.) and in Bolivia against *Diabrotica* (F.) and *Diabrotica saccharalis* (F.) on sugarcane (Teran, in litt.).

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*Eurus natura nigrae magis quam in minimis tota.*

**Plinio**

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SOME NEW SPECIES OF TELENOMUS (HYM., SCELIONIDAE)
EGG-PARASITOIDS OF TROPICAL PYRALID PESTS
(lep., Pyralidae) (*)

The ecology of tropical pyralid stemborers and their relationship with wild and cultivated graminaceous plants has long been an area of intensive research (Pathak, 1968 and references therein). Several species of stemborers have shifted from wild to cultivated host plants, and in the process have become serious pests of their new hosts, e.g., sugarcane borers in the New World, maize borers in the Old World. Parasitoids of the borers have also shifted to the new host-plant environment, sometimes to the extent that borer populations are effectively controlled (Yasumatsu & Torii, 1968). The influence that the presence of alternative host plants has on the population density of both the pests and their natural enemies is, however, still unclear (compare, e.g., Nagarkatti and Ramachandran Nair, 1973 with Cochereau, 1980).

The biological control of pest pyralids, from the economic point of view, may be more effective than other methods because of the cultural techniques used in raising maize, rice and sugarcane. Several projects are presently being carried out to control pyralid populations using egg parasitoids of the genus Telenomus (Hymenoptera: Scelionidae) with promising results, for example, in the Ivory Coast against Eldana saccharina Wlk., Maliarpha separataella Rag. and Scirpophaga melanoclysta Mey. on sugarcane, rice and maize (Cochereau, in litt.), in India against Chilo sacchariphagus (Boyer) on sugarcane (David, in litt.) and in Bolivia against Diatraea rufescens Box and Diatraea saccharalis (F.) on sugarcane (Teran, in litt.). The biology of these egg parasitoids is even more interesting and their potential for effective population control greater in that at least some are phoretic upon the adults of their host (Cochereau, in litt.).

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The taxonomic problems of these egg parasitoids are almost overwhelming. The only identification keys available are those published by Nixon for the species of the Ethiopian (1935) and Oriental regions (1937, 1940). These papers dealt with only a small fraction of the fauna of the Old World tropics and never pretended to be more than the first contribution toward the study of the systematics of the telenomines from these regions. Since their publication only a few more taxonomic papers have appeared, dealing with the description of single species (e.g. Mani, 1941) or with corrections in host associations (Yasumatsu, 1950). Since 1940, however, species of Telenomus reared from tropical pyralid pests of both wild and cultivated grasses have often been observed and recorded because of their presumed importance for biological and integrated control (e.g. Rothschild, 1970; Appert, 1973; Nagraatti & Ramachandran Nair, 1975; C.I.B.C., 1977) and have been the subject of a handbook (Nishida & Torii, 1970) and a Symposium (1967).

We present below descriptions of four new species and redescriptions of a fifth (Crawford, 1914) of Telenomus reared from eggs of pyralid pests of maize, rice and sugarcane. The old world species are compared with the keys and descriptions of Nixon (1935, 1937, 1940). We recognize that because of inadequate descriptions, intraspecific variation and erroneous host records, some of these may have already been described and named. We feel that, nevertheless, it is essential that identifiable names be made available so that work on the biology of these species may continue.

ABBREVIATIONS AND TERMINOLOGY

Some new characters and measurements are here briefly defined. For further details refer to Bin, 1981 and to the following papers in press: Johnson, 1982; Bin and Dessart, 1983. W: width; L: length; T1, T2: metasomal tergite 1, 2; DCI: ratio of W/L of head measured in dorsal view; FCI: ratio of W/L of head measured in full frontal view; acetabular field: patch of fine coriaceous sculpture near dorsal apex of acetabular carina; claval formula: number of plate sensilla on underside of apical antennomeres, given as segments involved/number of sensilla, e.g., A11-A8/1-2-2-1; episternal foveae: diagonal line of foveae on mesepimeron between acetabular carina and mesopleural pore; intercoxal space: area on ventral portion of mesepimeron between fore and mid coxae; metapleural carina: longitudinal crest between posterior margin of metapleuron and propodeal spiracle, sometimes extending cephalad of spiracle; orbital bands: coriaceous sculpture along
inner orbits of eyes; preocellar pit: deep hole located just ventrad of median ocellus, function unknown; total length: measured as sum of: head length in dorsal view, greatest mesosomal length in lateral view and greatest metasomal length in lateral view.

**Telenomus planatus** n. sp.

(Fig. I, 1-6; Fig. II, 1-6; Fig III, 1-4; Pl. I; Pl. II, 1-2)

Holotype female. Measurements: DCI: 1.78; FCI: 1.30; frons W/eye height: 1.05; W/L T1: 2.9; L/W T2: 1.00; L/W metasoma: 2.05; total length: 1.65 mm.

Color. Head and body dark brown; all coxae brown on outer side, yellow medially; legs pale yellow; apical tarsomeres brown; radix, base of A1 pale yellow; antennae otherwise brown.

Head. Vertex broadly and smoothly rounded onto occiput, scaly-reticulate throughout, setae inserted into small punctures; no hyperoccipital carina; occiput above with same sculpture as vertex, smooth near occiput carina; occipital carina complete, but indistinct medially, simple (i.e., not crenulate); orbital bands broadly effaced, present only ventrally; frons smooth, with two rows of 4-6 setae parallel to each inner orbit; preocellar pit absent; frontal depression weakly developed; frons not bulging between antennal insertion and inner orbits; mandibles narrow, tridentate; clypeal margin edentate; eyes setose; inner orbits rounded at level of lateral ocelli; temples weakly bulging, not grooved, with no band of sculpture along posterior orbits.

Mesosoma. Mesoscutum strongly depressed, setose, coriaceous throughout; parascutal furrows not crenulate; notauli absent; scutellum smooth, sparsely setose, submarginal foveolae fine; dorsellum weakly expanded medially, weakly longitudinally striate at lateral margins, otherwise almost smooth, with only very shallow longitudinal striae medially; metanotum lateral of dorsellum smooth, without crenulae or punctures; medial lobes of propodeum acute, without deep apical foveae; acetabular carina weakly developed, simple; no episternal foveae; width of intercoxa space greater than length of fore coxa; postpectal carina with only a few, very fine crenulae; no mesopleural carina; mesopleural furrow well-developed; acetabular field very small, sculpture shallowly impressed, reaching neither intercoxal space nor mesopleural furrow; posterior margin of metapleuron not expanded; metapleural carina indicated only by short spur posteriorly.
Metasoma. T1 with 2 pairs of lateral setae, 1 pair of sublateral setae; T1 longitudinally costate through entire length laterally, medially costate only in basal half; greatest length of basal costae on T2 subequal to medial length of T1.

Appendages. Antennae (fig. I, 3) 11-segmented; claval formula: A11-A8/ 1-2-2-1; LA2 > LA3; A6 strongly transverse; L, W A7 < A8; A8-A10 transverse. Wings clear, barely surpassing apex of metasoma; basal vein not pigmented; postmarginal vein longer than stigmal; greatest width of hind wing 1.2 times length of fringe at that point. Legs (fig. I, 4-6) shorter and stouter than is typical for the genus.

Males. Genitalia (fig. II, 6): digital teeth large, 5/digitus (see variation below); laminae volsellares in form of elongate trapezoidal plate, most strongly pigmented laterally, such that genitalia appear to have two supporting rods converging toward digit; aedeagal lobe short, broad; total length of aedeago-volsellar shaft 3.0-3.2 times length of aedeagal lobe, 1.6-1.8 times length of basal ring. Antennae (fig. II, 1) 12-segmented: A2 subequal in length to A3; A4, slightly shorter than A3 (fig. II, 2) with a distinct basiconic sensillum; A6-A10 globose to transverse (see variation). Legs (fig. II, 3-5). Radicle and A1 pale yellow; A2-A12 light brown to brown, becoming darker distally; male otherwise very similar to female.

Hosts: Eldana saccharina Wik., Malilarpha separatella Rag. (Lepidoptera: Pyralidae).

Variation. The series of specimens reared from the two hosts differ in several aspects. Those reared from the eggs of Malilarpha compared to those from Eldana (including the holotype) have smaller digital teeth, the teeth are inserted farther from the apex of the digitii, and the digitii therefore appear to be more rounded (fig. III, 4); the costei on T1 and T2 are shorter, so much so that those on T2 appear only as a row of foveae (pl. II, 2) the mesoscutal sculpture is more shallowly impressed and may be effaced posteriorly (pl. II, 1); the head is somewhat more globose (fig. III, 1); A6-A10 in the male are transverse (fig. III, 2); A5 (fig. III, 3) with a distinct basiconic sensillum; T2 and the metasoma in general are relatively shorter (pl. II, 2). We postulate that these differences are correlated to the smaller overall size of the specimens from Malilarpha and do not indicate the existence of two distinct species. Biological control workers should nevertheless be aware that differences between the two do exist and should test our hypothesis with interbreeding experiments.
Fig. II

*Telenomus applanatus* n. sp. ♀ (reared from *Eldana saccharina*). - 1. Antenna
Remarks. *Telenomus applanatus* runs out to the genus *Platyteletomurus* in Nixon's key to African genera of Telenominae (1935: 74). As discussed in Johnson (1982, in press) we believe that all species classified in this genus since its descriptions by Dow (1914) should be regarded as species of *Telenomus*. The species described here may be distinguished from *T. hylas* (Nixon) by its more globose head (DCI < 2) and more elongate metasoma (L/W metasoma 1.8-2.0). *Telenomus applanatus* may also be separated from *T. busseolae* (Gahan) by its longer metasoma (L metasoma > L mesosoma).

Telenomus versicolor n. sp.

(Fig. IV, 1-7; Fig. V, 1-6; Pl. III)

Holotype female. Measurements: DCI: 1.95; FCI: 1.25; frons W/eye height 1.13; W/L T1: 4.9; L/W T2: 1.04; L/W metasoma: 1.78; total length: 1.76 mm.

Color. Head and body very dark brown to black; all coxae brown; trochanters, bases and apices of femora and tibiae, basal four tarsomeres brownish-yellow; legs otherwise brown; radicle, base af A1, underside and apex of A2 brownish-yellow; antennae otherwise brown.

Head. Vertex broadly and smoothly rounded onto occiput, scaly-reticulate posteriorly, sculpture effaced between ocelli, setae inserted into small punctures; no hyperoccipital carina; occiput smooth near occipital carina, otherwise with same sculpture as vertex; occipital carina complete medially, simple; orbital bands of shallowly impressed coriaceous sculpture broadly interrupted near mid point of eye, ventrally expanding to reach frontal depression and antennal insertions; area of frons below median ocellus and above break in orbital bands with numerous scattered setae, no distinct ocellar setae; frons otherwise smooth; no preocellar pit; frontal depression weakly developed; frons non bulging between antennal insertions and inner orbits; eyes setose; inner orbits rounded at level of lateral ocelli; temples (as seen from above) narrow, weakly bulging, not grooved, bands of coriaceous sculpture along posterior orbits extending over approximately half the distance to occipital carina.

Mesosoma. Mesoscutum evently convex, coriaceous throughout, setose, setal bases not postulate; parascutal furrows not crenulate; notauli absent; scutellum smooth, setose, submarginal foveae fine, smaller than dorsal dorsellar punctures; dorsellum well developed, only slightly longer medially than laterally, punctate above, longitudinally striate below; ventral margin of metanotum laterad of dorsellum, near bases of hind wings finely crenulate; inner lobes of propodeum acute, without deep apical foveae; acetalellar carina simple; episternal foveae absent; width of intercoxal space less than length of fore coxa, greater than length of setae arising from its surface; postpectal carina finely crenulate; mesopleural furrow well developed; mesopleural carina absent; acetalellar field large, setose, entering mesopleural furrow, not reaching intercoxal space; anteroventral and postero dorsal quadrants of metapleuron longitudinally wrinkled; deep furrow arising from
Fig. IV

metapleural pore, extending to posterior margin of sclerite (similar to that found in many species of Trissolcus); posterior margin of metapleuron weakly expanded, lamellate, crenulate; metapleural carina indicated by short spur posteriorly.

Metasoma. T1 with 5 pairs of lateral setae, 2 pairs of sublateral setae, costae reduced medially to row of foveae, extending over basal three-fourths of length of sclerite laterally; costae on T2 reduced to row of foveae.

 Appendages. Antennae (fig. IV, 5) 11-segmented; claval formula A11-A8/1-2-2-1; L A2 > LA3; A6 strongly transverse; L, W A7 < A8; A8-A10 transverse. Wings clear, surpassing apex of metasoma; basal vein not pigmented; postmarginal vein longer than stigmal; hind wing narrow, greatest width 1.4 times length of fringe at that point. Legs (fig. IV, 4, 5, 7) short and stout middle 5th tarsomere (fig. IV, 6) ventrally with ordinary bristles.

 Male. Two distinct color morphs present. Dark: head and body dark brown; fore coxae brownish-yellow; legs, antennae otherwise yellow. Bicolored: head and mesosoma yellowish brown, often with dark brown patches around ocelli, lateral parts of mesonotum, head and mesosoma distinctly lighter than dark brown metasoma; legs and antennae as in dark morph. Genitalia (fig. V, 6): digital teeth small, 3/digitus (rarely 4); digitus small; laminae volsellares in form of narrow ventral plate; penis valves strongly sclerotized, continuous laterally with base of aedeago-volsellar shaft; aedeagal lobe short, broad; length of aedeago-volsellar shaft 2.9-3.2 times length of aedeagal lobe, 1.3-1.5 times length of basal ring. Antennae (fig. V, 1) 12 segmented; LA2 > LA3; A4, A5 (fig. V, 2) slightly longer with a basiconic sensillum, wider than A3-A4; A6-A10 transverse. Legs (fig. V, 3, 5) short and stout. Otherwise, very similar to female, except for the following: convex portion of mesosoma heavily setose; longitudinal striae on metapleuron absent or very weak; metasoma shorter and stouter.

 Host: Scirpophaga melanoclysta Meyrick (Lep. Pyralidae)

 Variation. Except for the color morphs of the males, there is no significant variation among the available specimens.

 Remarks. Telenomus versicolor keys out to either T. aleus or T. hyperion in Nixon’s key to African Telenomus (1935: 77). It may be easily distinguished from these by the structure of the male genitalia: 5 small teeth/digitus (5 in aleus, 3 large ones in hyperion); the overall shape of the
Fig. V.
Telenomus verticolor n. sp. ♂. 1. Antenna. 2. 5th antennomere. 3. Fore leg.
genitalia, narrow medially, widening both basally and apically; the basal extension of the penis valves and the relatively small digitii. On the basis of Nixon’s descriptions, versicolor appears to be closest to nephele, from which it may be distinguished by the relatively shorter metasoma (less than twice as long as wide), more strongly developed costae on T1 (abbreviated only medially), and the presence of bicolorated males (dark in nephele). Telenomus versicolor belongs to the tabanivorus species group (see Johnson 1982, in press) on the basis of its short, stout legs (in both sexes!) and the bicolorated males. Cochereau (in litt.) reports that this species is phoretic upon the adult Scirpophaga, but we could find no morphological specializations of the legs (fig. IV, 6) or mandibles associated with this behavior. This is the same species that was briefly described by Tran-Vinh-Liem (1977) as T. thestor. The sex ratio of the material available to us (% males) is 35.9% (124 males, 221 females). Of the total number of males (124), 40.3% (50) were of the bicolorated morph. It is not known whether a single female is capable of laying eggs that will develop into both morphs. The male genitalia of the two morphs are practically identical in structure.


Telenomus transversus n. sp.

(Fig. VI, 1-5; Pl. II, 3-4)

Holotype female. Measurements: DCI: 1.85; FCI: 1.33; frons W/eye height: 1.38; W/L T1: 6.4; L/W T2: 1.46; L/W metasoma: 2. 64; W hind wing/fringe L: 1.2; total length: 1.71 mm.

Color. Head and body dark brown; fore coxae brown, middle and hind coxae yellow; legs yellow; apical tarsome brown; radicle and base of A1 yellow, antennae otherwise brown.

Head. Vertex broadly and smoothly rounded onto occiput, coriaceous throughout; no hyperoccipital carina; occiput with same sculpture as vertex; occipital carina complete and simple (i.e. not crenulate); orbital bands indicated only ventrally; frons above the frontal depression with several scattered setae and some others parallel to the inner orbits; frontal depression sculptured with weak vertical striae above insertions of an-
tennae; smooth and shallow depressions surrounding antennal insertions; cheeks and malar region finely coriaceous; preoccellar pit absent; frons weakly bulging; clypeus margin produced medially; mandible narrow, 5-dentate; eyes virtually bare; temples weakly bulging, with narrow band of shallow coriaceous sculpture.

Fig. VI


Mesosoma. Mesoscutum weakly and evenly convex, coriaceous throughout with scattered setae inserted into distinct punctures; parascutal forrows not crenulate; notauli absent; scutellum slightly bulging in profile, smooth with long sparse setae, no submarginal foveae visible; dorsellum strongly transverse, dorsellar surface almost perfectly flat, weakly differentiated from metanotum, with dorsal row of foveolae, otherwise with shallow longitudinal striae, viewed in profile, nearly in same plane as posterior surface of propodeum, perpendicular to longitudinal axis of body; acetabular carina
simple; episternal foveae absent, but their course indicated by a distinct, shallow furrow; intercoxal space very narrow, width subequal to length of setae arising from its surface; postpectal carina very finely crenulate; no mesopleural carina; mesopleural furrow ventrally well developed; no acetabular field visible, mesepisternum ventrally smooth, shining; area of mesopleuron just below fore wing very finely longitudinally striate; metapleuron ventrally with weak wrinkles radiating from metapleural pore, with deep furrows arising from pore, continuing to posterior margin; posterior margin of metapleuron expanded into narrow lamella, widest ventrally; metapleural carina absent.

Metasoma. T1 with 2 pairs of lateral setae, 1 pair of sublateral setae, smooth throughout except some very fine punctures along basal margin most evident laterally; T2 with no longitudinal costae but with several transverse striations basally, otherwise smooth and shining.

Appendages. Antennae (fig. VI, 1) 11-segmented, strong and stout; clava 4-segmented, claval formula A11-A8/1-2-2-1; L A2 > L A3, A4-A6 transverse and weakly rounded, A7 trapezoidal, A8-A9 transverse, A11 slightly longer than wide, apically rounded. Wings narrow, with long marginal setae; fore wing with postmarginalis longer than stigmaulis, no basal vein. Legs (fig. VI, 2, 3, 5) short and stout; middle 5th tarsomere (fig. VI, 4) ventrally with four strong spines, which can be considered a phoretic adaptation.

Host: Tryporyza innotata Wik. (Lep., Pyralidae).


Remarks. In Nixon's (1940) key to the species of Telenomus from the Indo-Malayan Region, this species keys out to T. rowani (Gahan). Telenomus transversus is clearly related to both rowani and sorus Nixon on the basis of the elongate metasoma, smooth T1, transverse scutellum and the peculiar form of the dorsellum. It may be distinguished from those two by the presence of transverse wrinkles on the base of T2 in place of the otherwise almost universal longitudinal sculpture. This character is quite unusual for scelionids, and our first impression was that it was some sort of artifact. The wrinkles are, however, clearly developed in both specimens. The two were collected as adults clinging to the wings of their host; the chance that they represent teratological specimens can, therefore, probably be ruled out.
Telenomus globosus n. sp.
(Fig. VII, 1-5; Pl. IV)

Holotype female. Measurements: DCI: 1.58; FCI: 1.23; front W/eye height: 1.14; W/L T1: 3.7; L/W T2: 0.95; L/W metasoma: 1.48; total length: 1.56.

Color. Head and mesosoma dark brown, metasoma somewhat lighter, front coxa brown, middle and hind coxae yellow, legs yellow, apical tarsomere brown; radicle and base of A1 yellow; apex of A1, A2-A7 brown, underside lighter; A8-A11 brown.

Head. Vertex broadly and smoothly rounded onto occiput, scaly-reticulate throughout, sparsely setose; no hyperoccipital carina; occiput with same sculpture as vertex; occipital carina simple, distinctly interrupted medially; orbital bands finely and shallowly coriaceous extended to the malar sulcus and effaced near mid point of height of eye; frons smooth; no ocellar setae; preocellar pit absent; frontal depression developed, shallow and smooth; frons not bulging between antennal insertions and inner orbits; mandibles narrow, 3-dentate; clypeal margin rounded medially; eyes setose; temples weakly bulging, with a band of coriaceous sculpture along posterior orbit extending at most half the distance from the occipital carina.

Mesosoma. Mesoscutum flat, coriaceous and setose throughout; parascutal furrow not crenulate; notauli absent; scutellum smooth with some long lateral setae, submarginal foveae fine; dorsellum well developed, as long laterally as medially, punctate above, longitudinally striate below; medial lobes of propodeum acute, without deep apical foveae; acetabular carina simple; episternal foveae absent; width of intercoxal space greater than length of fore coxa; postpectal carina finely crenulate; mesopleural carina absent; mesopleural furrow well developed; acetabular field with a fine coriaceous sculpture reaching mesopleural furrow, merging there with fan-like striae arising from mesopleural pore, not reaching intercoxal space; posterior margin of metapleuron weakly expanded, lamellate and crenulate; deep furrow arising from metapleural pore and extending to posterior margin of sclerite; metapleural carina absent.

Metasoma. T1 with 2 pairs of lateral setae and 1 pair of sublateral setae; costae only in basal half; greatest length of basal costae on T2 shorter than medial length of T1; T2 otherwise smooth.
Fig. VII

*Telenomus globosus* n. sp. ♀ ♂ - 1. ♀ lateral habitus. - 2. ♂ dorsal habitus.

Note: The key points in the diagram include the lateral and dorsal views of the insect, highlighting the antennae and genitalia.
Appendages. Antennae (fig. VII, 5) 11-segmented, claval formula A11-A8/1-2-2-1; LA2 > LA3; A5 and A6 virtually globose; L/W A7 < L/W A8; A8-A10 transverse. Wings clear, surpassing apex of metasoma; basal vein not pigmented, postmarginal vein longer than stigmal vein; hind wings narrow, greatest width 1.4 times length of fringe at that point.

Male. Genitalia (fig. VII, 5): digital teeth small, 3-4/digitus; laminae volsellares in form of two indistinct converging rods; aedeagal lobe short, pointed apically; length of aedeago-volsellar shaft 3.0 times length of aedeagal lobe, 2.4 times length of basal ring. Antennae (fig. VII, 4). LA3 > LA2; length of A4 and A5 subequal; A5 produced ventrally in a tyloid sensillum; A6-A11 distinctly transverse, radicle and A1-A5 yellow, A7-A12 brown, A6 intermediate in color. Legs: otherwise as in female.

Host: Chilo sacchariphagus (Boyer) (Lep., Pyralidae).

Material: Holotype ♀, India, Tamil Nadu, Coimbatore; from eggs of Chilo sacchariphagus; coll. H. David; 2 ♂, 7 ♀. Holotype in BMMH, Paratypes in BMNH, CNC, USNM and our collections.

Remarks. In NIXON'S key to Asiatic Telenomus (1940), T. globosus runs out to couplet 18; at that point the choice is based on the size of the animal (0.7 mm versus 0.55 mm). Six species are keyed out past this point, and we will compare globosus with all of them. The genitalia of globosus and T. remus Nixon are similar in structure; T. remus, however, is characterized by a strongly transverse head (seen from above) and a smooth, sculpturereless vertex (globosus: head nearly quadrate, vertex scaly-reticulate). Telenomus globosus may be easily distinguished from the remaining five species, manolus Nixon, usipetes Nixon, tirathabe Ferrière, pegasus Nixon and otones Nixon, only by a comparison of the male genitalia. The laminae volsellares in globosus are strongly pigmented laterally so as to appear as a pair of rods and are not platelike as in usipetes (cfr. fig. 1 e in NIXON, 1938); the rods are separated, and not fused as in pegasus (cf. fig. 16 in NIXON, 1940); the digital teeth are small and the aedeago-volsellar shaft gradually narrows apically, while in T. otones the teeth are very large and the shaft is abruptly narrowed (cf. fig. 14 in NIXON, 1940); finally, the rods of the laminae volsellares converge apically and, again, the aedeago-volsellar shaft narrows apically, the shaft of both T. manolus and tirathabae is nearly parallel-sided, or even widens apically, and the rods diverge near their articulation with the digiti (cf. figs. 4 a and 11 b in NIXON, 1937). In general habitus,
T. globosus is very similar to the Neotropical species T. impressus Ashmead (see fig. 23 in Nixon, 1940). It may be distinguished from that species by the lack of episternal foveae (Nixon's «nearly transverse crenate groove»). Telenomus globosus was reared together with T. digmoides Nixon in large numbers from the eggs of the sugarcane internode borer (Chilo sacchariphagus) in India (David, in litt.).

**Telenomus alecto** Crawf.

(Fig. VIII, 1-6; Pl. V)


Female. Measurements: DC1: 2.00; FCI: 1.36 from W/eye height: 0.96; W/L T1: 3.8; L/W T2: 0.70; L/W metasoma: 1.31; W hind wing/ fringe L: 1.9; total length: 1.81 mm.

Color. Head and body very dark brown; legs, including all coxae, yellow; radicle yellow; A1-A6 yellow, slightly darker above; A8-A11 brown; A7 intermediate in color.

Head. Vertex broadly rounded, coriaceous and setose; no hyperoccipital carina; occiput with some sculpture as vertex weakly effaced near the occipital carina; head strongly reflexed, occiput in dorsal position appearing flat; occipital carina quite distinct, complete and simple; head posterior to occipital carina with striations more or less parallel to the carina itself; upper part of frontal depression smooth, lower part (above the antennal insertions) with weak transverse striations; frons otherwise coriaceous throughout with setae inserted into distinct punctures; lateral angles of clypeal margin sharply pointed; labral margin excised medially; mandibles with 3 small teeth; eyes distinctly setose; preocellar pit not visible (250 x); temples (seen from above) narrow, weakly bulging, with a narrow band of coriaceous sculpture along the posterior orbits reaching the occipital carina dorsally and extending ventrally 2/3 the distance from the posterior orbit to occipital carina, otherwise smooth with some scattered setae; cheeks smooth.

Mesosoma. Mesoscutum strongly depressed, coriaceous, setose throughout, setal bases not pustulate; parascutal furrows not crenulate; notali
Fig. VIII

*Telenomus alecto* Crawf. ♀ ♂.
1. ♀ lateral habitus.
2. ♀ dorsal habitus.
3. ♀ antenna.
4. ♂ antenna.
5. ♂ 5th antennomere.
6. ♂ genitalia.
absent; scutellum strongly transverse, smooth, setose, submarginal foveae fine; dorsellum longest medially, areolate-rugose; ventral margin of metanotum between bases of hind wings and dorsellum crenulate; medial lobes of propodeum acute; without deep apical foveae; acetabular carina simple (not crenulate); episternal foveae present, very shallow, indistinct; width of intercoxal space greater than length of fore coxa; postpectal carina crenulate, mesopleural furrow well-developed; mesopleural carina absent; acetabular field large, not reaching intercoxal space, but entering mesopleural furrow, sculpture on anterior portion of furrow reaching postpectal carina; ventral portion of metapleuron with shallow striae radiating from metapleural pore, with deep furrow arising from pore extending to posterior margin of sclerite; posterior margin of metapleuron strongly expanded, lamellate; metapleural carina indicated from posterior margin of sclerite anteriorly to metapleural pore, in front of this indicated only by indistinct ridge.

Metasoma. T1 with 2-3 pairs of lateral setae and 1 pair of sublateral setae; costae on T1 extending over 2/3 length of sclerite; greatest length of costae on T2 subequal to medial length on T1, wrinkles expanded fan-like medially and reaching at most 1/3 of T2 length.

Appendages. Antennae (fig. VIII, 3) 11-segmented, claval formula A11-A8/1-2-2-1; LA2 = LA3; L/WA4 > L/WA5, A6 quadrate, L/WA7 < L/WA8; A8-A10 transverse. Wings clear, surpassing apex of metasoma, basal vein not pigmented, postmarginal vein longer than stigmatic; hind wing relatively narrow, greatest width 1.9.

Male. Genitalia (fig. VIII, 6): digital teeth small, 3/digitus; laminae volvulares in form of elongated plate with lateral indications of rods more pigmented; aedeagal lobe short and rounded apically; total length of aedeago-volvular shaft 3.6-4.0 times length of aedeagal lobe, 2.1-2.4 times length of basal ring. Antennae (fig. VIII, 4) 12-segmented, A2 subequal in length to A3, A4 longer than A3 and virtually equal to A5; A5 (fig. VIII, 5) ventrally and medially with a distinct tyloid-sensillum; A6-A7 equal in length and both slightly rounded; A8-A11 also equal in length but rounded dorsally, ventro-apical angle expanded bearing a long seta; radicle yellow, A1-A2 yellow, A3-A12 light brown becoming darker distally. Legs and all coxae yellow, apical tarsomere light brown.

Host: Diatraea rufescens Box and D. saccharalis (F.) (Lep. Pyralidae)

Material. Bolivia, from eggs of Diatraea rufescens Box on sugar cane.


SUMMARY

Four new species of Telenomus (Hymenoptera: Scelionidae) are described on account of their economic importance as agents controlling biologically some tropical Pyralid pests: Telenomus applanatus reared from Eldana saccharina Wlk, on sugar cane and Maruipha separatella Rag. on rice on the Ivory Coast; Telenomus versicolor from Scirpophaga melanocephala Meyr, on rice on the Ivory Coast; Telenomus transversus on Tryporyza innotata Wlk. on rice in Indonesia and Telenomus globosus from Chilo sacchariphagus (Boy.) on sugar cane in India.

Telenomus alecto Craw., also an effective parasitoid of Diatraea saccharalis (F.) and D. rufescens Box on sugar cane in Central and South America, is redescribed.

Telenomus versicolor and T. transversus are phoretic in behavior but only the latter exhibits tarsal adaptations.

REFERENCES


EXPLANATION OF PLATES

PLATE I

*Telenomus appianatus* n.sp. ♂
(reared from *Eldana saccharina*)

1. — Head in frontal view (240 x)
2. — Mandibles and clypeus (512 x)
3. — Mesosoma in profile (224 x)
4. — Mesosoma in dorsal view (224 x)
5. — Detail of scutellum, T1 and T2 (288 x)
6. — Metasoma in dorsal view (224 x)

PLATE II

*Telenomus appianatus* n. sp. ♂
(reared from *Malariapha separatella*)

1. — Mesosoma in dorsal view (224 x)
2. — Metasoma in dorsal view (224 x)

*Telenomus transversus* n. sp. ♂

3. — Metasoma in dorsal view (192 x)
4. — Detail of T1 and T2 (384 x)

PLATE III

*Telenomus verricolor* sp. n. ♂

1. — Head in frontal view (224 x)
2. — Detail of clypeus and mandible (448 x)
3. — Mesosoma in lateral view (208 x)
4. — Mesosoma in dorsal view (192 x)
5. — Detail of scutellum, dorsellum, T1 and T2 (224 x)
6. — Metasoma in dorsal view (192 x)
Plate IV

Telenomus globozus n. sp. Q

1. — Head in frontal view (208 x)
2. — Details of clypeus and mandibles (384 x)
3. — Mesosoma in lateral view (192 x)
4. — Mesosoma in dorsal view (192 x)
5. — Details of scutellum, dorsellum, T1 and T2 (256 x)
6. — Metasoma in dorsal view (192 x)

Plate V

Telenomus alcost Crawl. Q

1. — Head in frontal view (176 x)
2. — Details of clypeus and mandibles (480 x)
3. — Mesosoma in lateral view (176 x)
4. — Mesosoma in dorsal view (176 x)
5. — Detail of scutellum, dorsellum, T1 and T2 (224 x)
6. — Metasoma in dorsal view (176 x)