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THE PTERODECTINE FEATHER MITES OF HUMMINGBIRDS:  
THE GENUS *TOXERODECTES* PARK AND ATYEO  
(THE *HASTIFOLIA* GROUP)<sup>1</sup>

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ABSTRACT

A key to the 15 known species of *Toxerodectes* is presented plus the redescription of the type species, *Pterodectes gladiger hastifolia* Trouessart, 1899 and the descriptions of six new species: *T. antesetatus* from *Colibri t. thalassinus*, Mexico; *T. biscutatus* from *Colibri delphinae*, British Honduras, Peru, Venezuela; *T. corniger* from *Eupherusa e. eximia*, Mexico, Nicaragua and *Doryfera j. johanna*, Ecuador; *T. eurygnathus* from *Trochilus p. polytmus*, Jamaica; *T. florisugae* from *Florisuga m. mellivora*, Mexico, Panama; and *T. kangi* from *Campylopterus h. hemileucurus*, Mexico, Nicaragua.

Key Words: Proctophyllodidae, *Toxerodectes*, feather mites, Trochilidae, hummingbirds.

INTRODUCTION

The genus *Toxerodectes* defined in Park and Atyeo (1971a) contains fifteen species divided into three species groups. Seven of these species (the *hastifolia* group) will be treated in this paper and the remaining species in a following number of this journal. Except for papers cited after 1972, the bibliography for this article is published in Park and Atyeo (1973).

*Toxerodectes* Park and Atyeo

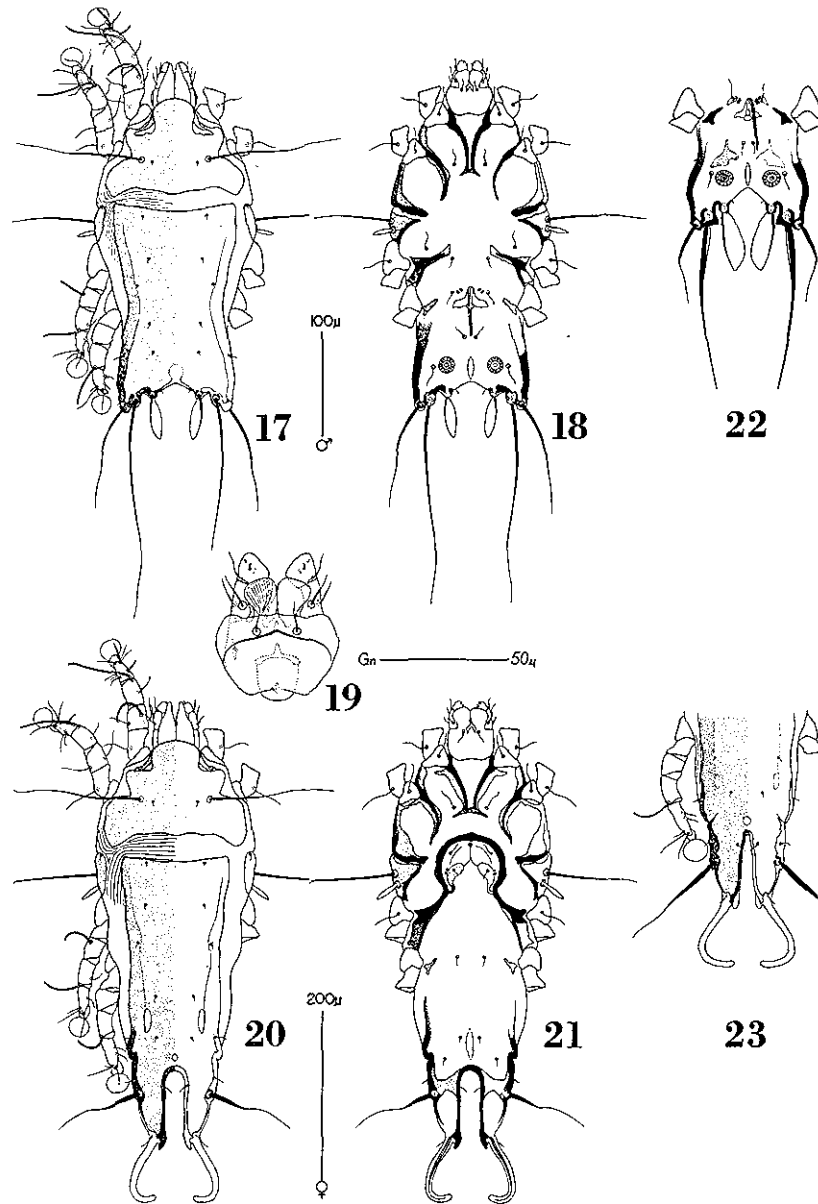
*Toxerodectes* Park and Atyeo, 1971a: 75, 78. [Type by original designation, *Pterodectes gladiger hastifolia* Trouessart, 1899.]

The members of this genus can be distinguished from related taxa by the broadly arched terminal cleft in the male, attenuated terminal lobes fused with the anterior hysterosoma in the female, and by the subhumeral setae lanceolate or bladelike in both sexes. The included species can be separated into three species groups by the conditions of epimerites I in both sexes, setae *d* 5 in the male, and by the presence or absence of subcapitular expansions in the male. The *gladiger* group is characterized by the fusion of epimerites I along the ventral midline for almost their entire lengths, by the lack of the subcapitular flanges, and by the leaflike appearance of setae *d* 5 in the male. In the *hastifolia* and *lecroyae* groups, epimerites I are parallel-sided and are joined only at their terminations by secondary sclerotizations. Occasionally, obvious secondary sclerotizations may join the posterior portions of these structures for considerable distances. The *hastifolia* group may be differentiated from the *lecroyae* group by the subcapitular flanges of the males (not always readily apparent) and setae *d* 5 expanded, rather than the males without flanges and having setae *d* 5 simple.

The species of *Toxerodectes* are quite variable. The distinctive terminus illustrated for the male (fig. 17) is characteristic for most of the species, but the lengths of the posterolateral lobes may be shorter and less widely separated resulting in a terminus with a comparatively narrow and shallow

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Figs. 17-21. *Toxerodectes antesetatus*, n. sp.: dorsal and ventral aspects of male (17, 18) and female (20, 21) and ventral aspect of male gnathosoma (19).

Figs. 22-23. *Toxerodectes biscutatus*, n. sp.: dorsal and ventral aspects of male.

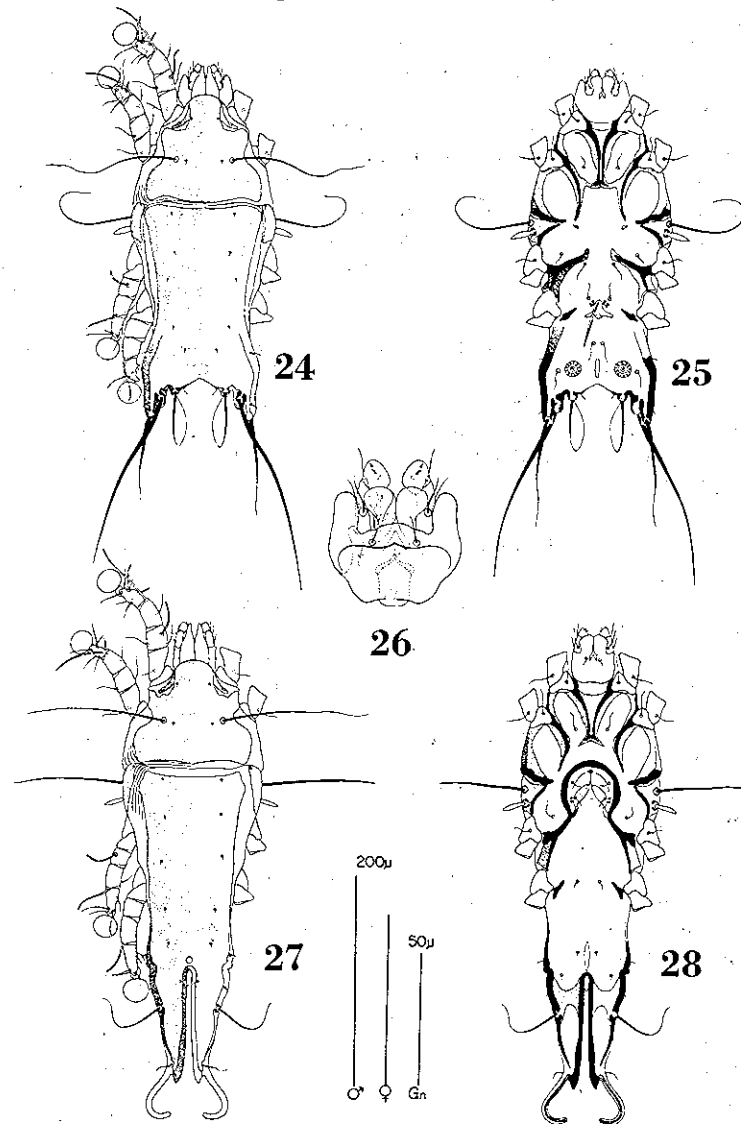
cleft (fig. 48). Following this trend, it might be expected that the termini in undiscovered species will be truncated or similar to that of *Syntomodectes selenurus* (fig. 7).

The females of this genus have a complete hysterosomal shield; the lobar region is not differentiated from the anterior hysterosomal shield by a transverse suture near the cleft apex. As for males, the females are variable. In some species the terminal lobes are long, the cleft is narrow and parallel-sided and the appendages arise from the apicolateral (sub-terminal) surfaces (fig. 27). In other species, the lobes are shorter, the cleft is almost rectangular, and the appendages arise from the lobar apices (fig. 62).

The following key includes the species of *Toxerodectes*, but space limitations make it necessary to present the formal descriptions and illustrations of these species in two successive issues of this journal. The first installment includes the seven species of the *hastifolia* group, the second includes the three species of the *gladiger* group and the five species of the *lecroyae* group.

Key to the species of *Toxerodectes*

1. Male with setae *d* 5 simple or spiculiform (*lecroyae* group) ..... 2  
    Male with setae *d* 5 dilated, leaflike (rarely lanceolate) ..... 6
2. Male with tarsi IV extended beyond the level of the external postanal setae (*pae*) ..... 3  
    Male with tarsi IV not extended beyond the level of setae *pae* ..... 4
3. Female with terminal cleft wider than long; male with coxal fields I closed ..... *heliomasteris*, n. sp.  
    Female with terminal cleft longer than wide; male with coxal fields I open ..... *subulatus*, n. sp.
4. Male with setae on coxae IV positioned on membranous integument, tarsi IV not extended to level of setae *pae* ..... *grandissimus*, n. sp.  
    Male with coxal setae IV positioned on sclerotizations associated with epimerites IVa, tarsi IV extended to level of setae *pae* ..... 5
5. Female with terminal lobes with lateral protuberances at level of setae *l* 5, setae *pai* positioned at level of setae *l* 5; male with genital organ not extending to level of adanal discs ..... *zusii*, n. sp.  
    Female with terminal lobes not bearing lateral protuberances, setae *pai* positioned posterior to level of setae *l* 5; male with genital organ extending to level of adanal discs ..... *lecroyae*, n. sp.
6. Both sexes with epimerites I fused along their lengths, i.e., Y-shaped (*gladiger* group) ..... 7  
    Both sexes with epimerites I parallel-sided, with secondary sclerotizations joining them at posterior terminations (rarely along their lengths where parallel-sided) (*hastifolia* group) ..... 9
7. Female with setae *pai* positioned anterior to level of setae *l* 5 ..... *attenuatus*, n. sp.  
    Female with setae *pai* positioned at or posterior to level of setae *l* 5 ..... 8
8. Male with setae *d* 5 more or less spatula-shaped; female with



Figs. 24-28. *Toxerodectes corniger*, n. sp.: dorsal and ventral aspects of male (24, 25) and female (27, 28) and ventral aspect of male gnathosoma (26).

- setae *pai* positioned posterior to level of setae *l 5* .....  
 ..... *gladiger* (Trouessart)  
 Male with setae *d 5* more or less lanceolate; female with setae  
*pai* positioned at level of setae *l 5* ..... *parallelus*, n. sp.  
 9. Male with coxal setae IV positioned on sclerotizations associated  
 with epimerites IVa ..... *florisugae*, n. sp.

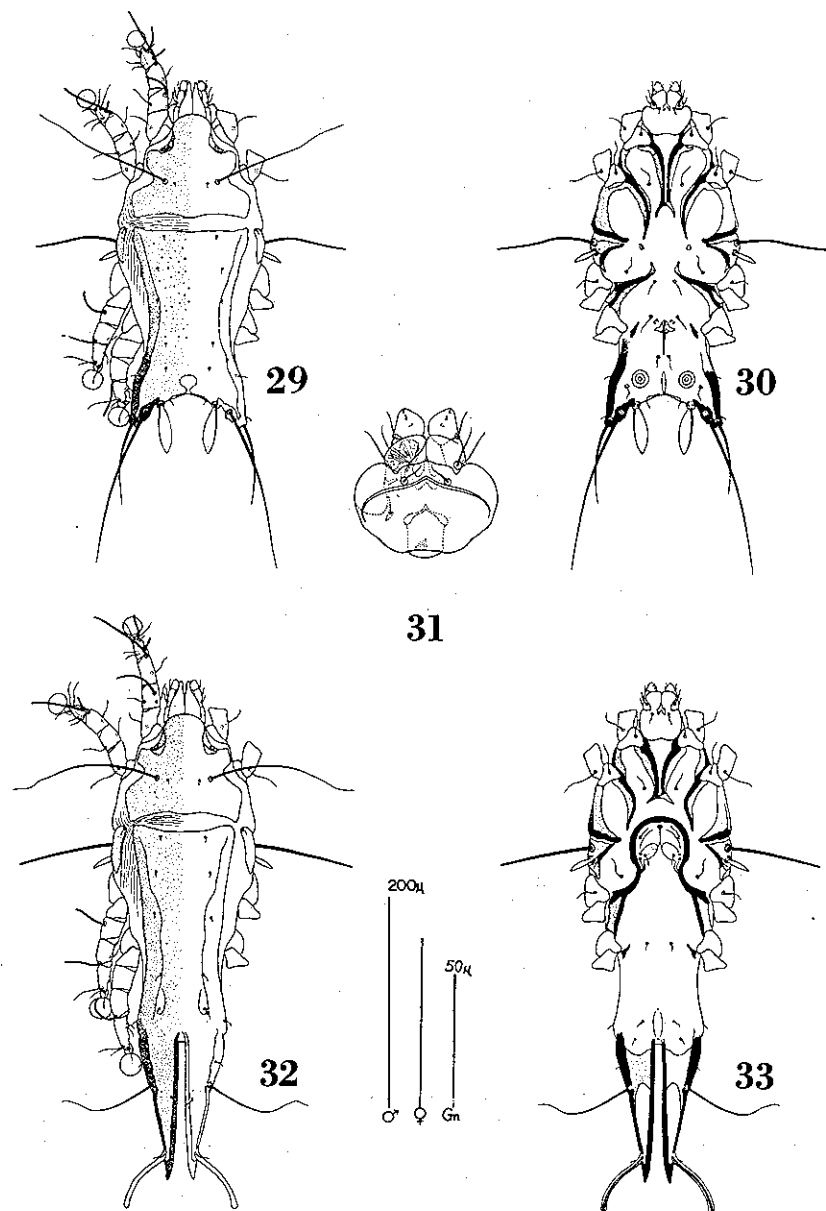
- Male with coxal setae IV positioned on membranous integument off epimerites IVa .....10
10. Male with anterolateral flanges of subcapitulum extended to level of anterior borders of pseudorutellar processes, and with coxal fields I closed .....*corniger*, n. sp.  
Male with anterolateral flanges of subcapitulum not extended to level of anterior borders of pseudorutellar processes, and with coxal fields I open .....11
11. Female with setae *pai* positioned posterior to level of setae *l 5* .....12  
Female with setae *pai* positioned anterior to level of setae *l 5* .....13
12. Male with lateral flanges of subcapitulum large; female with hysterosomal appendages arising anterolateral to apices of elongated terminal lobes .....*eurygnathus*, n. sp.  
Male with lateral flanges of subcapitulum rudimentary; female with hysterosomal appendages arising at apices of short terminal lobes .....*kangi*, n. sp.
13. Female with terminal cleft longer than  $120\mu$ ; male with anterolateral flanges of subcapitulum extended beyond level of palpal setae *v* ..... *hastifolia* (Trouessart)  
Female with terminal cleft shorter than  $100\mu$ ; male with anterolateral flanges of subcapitulum not extended to level of palpal setae *v* .....14

THE *HASTIFOLIA* GROUP*Toxerodectes antesetatus*, new species

MALE (holotype). Length,  $332\mu$ ; width,  $152\mu$ . Propodosomal shield  $95\mu$  in length,  $125\mu$  in width; external scapular setae separated by  $62\mu$ , internal scapular setae by  $42\mu$ . Scapular shields absent. Hysterosomal shield  $190\mu$  in length,  $120\mu$  in width; terminal cleft  $26\mu$  in length. Ventral idiosoma with coxal fields I-IV open; genital organ  $46\mu$  in length, extended to level of setae *c 2*; adanal discs  $17\mu$  in diameter, separated center-to-center by  $47\mu$ ; anal shields absent. Setae: *sh*,  $21\mu \times 4\mu$  bladelike; *d 5*,  $40\mu$  in length, lanceolate; *d 2* and *d 4* in trapezoidal arrangement; *d 4* at the level of *l 3*. Tarsi IV not extended to level of *pae*; solenidion  $\Phi$  on tibia IV subequal to  $\Phi$  on tibia III;  $\sigma 1$  shorter than  $\Phi$  on leg III.

FEMALE (paratype). Length, excluding hysterosomal appendages,  $530\mu$ ; width,  $191\mu$ . Propodosomal shield  $127\mu$  in length,  $162\mu$  in width; external scapular setae separated by  $80\mu$ , internal scapular setae by  $50\mu$ . Scapular shields absent. Hysterosomal shield  $348\mu$  in length,  $130\mu$  in width; terminal cleft linear,  $95\mu$  in length; hysterosomal appendages arising lateral to apices of lobes. Setae: *sh*,  $30\mu \times 6\mu$ , bladelike; *d 5*,  $19\mu$  in length; *l 5*,  $88\mu$  in length, basally dilated; *d 2* and *d 4* in trapezoidal arrangement; *pai* inserted at the level slightly anterior to *l 5*;  $\Phi$  on tibia IV subequal to  $\Phi$  on leg III;  $\sigma 1$  shorter than  $\Phi$  on leg III.

TYPE DATA. From *Colibri t. thalassinus*:  $\delta$  holotype, 5  $\varphi$   $\varphi$  7  $\varphi$   $\varphi$  paratypes, 2 miles W. Omiltemi, Guerrero, Mexico, December 26,



Figs. 29-33. *Toxerodectes eurygnathus*, n. sp.: dorsal and ventral aspects of male (29, 30) and female (32, 33) and ventral aspect of male gnathosoma (31).

1956, W. B. Davis; 4 ♂♂, 3 ♀♀ paratypes, 33 miles W. Hidalgo, Michoacan, Mexico, November 2, 1941, C. C. Lamb; 2 ♀♀ paratypes, 5 km. N. Tres Cumbres, Morelos, Mexico, August 20, 1950, C. Humphreys. The holotype and paratypes are deposited in the University of Georgia; paratypes deposited: GAUD, NMNH.

REMARKS. This species is closely related to *T. kangi* and *T. biscutatus*, but is distinguished by the male having setae *d 5* shorter, and by the female having setae *pai* positioned anterior to level of setae *l 5*. The name *antesetatus* is selected to call attention to the position of setae *pai* in the female.

*Toxerodectes biscutatus*, new species

MALE (holotype). Length, 332 $\mu$ ; width, 144 $\mu$ . Propodosomal shield 90 $\mu$  in length, 120 $\mu$  in width; without lacunae; external scapular setae separated by 57 $\mu$ , internal scapular setae by 38 $\mu$ . Scapular shields absent. Hysterosomal shield 195 $\mu$  in length, 115 $\mu$  in width; without lacunae; terminal cleft 40 $\mu$  in length. Ventral idiosoma with coxal fields I-IV open; genital organ 50 $\mu$  in length, extended slightly beyond the level of setae *c 2*; adanal discs 18 $\mu$  in diameter, separated center-to-center by 45 $\mu$ ; anal shields present. Setae: *sh*, 19 $\mu$  x 3 $\mu$ , bladelike; *d 5*, 64 $\mu$  in length, leaflike; *d 2* and *d 4* in trapezoidal arrangement; *d 4* at the level of *l 3*. Tarsi IV not extended to level of setae *pae*; solenidion  $\Phi$  on tibia IV subequal to  $\Phi$  on tibia III;  $\sigma l$  slightly shorter than  $\Phi$  on leg III.

FEMALE (paratype). Length, excluding hysterosomal appendages, 500 $\mu$ ; width, 188 $\mu$ . Propodosomal shield 123 $\mu$  in length, 162 $\mu$  in width; without lacunae; external scapular setae separated by 76 $\mu$ , internal scapular setae by 52 $\mu$ . Scapular shields absent. Hysterosomal shield 340 $\mu$  in length, 136 $\mu$  in width; without lacunae; terminal cleft narrow, V-shaped, 148 $\mu$  in length; hysterosomal appendages arising lateral to apices of lobes. Setae: *sh*, 26 $\mu$  x 6 $\mu$ , bladelike; *d 5*, 15 $\mu$  in length; *l 5*, 148 $\mu$  in length, basally dilated; *d 2* and *d 4* in trapezoidal arrangement; *pai* inserted at level of *l 4*;  $\Phi$  on tibia IV subequal to  $\Phi$  on tibia III;  $\sigma l$  subequal to  $\Phi$  on leg III.

TYPE DATA. From *Colibri delphinae*: ♂ holotype, 1 ♂, 4 ♀♀ paratypes, eastern peak of Cockscumb Mts., Stann Creek district, British Honduras, May 8, 1958, S. M. Russell; 3 ♂♂, 7 ♀♀ paratypes, Mt. Duida, Amazonas, Venezuela, February 24, 1924, Olalla Brothers; 10 ♂♂, 12 ♀♀ paratypes July 14, 1925 and 7 ♂♂, 4 ♀♀ paratypes July 9, 1925, 30 mi W. Moyobamba, Peru, H. Watkins. The holotype and paratypes are deposited in the University; paratypes are deposited: AMNH, CAS, LAS, NMNH, GAUD.

REMARKS. The species, closely related to *T. antesetatus*, is distinguished by the male having larger setae *d 5*, moderately developed anal shields and longer terminal cleft, and by the female having the terminal cleft V-shaped and setae *pai* positioned anterior to the level of setae *l 5*. The name for the new species refers to the pair of anal shields in the male.

*Toxerodectes corniger*, new species

MALE (holotype). Length, 340 $\mu$ ; width, 152 $\mu$ . Propodosomal shield 102 $\mu$  in length, 114 $\mu$  in width; without lacunae; external scapular setae separated by 54 $\mu$ , internal scapular setae by 32 $\mu$ . Scapular shields absent. Hysterosomal shield 195 $\mu$  in length, 114 $\mu$  in width; without lacunae;

terminal cleft  $30\mu$  in length. Ventral idiosoma with coxal fields I closed; genital organ  $55\mu$  in length, extended slightly beyond the level of setae  $c$  2; adanal discs  $20\mu$  in diameter, separated center-to-center by  $45\mu$ ; anal shields absent. Setae:  $sh$ ,  $23\mu \times 5\mu$ , bladeliike;  $d$  5,  $51\mu$  in length, leaflike;  $d$  2 and  $d$  4 in trapezoidal arrangement;  $d$  4 at the level of  $l$  3. Tarsi IV not extended to level of setae  $pae$ ; solenidion  $\Phi$  on tibia IV slightly longer than  $\Phi$  on tibia III;  $\sigma$  1 subequal to  $\Phi$  on leg III.

FEMALE (paratype). Length, excluding hysterosomal appendages,  $548\mu$ ; width,  $169\mu$ . Propodosomal shield  $124\mu$  in length,  $143\mu$  in width; without lacunae; external scapular setae separated by  $72\mu$ , internal scapular setae by  $51\mu$ . Scapular shields absent. Hysterosomal shield  $368\mu$  in length;  $129\mu$  in width; without lacunate; terminal cleft narrow,  $128\mu$  in length; hysterosomal appendages arising lateral to apices of lobes. Setae:  $sh$ ,  $26\mu \times 6\mu$ , bladeliike;  $d$  5,  $16\mu$  in length;  $l$  5,  $106\mu$  in length, basally slightly dilated;  $d$  2 and  $d$  4 in trapezoidal arrangement;  $pai$  inserted at level of  $l$  4 and anterior to  $l$  5;  $\Phi$  on tibia IV subequal to  $\Phi$  on tibia III;  $\sigma$  1 subequal to  $\Phi$  on leg III.

TYPE DATA. From *Euperusea e. eximia*:  $\delta$  holotype, 2  $\delta$   $\delta$ , 5  $\varphi$   $\varphi$  paratypes, Presidio, Veracruz, Mexico, May 7, 1943, C. C. Lamb, 3  $\delta$   $\delta$ , 2  $\varphi$   $\varphi$  paratypes, same data as holotype except April 30, 1942; 7  $\delta$   $\delta$ , 11  $\varphi$   $\varphi$  paratypes, San Raphael del Norte, Nicaragua, other data unknown; 6  $\delta$   $\delta$ , 20  $\varphi$   $\varphi$  paratypes, Guatemala, other data unknown. The holotype and paratypes are deposited in the University of Georgia; paratypes deposited: AMNH, CAS, GAUD, LAS, NMNH, NU, TC, ZSZM.

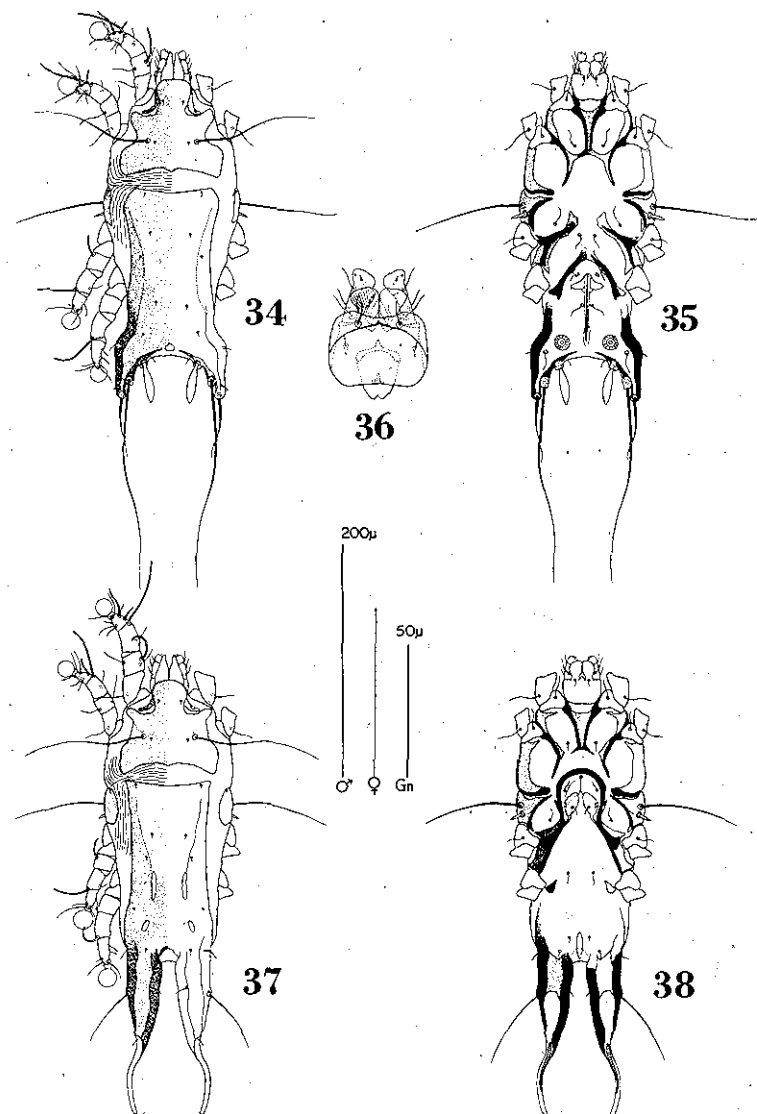
ADDITIONAL MATERIAL. From *Doryfera j. johanna*: 2  $\delta$   $\delta$ , 5  $\varphi$   $\varphi$ , near San José de Sumarco, Napo-Pastana Prov., Ecuador, March 10, 1923, Olalla and Sons; 2  $\delta$   $\delta$ , 1  $\varphi$ , Native Bogotà Collections, Colombia, other data unknown.

REMARKS. This taxon is separated from related species by the male having the subcapitular flanges projecting forward to the level of the anterior border of the pseudorutellar processes. The name *corniger* is given to refer to the hornlike condition of the subcapitulum.

*Toxerodectes eurygnathus*, new species

MALE (holotype). Length,  $328\mu$ ; width,  $145\mu$ . Propodosomal shield  $97\mu$  in length,  $112\mu$  in width; without lacunae; external scapular setae separated by  $50\mu$ , internal scapular setae by  $30\mu$ . Scapular shields absent. Hysterosomal shield  $180\mu$  in length,  $110\mu$  in width; without lacunae; terminal cleft  $31\mu$  in length. Ventral idiosoma with coxal fields I-IV open; genital organ  $34\mu$  in length, extended to level of  $c$  2; adanal discs  $16\mu$  in diameter, separated center-to-center by  $45\mu$ ; anal shields absent. Setae:  $sh$ ,  $24\mu \times 4\mu$ , bladeliike;  $d$  5,  $48\mu$  in length, leaflike;  $d$  2 and  $d$  4 in trapezoidal arrangement;  $d$  4 at level anterior to  $l$  3. Tarsi IV not extended to level of setae  $pae$ ; solenidion  $\Phi$  on tibia IV subequal to  $\Phi$  on tibia III;  $\sigma$  1 subequal to  $\Phi$  on leg III.

FEMALE (paratype). Length, excluding hysterosomal appendages,  $582\mu$ ; width,  $150\mu$ . Propodosomal shield  $129\mu$  in length,  $140\mu$  in width; without lacunae; external scapular setae separated by  $61\mu$ , internal scapular setae by  $40\mu$ . Scapular shields absent. Hysterosomal shield  $380\mu$  in length,



Figs. 34-38. *Toxerodectes florissugae*, n. sp.: dorsal and ventral aspects of male (34, 35) and female (37, 38) and ventral aspect of male gnathosoma (36).

120 $\mu$  in width; without lacunae; terminal cleft narrow, U-shaped, 170 $\mu$  in length; hysterosomal appendages arising lateral to apices of lobes. Setae: *sh*, 33 $\mu$  x 6 $\mu$ , bladelike; *d* 5, 12 $\mu$  in length; *l* 5, 138 $\mu$  in length, basally not dilated; *d* 2 and *d* 4 in trapezoidal arrangement; *pai* inserted at level of midlength of terminal cleft and posterior to *l* 5;  $\Phi$  on tibia IV subequal to  $\Phi$  on tibia III;  $\sigma$  I subequal to  $\Phi$  on leg III.

**TYPE DATA.** From *Trochilus p. polytmus*: ♂ holotype, 4 ♂♂, 8 ♀♀ paratypes, Caymanas, Kingston, Jamaica, September 26, 1962, A. Ventura; 3 ♂♂, 3 ♀♀ paratypes, St. Andrew, Jamaica, December, 1906, J. E. Sherlock. The holotype and paratypes are deposited in the University of Georgia; paratypes deposited: GAUD.

**REMARKS.** This species, restricted to birds of the genus *Trochilus*, is readily distinguished from related species by the male having a short genital organ and wide subcapitular flanges, and by the female having a long terminal cleft with setae *pai* positioned posterior to the level of setae *l 5*. The name *eurygnathus* is selected referring to the condition of subcapitulum of the male gnathosoma.

*Toxerodectes florisugae*, new species

**MALE** (holotype). Length, 330 $\mu$ ; width, 130 $\mu$ . Propodosomal shield 94 $\mu$  in length, 100 $\mu$  in width; external scapular setae separated by 48 $\mu$ , internal scapular setae by 31 $\mu$ . Scapular shields absent. Hysterosomal shield 203 $\mu$  in length, 103 $\mu$  in width; terminal cleft 40 $\mu$  in length. Ventral idiosoma with coxal fields I closed, II-IV open; genital organ 62 $\mu$  in length, extended to level of adanal discs; adanal discs 13 $\mu$  in diameter, separated center-to-center by 45 $\mu$ ; anal shields absent. Setae: *sh*, 14 $\mu$  x 2 $\mu$ , narrow, bladelike; *d 5*, 39 $\mu$  in length, lanceolate; *d 2* and *d 4* in trapezoidal arrangement; *d 4* at the level slightly anterior to *l 3*. Tarsi IV not extended to level of setae *pae*; solenidion  $\Phi$  on tibia IV subequal to  $\Phi$  on tibia III;  $\sigma 1$  shorter than  $\Phi$  on leg III.

**FEMALE** (paratype). Length, excluding hysterosomal appendages 460 $\mu$ ; width, 152 $\mu$ . Propodosomal shield 110 $\mu$  in length, 116 $\mu$  in width; external scapular setae separated by 60 $\mu$ , internal scapular setae by 42 $\mu$ . Scapular shields absent. Hysterosomal shield 330 $\mu$  in length, 107 $\mu$  in width; terminal cleft U-shaped, 120 $\mu$  in length; hysterosomal appendages arising from apices of lobes. Setae: *sh*, 15 $\mu$  x 2 $\mu$ , narrow bladelike; *d 5*, 11 $\mu$  in length; *l 5*, 70 $\mu$  in length, setiform; *d 2* and *d 4* in trapezoidal arrangement; *pai* inserted at the level of *l 5*;  $\Phi$  on tibia IV shorter than  $\Phi$  on leg III;  $\sigma$  shorter than  $\Phi$  on leg III.

**TYPE DATA.** From *Florisuga m. mellivora*: ♂ holotype, 3 ♂♂, 4 ♀♀ paratypes, Vallee Nacional, Oaxaca, Mexico, March 9, 1961, L. L. Wolf; 1 ♀ paratype, Soyaltepec, Oaxaca, Mexico, October 15, 1943, M. del Toro Aviles; 1 ♀ paratype, Futla, Oaxaca, Mexico, June 22, 1939, M. del Toro Aviles; 3 ♂♂, 1 ♀ paratypes, Almirante, Bocas del Toro, Panama, October 17, 1965, Loftin. The holotype and paratypes are deposited in the University of Georgia.

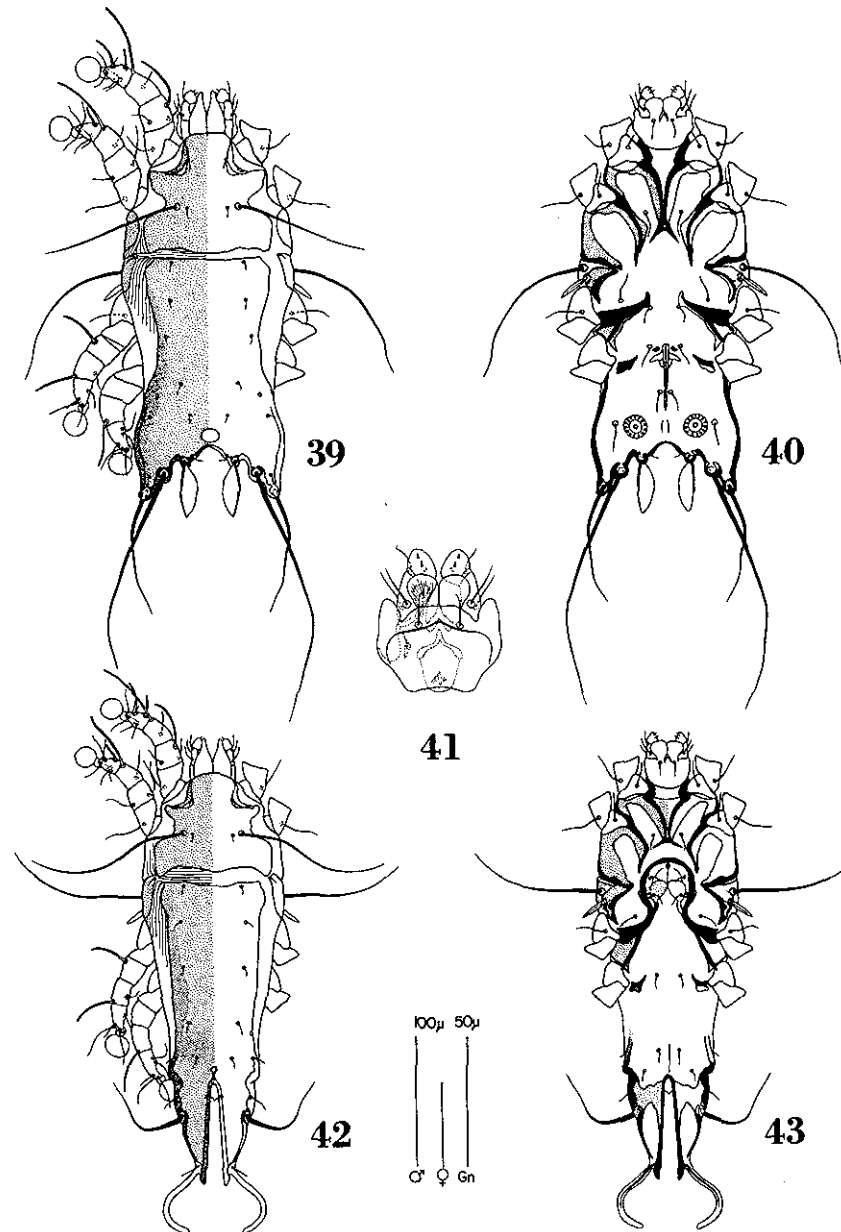
**REMARKS.** This species, restricted to birds of the genus *Florisuga*, is separated from related species by the male having setae *cx 4* positioned on the sclerotizations associated with epimerites IVa, coxal fields I closed, and by the female having a unique condition of the lobar region (fig. 37). The name *florisugae* is selected to designate the type host.

*Toxerodectes hastifolia* (Trouessart)

*Pterodectes gladiger hastifolia* Trouessart, 1899: 37.—Canestrini and Kramer, 1899: 127.—Radford, 1953: 214.

*Toxerodectes hastifolia*: Park and Atyeo, 1971a: 75, 77, 78.

**MALE** (lectotype). Length, 359 $\mu$ ; width, 160 $\mu$ . Propodosomal



Figs. 39-43. *Toxerodectes hastifolia* (Trouessart): dorsal and ventral aspects of male (39, 40) and female (42, 43) and ventral aspect of male gnathosoma (41).

shield  $105\mu$  in length,  $125\mu$  in width; external scapular setae separated by  $60\mu$ , internal scapular setae by  $38\mu$ . Scapular shields present. Hysterosomal shield  $209\mu$  in length,  $126\mu$  in width; terminal cleft  $28\mu$  in length. Ventral idiosoma with coxal fields I-IV open; genital organ  $55\mu$  in length, extended slightly beyond  $c$  2; adanal discs  $18\mu$  in diameter, separated center-to-center by  $50\mu$ ; anal shields present. Setae: *sh*,  $25\mu \times 5\mu$ , bladelike; *d* 5,  $63\mu$  in length, lanceolate; *d* 2 and *d* 4 in trapezoidal arrangement; *d* 4 at level of *l* 3. Tarsi IV not extended to level of setae *pae*; solenidion  $\Phi$  on tibia IV subequal to  $\Phi$  on tibia III;  $\sigma$  I subequal to  $\Phi$  on leg III.

FEMALE (paralectotype). Length, excluding hysterosomal appendages,  $580\mu$ ; width,  $195\mu$ . Propodosomal shield  $141\mu$  in length,  $160\mu$  in width; external scapular setae separated by  $76\mu$ , internal scapular setae by  $50\mu$ . Scapular shields absent. Hysterosomal shield  $381\mu$  in length,  $136\mu$  in width; terminal cleft narrow, V-shaped,  $130\mu$  in length; hysterosomal appendages arising lateral to apices of lobes. Setae: *sh*,  $30\mu \times 6\mu$ , bladelike; *d* 5,  $15\mu$  in length; *l* 5,  $137\mu$  in length, basally dilated; *d* 2 and *d* 4 in trapezoidal arrangement; *pai* inserted at level of *l* 4;  $\Phi$  on tibia IV subequal to  $\Phi$  on legs III;  $\sigma$  I subequal to  $\Phi$  on leg III.

TYPE DATA. From *Clytolaema rubricauda* (= *C. rubinea*):  $\delta$  lectotype, 2  $\delta$   $\delta$ , 1  $\varphi$  paralectotypes, Brazil, no other data. The types are deposited in the Trouessart Collection.

ADDITIONAL MATERIAL. From *Amazilia beryllina viola*: 4  $\delta$   $\delta$ , 1  $\varphi$ , Mexico (Guerrero). From *A. cyanura guatemalae*: 1  $\delta$ , 3  $\varphi$   $\varphi$ , Mexico (Chiapas). From *A. tzacatl*: 6  $\delta$   $\delta$ , 7  $\varphi$   $\varphi$ , Mexico (Veracruz, Oaxaca).

REMARKS. We have never recollected *Toxerodectes hastifolia* from the type host, but have collected in small numbers from numerous hosts a species form similar to the poorly preserved types of *T. hastifolia*. We tentatively include the mites from *Amazilia* species as being conspecific with this species but must retain mites from other hosts as undetermined in the *T. hastifolia* complex. This latter group has been collected from *Chalybura buffoni micans* (Panama), *Goldmania violiceps* (Panama), *Lampornis hemileucus* (Costa Rica), and *Thalurania furcata townsendi* (Guatemala).

#### *Toxerodectes kangi*, new species

MALE (holotype). Length,  $320\mu$ ; width,  $149\mu$ . Propodosomal shield  $93\mu$  in length,  $122\mu$  in width; external scapular setae separated by  $55\mu$ , internal scapular setae by  $38\mu$ . Scapular shields absent. Hysterosomal shield  $188\mu$  in length,  $114\mu$  in width; terminal cleft  $27\mu$  in length. Ventral idiosoma with coxal fields I-IV open; genital organ  $44\mu$  in length, extended to level of setae  $c$  2; adanal discs  $17\mu$  in diameter, separated center-to-center by  $45\mu$ ; anal shields absent. Setae: *sh*,  $23\mu \times 6\mu$ , bladelike; *d* 5,  $50\mu$  in length, lanceolate; *d* 2 and *d* 4 in rectangular arrangement; *d* 4 at level of *l* 3. Tarsi IV not extended to level of setae *pae*; solenidion  $\Phi$  on tibia IV subequal to  $\Phi$  on tibia III;  $\sigma$  I subequal to  $\Phi$  on leg III.

FEMALE (paratype). Length, excluding hysterosomal appendages,  $510\mu$ ; width,  $190\mu$ . Propodosomal shield  $125\mu$  in length,  $170\mu$  in width; external scapular setae separated by  $81\mu$ , internal scapular setae by  $59\mu$ . Scapular shields absent. Hysterosomal shield  $376\mu$  in length,  $130\mu$  in

width; terminal cleft V-shaped,  $82\mu$  in length; hysterosomal appendages arising from apices of lobes. Setae: *sh*,  $29\mu \times 6\mu$ , bladelike; *d 5*,  $32\mu$  in length; *l 5*,  $103\mu$  in length, basally dilated; *d 2* and *d 4* in rectangular arrangement; *pai* inserted at midlength of cleft;  $\Phi$  on tibia IV subequal to  $\Phi$  on legs III;  $\sigma 1$  subequal to  $\Phi$  on leg III.

TYPE DATA. From *Campylopterus h. hemileucurus*:  $\delta$  holotype, 1  $\delta$ , 3  $\varphi\varphi$  paratypes, Escuilapa, Oaxaca, Mexico, April 12, 1939, M. del Toro Aviles; 1  $\delta$  paratype, same data as holotype except April 1, 1939; 3  $\delta\delta$ , 5  $\varphi\varphi$  paratypes, 6 miles southwest Vallee Nacional, Oaxaca, Mexico, April 22, 1961, L. L. Wolf. The holotype and paratypes are deposited in the University of Georgia; paratypes deposited: NMNH.

ADDITIONAL MATERIAL. From *Campylopterus h. hemileucurus*: 2  $\delta\delta$ , 4  $\varphi\varphi$ , Matagalpa, Nicaragua, January 12, 1917, W. Richardson; 1  $\delta$ , 2  $\varphi\varphi$ , San Rafael del Norte, Jinotega, Nicaragua, March 29, 1917, collector unknown; 1  $\varphi$ , LaConcordia, Jinotega, Nicaragua, March 12, 1906, collector unknown.

REMARKS. This new species is closely related to *T. hastifolia* and *T. eurygnathus*, but can be separated by the male having a reduced subcapitular flange, and by the female with the hysterosomal appendages arising at the apices of terminal lobes and setae *pia* positioned posterior to the level of *l 5*. The name *kangi* is given in honor of Dr. Young Sun Kang, Professor of Zoology, Seoul National University.

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#### RECOVERY OF THE ALFALFA WEEVIL AND ITS PARASITES IN NORTH GEORGIA IN 1972<sup>1</sup>

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#### ABSTRACT

Adult alfalfa weevils were collected with phototaxis traps from Dec. 29—May 26 in Clarke Co., Ga., and exhibited parasitism by *Hyalomyodes triangulifer* (Loew) (Tachinidae) from Dec. 29—March 10. Adult weevils collected after March 10 were probably of the next generation. Alfalfa weevil larvae collected from Feb. 25—May 26 exhibited two peaks of parasitism by *Bathyplectes curculionis* (Thoms.) (Ichneumonidae) of 43% and 86%, respectively.

Key Words: Alfalfa weevil, parasites, *Hyalomyodes*, *Bathyplectes*, Tachinidae, Ichneumonidae.

As part of the second year of a cooperative study with the Insect Identification and Parasite Introduction Research Branch, ARS, USDA, on the biological control of the alfalfa weevil, *Hypera postica* (Gyllenhal), we conducted a survey for native and introduced parasites of the

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larval and adult stages of the weevil. We also tried to procure more information on the availability of alfalfa weevil eggs which could support a

#### MATERIAL AND METHODS

Live adult weevils were collected from the University of Georgia's DeKalb Farm in Clarke Co., using phototaxis traps as described by Miller, *et al.* (1972a) and Miller, *et al.* (1972b). The adult weevils were placed in large, screen-bottomed, plastic containers furnished with bouquets of alfalfa as used by Brunson and Coles (1968). Parasites emerging from the adult weevils fell through the screening and pupated in pieces of felt in the bottom. Adult weevils were held in the false bottom containers for 2-3 weeks, after which the parasites were counted and data recorded as % parasitism.

Alfalfa weevil larvae were collected from Feb. 25—May 20. Initially, from Feb. 25—March 10, larvae were reared from cuttings taken from the field as the alfalfa was too short for sweep sampling. From March 17—May 20 100 sweep samples were used for collections, and the procedure was that of Miller, *et al.* (1972a) in which 100 large larvae were reared for a parasitism determination. The data were recorder as number of larvae/100 sweeps and percent parasitism for each collection date.

#### RESULTS

Adult weevils were collected from Dec. 29—May 26, and they were parasitized by *Hyalomyodes triangulifer* (Loew) from Dec. 29—March 10. The highest parasitism by *H. triangulifer* was 21% on Jan. 7, and no *H. triangulifer* were recovered after March 10.

Alfalfa weevil larvae were collected in 100 sweep samples from March 17—May 20, and a high of 2555/100 sweeps was collected on April 24. *B. curculionis* parasitized from 19—43% of the weevil larvae collected and reared from alfalfa cuttings before sweeping was effective. The first of two peaks of parasitism was at 43% on March 10, and the second was at 86% on May 5. Between these peaks of parasite activity there was little effective parasitism from March 24—April 7. The data listed in Table 1 include the number of adult weevils per collection date. The percent of adults parasitized by *H. triangulifer*, the number of larvae per 100 sweeps and % parasitism of larvae by *B. curculionis*.

#### DISCUSSION AND CONCLUSIONS

The survey for parasites of larvae and adults of the alfalfa weevil showed that *B. curculionis* and *H. triangulifer* are still the only parasites that could be detected. The capture of adult weevils in the fields as early as Dec. 29, and the results of Miller, *et al.* (1972a) reinforce our contention that adults are present to lay eggs during warm days in the winter. The bimodal distribution of the adult weevil population is due to the fact that after the middle of April that the adults present are probably those of the newly emerged next generation.

Larvae were collected from alfalfa cuttings as early as Feb. 25, but considering the low average temperatures at this time of year, the eggs that produced these larvae must have been in the fields for some time. It is interesting that parasitism by *B. cuculionis* is at 40% on February 25, because this indicates that this parasite is probably active prior to this date. *B. curculionis* produces two peaks of activity as demonstrated by the per cent parasitism data. This is unexpcted in view of the warmer climate