

## STUDIES IN NEOTROPICAL MALLOPHAGA. VIII.

## "Ischnocera" of the American "Psittacidae", Part 2.

Genus "Paragoniocotes" Cummings<sup>1</sup>

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(With 46 text-figures)

On July 15, 1947 there appeared a very interesting and painstaking report on this genus by Dr. L. R. GUIMARÃES (*Arq. Zool. São Paulo*, 5 (5):43-310), in which he described eleven new species and arranged the known species in four groups, according to anatomical characters, and gave a detailed characterization of the genus.

In November of the same year my own paper on the same genus appeared (*Arthropoda*, 1:89-108), in which ten species and six subspecies were described as new. Long delay in the publication of the initial number of *Arthropoda*, containing my own paper, resulted in two of my new species being antedated by GUIMARÃES.

GUIMARÃES reduced my genus *Epipsittacus* (= *Dimorphus* Carriker) to a synonym of *Paragoniocotes* Cummings, placing its genotype, *E. mirabilis*, in his group C, as well as *abnormis* Kellogg, *neivai* Guimarães, *venezolanus* Stafford and two new species. He claims, with some reason, that while these four groups possess distinctive characters, that certain species serve as connecting links between them, and that the genus *Paragoniocotes* is, in reality, composed of a series of widely differing species which cannot be separated generically. All of the species described by me in 1947 fall into Guimarães group A, typical *Paragoniocotes*, agreeing in all respects with the genotype, *P. gripocephalus* Cummings.

I had planned to divide the whole group, treated by GUIMARÃES, into three genera, viz.: *Paragoniocotes* (Group A of GUIMARÃES); *Epipsittacus* (Group C) and a third genus (undescribed) which would include Groups B and D of GUIMARÃES.

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GUIMARÃES has, it seems to me, given about as vague a characterization of the genus as did CUMMINGS, and practically anything would agree with it on one or more of the many diversified characters he attributes to the genus.

MISS CLAY and Dr. HOPKINS agree with GUIMARÃES in his treatment of the group, and I shall do likewise, although with mental reservations, since it seems to me to be an ultra-conservative arrangement. GUIMARÃES suggests that sub-generic rank might be given to the four groups under which he divides the genus, although this is not a particularly satisfactory arrangement either. In most genera there are border-line species which are aberrant, and which might be classed as being intermediate between two genera, so that there might be some question as to which of the two genera they belonged, yet that fact would not necessarily make it justifiable to unite those two genera.

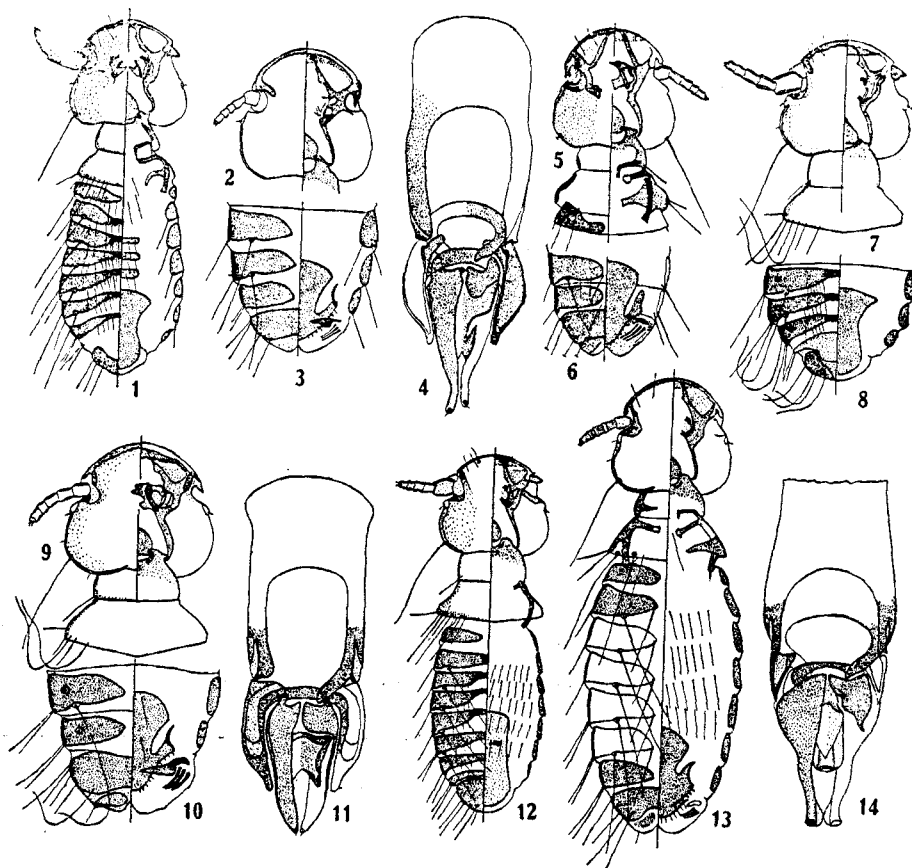
Since the concensus of opinion is to make one single genus of all the known, diversified species of the *Ischnocera* infesting the American *Psittacidae*, all of these species may be arranged into groups which possess certain structural affinities, in order to facilitate their identification. Dr. GUIMARÃES has done this in the only feasible manner, but I would suggest that the groups be reduced to three, instead of four, and I would add in each group certain characters to those given by GUIMARÃES, and would characterize these three groups as follows.

*Group A* — Males and females with "clavi" equal, in the form of a heavy, curving hook, projecting backward over first antennal segment (GUIMARÃES). In addition: Tergites in both sexes widely separated medially, except on apical segment of abdomen; cluster of three, heavy, ventral spines in apical segment of female set near posterior edge of segment, and with no thickened sclerite at their base.

*Group B* (Equals Group C of GUIMARÃES) — Males with "clavi" triangular, conspicuous, and projecting laterally; first segment of antennae in male much more developed than in female; female with "clavi" in the form of a heavy hook as in both sexes of Group A (GUIMARÃES). In addition: Tergites in male entire across abdomen in *all segments*, but widely separated medially in the female (excepting VIII); in female the cluster of spines is set in anterior portion of apical segment, just behind a prominent sclerite of varying shape. (Note: *P. neivai* Guimarães forms a connecting link between Groups B and C as here given, having dimorphic antennae, but no hook in female, merely a small "clavi"; has first five tergites entire in male, with VI and VII broken medially; in female the spines on segment VIII are as in Group B. The head is rounded, specially the pre-antennary area, with mandibles set far back from *frons*, more nearly resembling the species of Group C).

*Group C* (Equals Groups B and D of GUIMARÃES) — Males and females with "clavi" equal, ranging from rather prominent, triangular type, to minute, scarcely projecting beyond sides of head. Without sexual dimorphism of antennae. Pre-antennary area much longer than in A and B, sometimes rounded and sometimes truncated conical, and with mandibles set far back from *frons*.

It the male abdominal tergites I to III (sometimes I to IV) are entire, the remainder broken medially (except VIII). In female all tergites are broken medially, excepting VIII; spines on apical segment of female are set further back on segment, and are without trace of a thickened sclerite at their base (as in Group A).



*Paragoniocotes rauli* n. sp. — Fig. 1: Male; fig. 2: head of female; fig. 3: tip of abdomen of female; fig. 4: male genitalia. *Paragoniocotes venezolanus thetocercus* n. ssp., female — Fig. 5: Head; fig. 6: tip of abdomen. *Paragoniocotes militaris* n. sp. — Fig. 7: Head and thorax of male; fig. 8: tip of abdomen of male; fig. 9: head and thorax of female; fig. 10: tip of abdomen of female; fig. 11: male genitalia. *Paragoniocotes nevadensis* n. sp. — Fig. 12: Male; fig. 13: female; fig. 14: male genitalia.

Since I cannot see how it is possible to give a concise generic characterization of such a heterogenous group of species as this, I shall not attempt to do so, merely accepting that as given by GUIMARÃES, inadequate though it may be. Two characters are present in all females of the genus that I have seen, viz.: All tergites except apical are widely broken medially, and the presence on each side of the apical abdominal segment (ventrally) of three heavy, curving spines (in two known species two long and one short spines). As for the males, there is not a single generic character mentioned under any of the groups which is constant throughout the genus.

As stated above, all of the species described by me in 1947 possess all of the characters given under Group A, which includes *P. gripocephalus*, the genotype.

*P. cornutus* Carriker, Nov. 1947 equals *P. rotundus* Guimarães, July, 1947 (Host: *Amazona f. farinosa*). *P. heterogenitalis similis* Carriker, Nov. 1947 equals *P. cummingsi* Guimarães, July, 1947 (Host: *Amazona a. aestiva*).

All measurements are in millimeters and all drawings prepared by the author.

The following group of new species falls into Group B, as here characterized, and possess the characters given in the genus *Epipsittacus* Carriker.

*Paragoniocotes rauli* n. sp.

(Figs. 1-4)

*Types*, male and female adults, from *Ara rubro-genys* Lafresnaye, collected by the author at Ele-Ele, Dept. Cochabamba, Bolivia, October 13, 1937 (in coll. of author).

*Diagnosis*: Similar in type to *P. mirabilis* (Carriker), from *Ara ararauna* but differing in the shape of the head in both sexes, and especially in the male genitalia.

In *mirabilis* the female has the pre-antennary area very much narrower, with temples more strongly rounded, while in the male the temples of *rauli* are more rounded than in *mirabilis*. The figures give a clear conception of the characters of the species.

The type series consists of 7 males and 9 females.

Measurements of the types:

	♂		♀	
	Length	Width	Length	Width
Body.....	1.14	—	1.53	—
Head { frons.....	—	.282	—	.326
{ temples.....	—	.37	—	.423
{ occiput.....	.337	—	.41	—
Prothorax.....	.14	.206	.15	.25
Pterothorax.....	.108	.315	.16	.37
Abdomen.....	.66	.29	.91	.488
Antennae.....	.228	.062	.174	.043
Basal plate.....	.13	.10		
Paramers.....	.076	.09		
Endomera.....	.141	.065		

*Paragoniocotes venezolanus thectocercus* n. ssp.

(Figs. 5-6)

*Type*, female adult, from *Aratinga acuticauda neoxena* (Cory), collected by Wetmore and Carriker, Nazaret, La Goajira, Colombia, May 6, 1941 (in coll. U. S. Nat. Mus.).

*Diagnosis:* This race is represented by a single female, the type, and has been compared directly with a paratype of *P. venezolanus* Stafford. The two are very similiar, differing somewhat in size and shape of head and width of thoracic segments. In *thectocercus* the head measures .38 x .38, width at frons .31, while in *venezolanus* it is .39 x .42, with frons .347. The width of prothorax in *thectocercus* is .217 and pterothorax .358, while in *venezolanus* they are respectively .247 and .391. The genital plate is not clearly visible in the specimens of *venezolanus* examined. Undoubtably the male genitalia will present corroborative differences.

*Paragoniocotes militaris* n. sp.

(Figs. 7-11)

*Types,* male and female adults, from *Ara m. militaris* (Linné), collected by the author near Santa Marta, Colombia, Nov. 24, 1942 (in coll. of author).

*Diagnosis:* Differs in many details from both *P. mirabilis* and *P. abnormis*, taken on *Ara ararauna* and *A. chloroptera*. The frons in both sexes is uniformly and flatly rounded, nearer to *mirabilis* in this respect, but the first segment of the antennae in both sexes is larger, with inner clypeal and occipital bands more prominent and differently shaped.

The female genital plate is similar in shape to that of both of the above named species, but has the bristles along posterior margin coarse as in *abnormis*, but less abundant; the three heavy spines are thicker and less tapering apically, uniformly, but slightly curved and less horizontal in direction.

The male genitalia is very different from both *mirabilis* and *abnormis* in the shape of paramers and endomera, but more nearly resemble those of the latter. The type series is represented by 8 males and 26 females.

Measurements of the types:

	♂		♀	
	Length	Width	Length	Width
Body.....	1.24	—	1.78	—
Head { frons.....	—	.29	—	.39
{ temples.....	.36	.412	.423	.477
{ occiput.....	.347	—	.406	—
Prothorax.....	.174	.242	.163	.28
Pterothorax.....	.155	.38	.185	.455
Abdomen.....	.673	.484	1.14	.62
Antennae.....	.25	.065	.228	.045
Basal plate.....	.163	.087		
Paramers.....	.082	.092		
Endomera.....	.092	.065		

*Paragoniocotes nevadensis* n. sp.

(Figs. 12-14)

*Types*, male and female adults, from *Pyrrhura viridicata* Todd, collected by the author on Mt. San Lorenzo, near Sta. Marta, Colombia, Sept. 9, 1945 (in coll. of author).

*Diagnosis*: This species is close to *P. pyrrhurae* Guimarães, and perhaps should be classed as a subspecies of it, since the differences which separate the two are mostly small and are of degree, rather than kind. The first segment in the male is shorter in *nevadensis*, while there is no trace of the slight apical hook on segments 3 and 5 which are present in *pyrrhurae*. There are appreciable differences in size and proportion of the various body segments, and some differences in the male genitalia, but these are not great, as may be seen by a comparison of the figures of the two. The paramers are slightly larger and the various parts of the endomera of somewhat different shape.

The head of the male is wider (.314 x .347 against .29 x .31) and the width of the head is greater than the length in the males of both species, while in *pyrrhurae* it is wider than long in the female and in *nevadensis* longer than wide in the same sex (.358 x .347 against .34 x .36). The whole thorax is much narrower in the male of *nevadensis*, while in the female the prothorax is narrower in *nevadensis* and the pterothorax of equal width.

In the drawing of the female the genital plate may not be quite correct in the shape of the anterior portion, not being clearly visible. The species is represented by 2 males and 4 females from the type host.

## Measurements of the types:

	♂		♀	
	Length	Width	Length	Width
Body.....	1.12	—	1.51	—
Head { frons.....	—	.242	—	.25
temples.....	.314	.347	.358	.347
occiput.....	.306	—	.35	—
Prothorax.....	.13	.223	.13	.202
Pterothorax.....	.14	.337	.152	.337
Abdomen.....	.608	.358	.868	.40
Antennae.....	.186	.054	.16	.04
Basal plate.....	.152	.098		
Paramers.....	.032	.087		
Endomera.....	.12	.076		

*Paragoniocotes venezolanus* Stafford

(Figs. 15-17)

*Paragoniocotes venezolanus* Stafford, Bol. Ent. Venezolana, Vol. II, No. 1, March, 1943.  
(Host: *Cacicus c. cela*. Error, equals *Aratinga pertinax aeruginosa* (Linné), San Felipe, Venezuela).

The host for this species was given by STAFFORD as *Cacicus c. cela*, taken at San Felipe, Venezuela on May 18, 1938, which is obviously erroneous, since the genus is found only on Parrots. A specimen of *Aratinga pertinax* was collected by Dr. ANDUZE at San Felipe on May 18, the host of *Colpocephalum anduzei* Stafford, so that there can be little or no question but that this bird is the true host of *Paragoniocotes venezolanus*.

I have examined two males and a female (paratypes) of this species, also a male and female collected from the type host at Riohacha, Colombia. It is very close to *P. aratingae* Guimarães, with same shape of head in both sexes and same type of male genitalia.

It differs from *P. aratingae* in having head slightly larger in both sexes, but of same proportions; abdomen is much smaller in both sexes; 2nd. and 3rd. pairs of legs much heavier and longer, specially the 3rd. pair, and with 3rd. coxae twice as large. (3rd. femur, .174, and tibia .217; coxa, .108 x .108).

The paramers are the same length as in *aringae*, but the endomera is longer; the tips of the endomerical plates are longer and more slender, with the mesosome narrower; the spines on the apical segment of female are shorter and thicker, with the inner one but half the length of the other two. The types of this species are in Stafford's collection.

## Measurements of male and female paratypes:

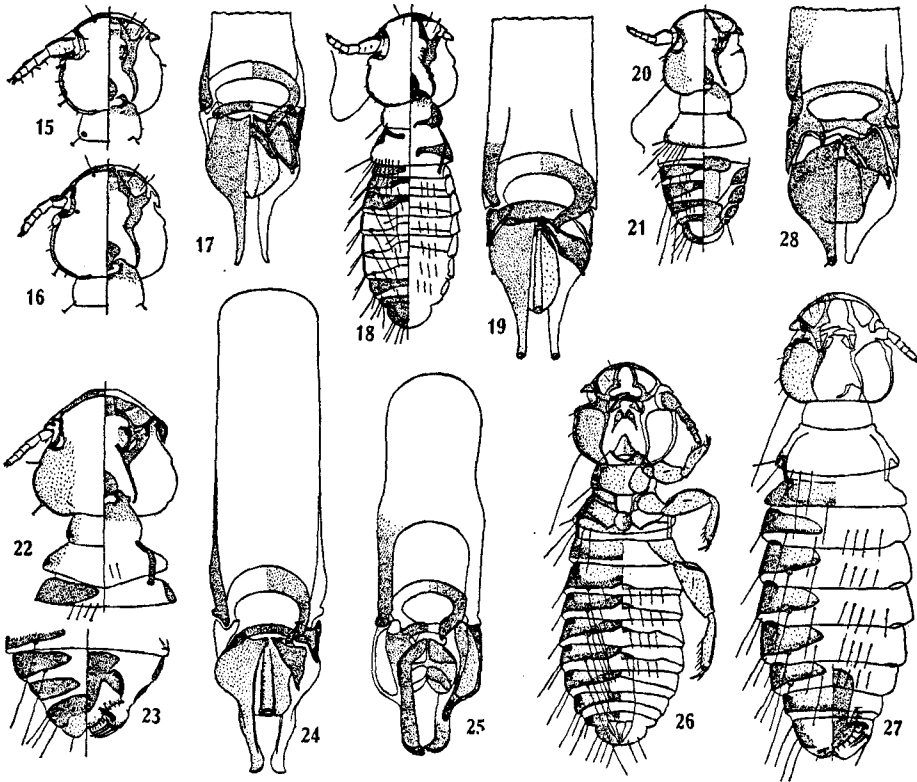
	♂		♀	
	Length	Width	Length	Width
Body.....	1.08	—	1.34	—
Head {	frons.....	.26	—	.34
	temples.....	.358	.347	.395
	occiput.....	.347	—	.39
Prothorax.....	.152	.22	.16	.24
Pterothorax.....	.152	.337	.163	.39
Abdomen.....	.50	.31	.74	.40
Antennae.....	.206	.06	.185	.045
Basal plate.....	.087	.098		
Paramers.....	.043	.085		
Endomera.....	.12	.077		

*Paragoniocotes guajirensis* n. sp.

(Figs. 18-19)

*Type*, male adult, from *Brotogerys j. jugularis* (P. L. S. Müller), collected by the author at Carraipia, La Guajira, Colombia, June 6, 1941 (in coll. U. S. Nat. Mus.).

*Diagnosis*: This species is typical in every way of my Group B, with dimorphic antennae, all abdominal tergites entire and genitalia of same type as



*Paragoniocotes venezolanus* Stafford — Fig. 15: Head of male; fig. 16: head of female; fig. 17: male genitalia. *Paragoniocotes guajirensis* n. sp. — Fig. 18: Male; fig. 19: male genitalia. *Paragoniocotes molinae* n. sp. — Fig. 20: Head and thorax of male; fig. 21: tip of abdomen of male; fig. 22: head and thorax of female; fig. 23: tip of abdomen of female; fig. 24: male genitalia. *Paragoniocotes abnormis* (Kellogg), male — Fig. 25: Genitalia. *Paragoniocotes neivai illustris* n. ssp. — Fig. 26: Male; fig. 27: female; fig. 28: male genitalia.

*aratingae* and *venezolanus*, being in these respects entirely different from *P. nirmoides* Guimarães, taken on *Brotogerys versicolurus chiriri* (Vieillot), which belongs in Group C.

The head is slightly longer than wide, with temples not strongly expanded; the 3rd. pair of legs are unusually well developed, almost as in *venezolanus*, but



the coxae are smaller. The male genitalia are, however, distinctive, but closer to *aratingae*. The paramers are the same as in *aratingae*, as well as the basal plate; the circular collar at end of basal plate is much thicker, except towards its points, which are more slender and tapering (see fig.); the long endomeral plates are very similar, but begin to taper at tip of paramer; the mesosome differs from both *aratingae* and *venezolanus*, being longer, elongated oval in shape, narrower than in *venezolanus* and much larger than in *aratingae*.

The species is represented by the male type only.

Measurements of the type:

	Length	Width
Body.....	1.18	—
Head { frons.....	—	.24
{ temples.....	.33	.314
{ occiput.....	.325	—
Prothorax.....	.14	.215
Pterothorax.....	.152	.305
Abdomen.....	.65	.315
Antennae.....	.205	.054
Basal plate.....	.17	.098
Paramers.....	.035	.085
Endomera.....	.11	.076

*Paragoniocotes molinae* n. sp.

(Figs. 20-24)

*Types*, male and female adults, from *Pyrrhura m. molinae* (Massena & Souancé), collected by the author at San Cristobal, Dept. Cochabamba, Bolivia, Jan. 28, 1937 (in coll. of author).

GUIMARÃES described *P. pyrrhurae* from *Pyrrhura frontalis chiripepe*, and also recorded specimens of it from five other species of the genus *Pyrrhura*, including *P. m. molinae* from Corumbá, Brazil. My specimens from *Pyrrhura m. molinae* are not at all close to *P. pyrrhurae* Guimarães which he records from that host, nor to *P. nevadensis*, which is close to *pyrrhurae*, although the male genitalia are of the same type as both, and differ only in small details.

*Diagnosis*: There is a decided sexual dimorphism in the shape of the head, and especially in the size of head and body. In the male the head is slightly longer than wide, with flatly rounded frons and temples, while in the female is truncated conical and the temples strongly expanded laterally, so that the head is considerably wider than long.

The genital plate of the female is very different in shape from that of *pyrrhurae* (see figs.), while the three spines are set much further back, their tips extending slightly beyond the hyaline tip of the abdomen. The chaetotaxy of

the genital plate also differs, the hairs along the posterior margin being more numerous, but there are only three short, submarginal spines. The male genitalia differ chiefly in the shape of the long endomeral plates and mesosome. The species is represented by the 3 males and 3 females of the type series.

Measurements of the types:

	♂		♀	
	Length	Width	Length	Width
Body.....	1.05	—	1.36	—
Head { frons.....	—	.215	—	.347
{ temples.....	.293	.278	.423	.495
{ occiput.....	.29	—	.41	—
Prothorax.....	.137	.20	.163	.282
Pterothorax.....	.14	.293	.152	.39
Abdomen.....	.586	.30	.77	.456
Antennae.....	.174	.065	.206	.043
Basal plate.....	.217	.095		
Paramers.....	.04	.09		
Endomera.....	.112	.084		

*Paragoniocotes abnormis* (Kellogg)

(Fig. 25)

*Gonicotes abnormis* Kellogg, 1906, J.N.Y. Ent. Soc., vol. 14, no. 1, p. 46, pl. II, fig.3  
(Host: *Ara chloroptera*, Argentina).

GUIMARÃES has described the male sex of this species, unknown to KELLOGG, also redescribed the female and figured both sexes from specimens taken on *Ara chloroptera* from S. Brazil. I have a single male from the type host, collected in the Dept. of Magdalena, Colombia. Comparing this specimen with GUIMARÃES' figure I find that they are practically identical, with the exception of slight differences in the male genitalia, a figure of which is here presented. As will be seen by comparing my figure with that given by GUIMARÃES, the paramers are longer, the endomeral plates are narrower basally and wider apically, while the mesosome differs even more. In my specimen the tips of the endomers are curved, as shown in the figure. Whether this is normal, or whether they have been bent by being pressed against the body integument, is uncertain, more likely the latter.

*Paragoniocotes neivai illustris* n. ssp.

(Figs. 26-28)

*Types*, male and female adults, from *Forpus c. conspicillatus* (Laf.), collected by the author at La Gloria, Dept. Magdalena, Colombia, May 24, 1943 (in coll. U. S. Nat. Mus.).

*Diagnosis:* Closely related to *P. neivai* Guimarães, from *Forpus passerinus vividus*, and like that species, forms a partial connecting link between Groups B and C (of the author), it having dimorphic antennae and all tergites entire as in Group B, but with "clavi" more or less triangular and equal in the sexes, and with the somewhat circular style of head, while the male genitalia approach the type found in Group C.

The measurements of the two races are very close, but there is a difference in the proportions of the head, *illustris* male being .337 x .358 against .35 x .35 for *neivai*, and female, .382 x .393 against .40 x .39 mm. In *illustris* the paramers are longer than in *neivai*, with the endomeral plates much wider and tapering abruptly to the short, slender tips; the mesosome is also wider apically and of decidedly different shape. There seems to be one additional hair on the abdominal sternites in both sexes, while the cluster of spines on segment VIII of the female consists of two long and a very short one (the inner).

In my figure of the female genital plate the chaetotaxy is not correct, it being the same as shown by GUIMARÃES for *neivai* (fig. 24D, p. 294).

Measurements of the types:

	♂		♀	
	Length	Width	Length	Width
Body.....	1.26	—	1.69	—
Head { frons.....	—	.25	—	.282
temples.....	.337	.358	.382	.393
occiput.....	.337	—	.375	—
Prothorax.....	.13	.228	.152	.252
Pterothorax.....	.163	.37	.195	.414
Abdomen.....	.705	.423	1.00	.542
Antennae.....	.217	.055	.174	.045
Basal plate.....	.205	.095		
Paramers.....	.045	.095		
Endomera.....	.104	.087		

*Note:* Apparently Dr. GUIMARÃES measures the length of the thoracic segments in a manner different from that to which I have been accustomed, taking length of prothorax from its junction with the pterothorax (at sides) to the occiput, and pterothorax from the postero-lateral angle to junction with prothorax.

In all of my measurements I take the distance from the posterior edge of prothorax to its anterior end *under the head*, and for the pterothorax I measure from its greatest posterior extension (in most cases in middle of abdomen) to its extreme anterior edge which is often further forward than its junction with the prothorax at the side of body. For the above reasons my measurements for the thoracic segments almost invariably show a greater length than those given by Dr. GUIMARÃES.

## GROUP C

The species described by GUIMARÃES which apparently fall into Group C are *Paragoniocotes anomalus*, *P. nirmoides* and *P. fulvofasciatum*. The female only of *anomalus* is known, both sexes of *nirmoides* are described and the male, only, of *fulvofasciatum*. In the two species of which the males are known, both have all of the tergites entire in the males, while all three have the "clavi" very small. In *anomalus* the legs are small, with coxae small, more or less globular and entirely underneath the thoracic segments. In *nirmoides* and *fulvofasciatum* the legs are much longer and stronger, with 2nd. and 3rd. coxae longer, more or less parallel-sided and extending considerably beyond the sides of the body, as in some of the new forms described below. The male genitalia in *nirmoides* and *fulvofasciatum* are, however, very different from those of the new forms described below in Group C.

The new species described below fall into two sections. In the first section (*P. tri-tergum* and races) tergites I to III in the male are entire, IV to VII broken medially, while in the second section (*P. quadro-tergum* and races) tergites I to IV are entire and V to VII broken medially, with the females of both sections having all of the tergites broken medially except VIII.

In *P. tri-tergum* the legs are long and strong and with the 2nd. and 3rd. coxae more strongly developed, some with both extending beyond edge of body, others with only the 3rd. In *P. quadri-tergum* the legs are comparatively small, and usually with all of the coxae entirely under the thorax or abdominal segment I, although in some the 3rd. coxae project slightly. The "clavi" in both sections are somewhat larger and more pronounced than in the three species described by GUIMARÃES, while both sections have the male genitalia of a similiar type, and quite different from all other known species of the genus.

*Paragoniocotes tri-tergum tri-tergum* n. sp.

(Figs. 29-31)

*Types*, male and female adults, from *Amazona a. aestiva* (Linné), collected by Plaumann at Nova Teutonia, Brazil, Oct. 26, 1938 (in coll. of G. H. E. Hopkins).

*Diagnosis*: The clypeal and antennal bands are strongly developed and heavily chitinized, the former with the inner margin somewhat crenulated and wider than usual along front of head; the area lying between the clypeal suture and the clypeal band is also rather heavily chitinized, while the inner clypeal bands are heavy, wider than usual, with the inner edge thickened just back of clypeal suture and scarcely visible in front of suture. The eyes are prominent, with a short bristle; temporal bands are narrow but strongly pigmented and crenulated along inner margin; the occipital bands extend from posterior mandibular condyle to anterior corner of prothorax, but are only slightly more pigmented than the whole area between them and the temples.

Prothorax small, with convex sides; pterothorax with strongly divergent sides and broadly rounded postero-lateral angles, and with posterior margin but slightly convex.

The abdomen is comparatively small and not differing greatly in size and shape in the sexes; the pleurites are narrow, but deeply pigmented; the tergites in the male are continuous in segments I to III and VIII, the remainder broken medially, while in the female all tergites are broken medially except VIII, although the ends of VII are sometimes touching and often seem to be joined. The female genital plate and its chaetotaxy are very similar to the other species of the genus. The three heavy spines on each side of segment VIII of the female are also similar, and are set back near the posterior edge of sternite and are without a thickened sclerite at their bases, in this respect resembling the species of Group A. The male genitalia are, generally speaking, of the same type as the rest of the genus (excepting *nirmoides* and *fulvofasciatum*). The paramers are atrophied but longer than most species of the other groups; the inner endomeral plate is also of a similar pattern, as well as the basal plate, but the outer and larger endomeral plates and the mesosome are quite different. The endomeral plates are wide, with the outer margin uniformly circular, and lacking the long slender tip present in practically all species of Groups A and B. The mesosome is a very large plate, with thickened lateral margins and nearly as long as the outer endomeral plates. The species is represented by 13 males and 26 females, all but one male and 3 females belonging to the type series.

Measurements of the types:

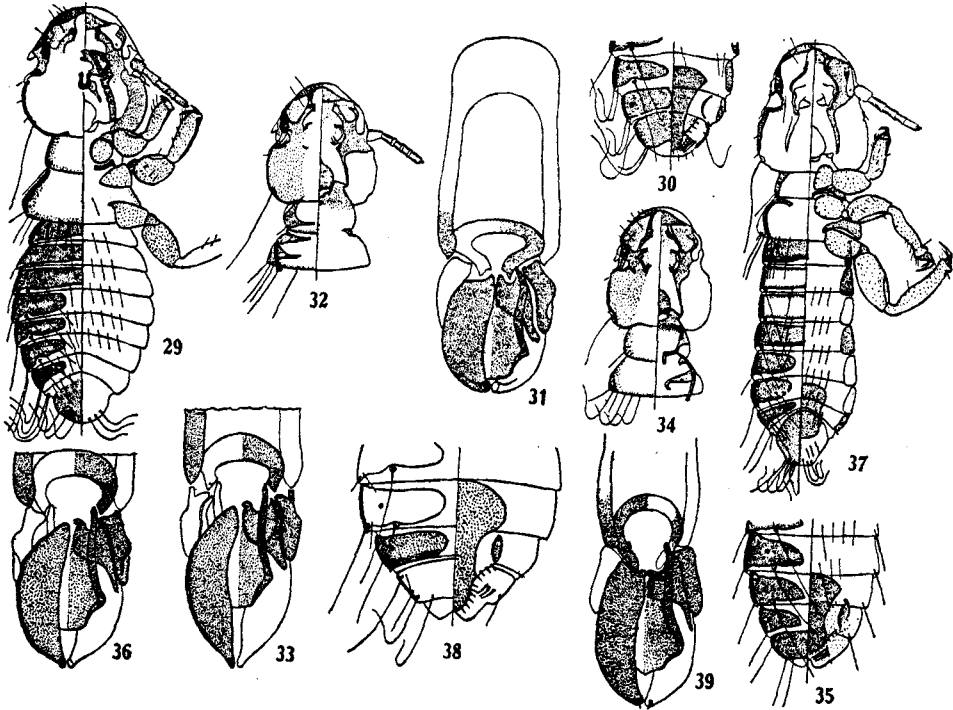
	♂		♀	
	Length	Width	Length	Width
Body.....	1.47	—	1.73	—
Head { frons.....	—	.337	—	.358
temples.....	.44	.435	.456	.467
occiput.....	.43	—	.45	—
Prothorax.....	.185	.26	.217	.27
Pterothorax.....	.195	.423	.217	.434
Abdomen.....	.80	.52	1.04	.542
Antennae.....	.24	—	.217	—
Basal plate.....	.185	.077		
Paramers.....	.065	.10		
Endomera.....	.108	.08		

*Paragoniocotes tri-tergum bolivianum* n. ssp.

(Figs. 32-33)

*Types*, male and female adults, from *Amazona aestiva xanthopteryx* (Berlepsch) collected by the author at Samaipata, Bolivia, Nov. 10, 1935 (in coll. of the author).

*Diagnosis:* This form is smaller than *tri-tergum* in all dimensions of both sexes, excepting in length of abdomen which is about equal, and in width of prothorax, which is the same in both sexes. The frons is more pointed in the male but similar in the female, while the temples are proportionately narrower and more flattened laterally; the "clavi" are small, especially in the female; the clypeal band is narrower and nearly broken at suture, while the inner clypeal bands are clearly visible to their junction with the marginal band on frons; the prothorax has the sides more convex and pterothorax with sides strongly rounded and postero-lateral angles rather acute.



*Paragoniocotes tri-tergum tri-tergum* n. sp. — Fig. 29: Male; fig. 30: tip of abdomen of female; fig. 31: male genitalia. *Paragoniocotes tri-tergum bolivianum* n. ssp., male — Fig. 32: Head and thorax; fig. 33: genitalia. *Paragoniocotes tri-tergum tucumanae* n. ssp. — Fig. 34: Head and thorax of male; fig. 35: tip of abdomen of female; fig. 36: male genitalia. *Paragoniocotes quadri-tergum quadri-tergum* n. sp. — Fig. 37: Male; fig. 38: tip of abdomen of female; fig. 39: male genitalia.

The abdomen in both sexes is practically the same as in *tri-tergum*, but the genital plate of female differs somewhat in shape and chaetotaxy. The male genitalia are very different, as may be seen from the figures. The paramers are shorter in *bolivianum*; the circular collar of basal plate is much thicker medially and with narrower, shorter tips; the small endomerai plates differ but slightly, but the larger ones are much longer, narrower, more pointed apically and have outer margin uniformly circular from base to tip. The mesosome at first glance

seems to be shorter, but in reality it is longer, but of same shape as in *tri-tergum*. The subspecies is represented by 2 males and 2 females and a slightly immature male.

Measurements of the types:

	♂		♀	
	Length	Width	Length	Width
Body.....	1.41	—	1.69 (?)	—
Head { frons.....	—	.314	—	.33
{ temples.....	.415	.39	.467	.423
{ occiput.....	.405	—	.456	—
Prothorax.....	.163	.25	.198	.27
Pterothorax.....	.15	.365	.185	.42
Abdomen.....	.79	.456	1.05	—
Antennae.....	.195	—	.206	—
Basal plate.....	.195	.09	—	—
Paramers.....	.058	.10	—	—
Endomera.....	.143	.087	—	—

*Paragoniocotes tri-tergum tucumanae* n. ssp  
(Figs. 34-36)

*Types*, male and female adults, from *Amazona pretrei tucumana* (Cabanis), collected by the author at Padilla, Bolivia, Jan. 12, 1938 (in coll. of the author).

*Diagnosis*: Resembles *bolivianum* closely in head structure, but head is proportionately narrower, longer and with pre-antennary area longer and frons more circular; the prothorax is about the same, but pterothorax is slightly wider in male and both shorter and narrower in the female, with postero-lateral angles more rounded (as in *tri-tergum*).

The abdomen is very much smaller than in *bolivianum* in both sexes; tergites I to III (which are entire in male) are rather deeply incised medially on posterior margin.

In the female the head is proportionately narrower than the male at temples, but with temples more convex and occiput slightly more incised; in the male the width of abdomen is 60% of its length, in the female but 50%. The genital plate in the female has its posterior tip on a line with the posterior margin of tergite VIII, and seems to lack most of the short, thick spines set subterminally at its sides; the heavy, lateral spines are set far back, with apical third extending beyond line of tergite VIII. There is very little difference in the male genitalia.

except for the longer and slightly narrower endomeral plates. Type series consists of 8 males and 4 females.

Measurements of the types:

	♂		♀	
	Length	Width	Length	Width
Body.....	1.29	—	1.54	—
Head { frons.....	—	.293	—	.295
{ temples.....	.412	.37	.44	.38
{ occiput.....	.405	—	.42	—
Prothorax.....	.163	.24	.172	.25
Pterothorax.....	.152	.37	.163	.39
Abdomen.....	.69	.412	.93	.477
Antennae.....	.195	—	.19	—
Basal plate.....	.142	.098		
Paramers.....	.065	.09		
Endomera.....	0.98	.087		

*Paragoniocotes quadri-tergum quadri-tergum* n. sp.

(Figs. 37-39)

*Types*, male and female adults, from *Amazona a. autumnalis* (Linné), collected by the author at Tres Zapotes, Vera Cruz, Mexico, March 5, 1940 (in coll. U. S. Nat. Mus.).

*Diagnosis*: This species, together with its various subspecies may be readily distinguished in the male sex by the structure of the abdominal tergites, of which I to IV are entire across the abdomen, with II to IV slightly narrowed in median portion; by the strongly developed 2nd. and 3rd. pair of legs, by the more reduced, somewhat conical shape of the pre-antennary area of the head in both sexes, and by the longer antennae; the "clavi" vary in size in the different subspecies, but are never very prominent.

The clypeal bands are sometimes broken at the suture while the suture itself is much closer to the mandibles than in *tri-tergum*, with the area between the suture and frons wider. The thoracic structure is the same as in *tri-tergum* in both sexes; as well as that of the abdomen in the female, with all of the tergites (excepting VIII) widely separated medially, all heavily chitinized and more deeply colored along the outer and posterior borders; the pleurites are narrow and deeply colored.

The abdominal chaetotaxy seems to differ from that of *tri-tergum* in certain respects. The dorsal and ventral hairs are arranged in the same manner, but those at the postero-lateral angles of the abdomen are much reduced, there



being none on segments I to III, while in IV to VI there is one short and weak hair; VII has a longish and one weak hair, while VIII has the usual compliment of long hairs.

The general structure of the male genitalia differs not at all from that of *tri-tergum*, the differences being confined to a small variation in size and shape of the component parts.

The type series consists of 3 males and 3 females, with another male from a different specimen of the same host.

Measurements of the types:

	♂		♀	
	Length	Width	Length	Width
Body.....	1.42	—	1.62	—
Head { frons.....	—	.27	—	.285
temples.....	.445	.38	.456	.39
occiput.....	.445	—	.445	—
Prothorax.....	.174	.245	.175	.268
Pterothorax.....	.152	.355	.165	.38
Abdomen.....	.76	.38	.91	.49
Antennae.....	.228	.043	.22	.043
Basal plate.....	.152	.087		
Paramers.....	.08	.09		
Endomera.....	.13	.08		

*Paragoniocotes quadri-tergum tibialis* n. ssp.

(Figs. 40-41)

*Type*, adult male, from *Amazona f. farinosa* (Boddaert), collected by the author at Chatarona, Rio Beni, Bolivia, September, 1934 (in coll. of the author).

*Diagnosis*: Differs from *quadri-tergum* in following characters: Body somewhat larger in all measurements; pterothorax and abdomen proportionately wider; pre-antennary area with sides less rounded and front convex (not flattened); 3rd. femora and tibiae longer, the latter of different shape and both with heavy, deeply pigmented, marginal bands on outer side; tergite VII much wider at lateral edge and tergite VIII shorter and with anterior margin merely flatly convex instead of rounded; genital plate in female much longer and of different shape.

In the male genitalia the basal plate is wider, with the lateral bands thicker; the paramers are slightly thicker and with sides slightly curving; the small lateral endomeral plates are thicker distally and longer; the large endomeral plates are of same length but have outer margins more convex, thus being wider

in the median portion; the mesosome is practically the same. Species represented by the male holotype and one male paratype.

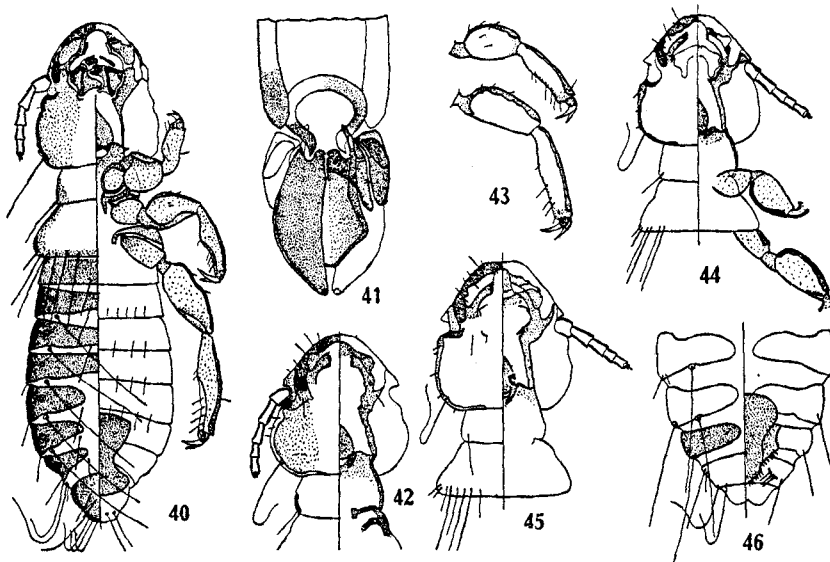
Measurements of the type:

	Length	Width
Body.....	1.59	—
Head { frons.....	—	.285
temples.....	.047	.395
occiput.....	.465	—
Prothorax.....	.19	.27
Pterothorax.....	.163	.42
Abdomen.....	.90	.48
Antennae.....	.25	.045
Basal plate.....	.518	.098
Paramers.....	.065	.098
Endomera.....	.12	.076

*Paragoniocotes quadri-tergum latacephalum* n. ssp.

(Figs. 42-43)

Type, male adult, from *Amazona farinosa inornata* (Salvadori), collected by the author at Bellavista, Santander N., Colombia, July 3, 1943 (in coll. U. S. Nat. Mus.).



*Paragoniocotes quadri-tergum tibialis* n. ssp. — Fig. 40: Male; fig. 41: male genitalia. *Paragoniocotes quadri-tergum latacephalum* n. ssp., male — Fig. 42: Head and thorax; fig. 43: 2nd. and 3rd. femora and tibiae. *Paragoniocotes quadri-tergum parvifrons* n. ssp., male — Fig. 44: Head and thorax. *Paragoniocotes quadri-tergum mercenaria* n. ssp. — Fig. 45: Head and thorax of male; fig. 46: tip of abdomen of female.

*Diagnosis:* This race is represented by a single male, the holotype. It is much larger than either *quadri-tergum* or *tibialis* (length, 1.76 against 1.42 and 1.57); the head is very wide at the temples, which are strongly rounded, while the pre-antennary area is decidedly conical, with straight sides and flatly rounded front; the "clavi" are large and triangular, much larger and more prominent than in the nominate race or *tibialis*.

The clypeal bands not broken at the suture, nor is the suture visible, while the inner clypeal bands are very broad, especially at their anterior ends and are not visibly connected anteriorly with the marginal clypeal band; the occipital bands are wider, while the temporal bands are *unpigmented*. Tergite VIII is small and has the anterior edge nearly straight, while there is a wide hyaline area between it and VII. The legs are heavily banded as in *tibialis*. The genital plate is not clearly visible but seems to be quite small. In the genitalia the basal plate is longer, but the remaining parts differ but very slightly in size or shape, and are closest to those of *tibialis*.

Measurements of the type:

	Length	Width
Body.....	1.76	—
Head { frons.....	—	.323
{ temples.....	.46	.43
{ occiput.....	.456	—
Prothorax.....	.217	.282
Pterothorax.....	.24	.44
Abdomen.....	.99	.52
Antennae.....	.27	.05
Basal plate.....	.215	.098
Paramers.....	.054	.098
Endomera.....	.12	.087

*Paragoniocotes quadri-tergum parvifrons* n. ssp.

(Fig. 44)

*Type*, male adult, from *Amazona ochrocephala panamensis* (Cabanis), collected by the author at Camperucho, Dept. Magdalena, Colombia, July 7, 1945 (in coll. U. S. Nat. Mus.).

*Diagnosis:* Close to *P. q. latacephalum*, but much smaller (head: .415 x .39 against .46 x .43) in all measurements except the genitalia, where the width at paramers is greater, and with the width of large endomerical plate less. The shape of the pre-antennary portion of the head is almost identical with that of *latacephalum*, but the front is slightly more flattened. The 2nd. and 3rd. pairs of coxae extend beyond the sides of the body as in *latacephalum*; the "clavi" are fairly large and triangular, also as in *latacephalum*.

The male genitalia are very similiar in all of the races of *quadri-tergum*, the various sclerites merely differing slightly in size, shape and proportion. Represented by the type only.

Measurements of the type:

	Length	Width
Body.....	1.49	—
Head {		
frons.....	—	.282
temples.....	.415	.39
occiput.....	.415	—
Prothorax.....	.18	.25
Pterothorax.....	.174	.38
Abdomen.....	.815	.42
Antennae.....	.24	.043
Basal plate.....	.195	.087
Paramers.....	.054	.087
Endomera.....	.112	.078

*Paragoniocotes quadri-tergum mercenaria* n. ssp.

(Figs. 45-46)

*Types*, male and female adults, from *Amazona mercenaria canipalliata* (Cabanis), collected by the author on Mt. San Lorenzo, near Santa Marta, Colombia, Sept. 11, 1945 (in coll. of the author).

*Diagnosis*: In size this race is very close to *latacephalum* and larger than the nominate form. The over-all length of male is between that of *latacephalum* and *parvifrons*, and about equal to *tibialis*. It may be noted, however, that most of the races of *quadri-tergum* are represented by only one or two specimens, so that the measurements alone cannot be safely used for separating them in some cases.

The general shape of the head is closest to that of *latacephalum*, having the pre-antennary portion truncated conical, but with the front not only more truncate, but slightly emarginate medially. The sides of the prothorax are less convex than in *latacephalum*, resembling *parvifrons* in this respect, but it is shorter than in *latacephalum* and longer than in *parvifrons*.

2nd. and 3rd. coxae much shorter than in *parvifrons*, the 2nd. scarcely extending beyond the body and 3rd. but slightly. The female is very similiar to that of the nominate race, these two being the only races of *quadri-tergum* for which the females are known. However in *mercenaria* the abdomen differs slightly in shape, being a perfect elongated oval, widest at segment IV, while in *quadri-tergum* it is widest at segment V. The genital plate is shorter and narrower (.28 x .19 against .30 x .23) and extends from middle of tergite VI to posterior edge of tergite VIII, while in *quadri-tergum* it extends from anterior

edge of segment VI to tip of abdomen. The chaetotaxy is the same in all respects. Represented by the types, only.

Measurements of the types:

	♂		♀	
	Length	Width	Length	Width
Body.....	1.60	—	1.78	—
Head { frons.....	—	.333	—	.37
Head { temples.....	.467	.434	.48	.465
Head { occiput.....	.462	—	.48	—
Prothorax.....	.195	.27	.195	.282
Pterothorax.....	.195	.434	.174	.445
Abdomen.....	.857	.553	1.15	.575
Antennae.....	.27	.05	.25	.045
Basal plate.....	.195	.108		
Paramers.....	.065	.094		
Endomera.....	.119	.08		

#### LIST OF HOSTS WITH THEIR PARASITES

<i>Amazona aestiva</i> (Linné)	<i>Paragoniocotes tri-tergum tri-tergum</i> n. sp.
<i>Amazona aestiva xanthopteryx</i> (Berlepsch)	<i>Paragoniocotes tri-tergum bolivianum</i> n. ssp.
<i>Amazona autumnalis autumnalis</i> (Linné)	<i>Paragoniocotes quadri-tergum quadri-tergum</i> n. sp.
<i>Amazona farinosa farinosa</i> (Boddaert)	<i>Paragoniocotes quadri-tergum tibialis</i> n. ssp.
<i>Amazona farinosa inornata</i> (Salvadori)	<i>Paragoniocotes quadri-tergum latacephalum</i> n. ssp.
<i>Amazona mercenaria canipalliata</i> (Cabanis)	<i>Paragoniocotes quadri-tergum mercenaria</i> n. ssp.
<i>Amazona ochrocephala panamensis</i> (Cabanis)	<i>Paragoniocotes quadri-tergum parvifrons</i> n. ssp.
<i>Amazona pretrei tucumana</i> (Cabanis)	<i>Paragoniocotes tri-tergum tucumanae</i> n. ssp.
<i>Ara chloroptera</i> (G. R. Gray)	<i>Paragoniocotes abnormis</i> (Kellogg)
<i>Ara militaris militaris</i> (Linné)	<i>Paragoniocotes militaris</i> n. sp.
<i>Ara rubro-genys</i> Lafresnaye	<i>Paragoniocotes rauli</i> n. sp.
<i>Aratinga acuticauda neoxena</i> (Cory)	<i>Paragoniocotes venezolanus thetocercus</i> n. ssp.
<i>Aratinga pertinax aeruginosa</i> (Linné)	<i>Paragoniocotes venezolanus</i> Stafford
<i>Brotogerys jugularis jugularis</i> (P. L. S. Müller)	<i>Paragoniocotes guajirensis</i> n. sp.
<i>Forpus conspicillatus conspicillatus</i> (Lafresnaye)	<i>Paragoniocotes neivai illustris</i> n. ssp.
<i>Pyrrhura molinze molinae</i> (Massena & Souancé)	<i>Paragoniocotes molinae</i> n. sp.
<i>Pyrrhura viridicata</i> Todd.	<i>Paragoniocotes nevadensis</i> n. sp.