A Brief Survey of *Bruelia* Species (Ischnocera : Mallophaga) Parasitic on the Babblers and Laughing Thrushes (Timaliidae)

BY
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INTRODUCTION

ALTHOUGH the genus *Bruelia* is of most common occurrence on passerine birds, yet it is not frequently recorded from the family Timaliidae (Babblers and Laughing Thrushes). There is no mention of this type of louse from these birds until 1947, when Ansari described *Bruelia pengya* from the Bengal Jungle Babbler (*Turdoides t. terricolor* Hodgson) for the first time. Later in 1955, the same author added two more species *viz.*, *Bruelia chilchil* from the common Indian Babbler (*Turdoides c. caudata* Dumont) and *Bruelia sehri* from the Simla Streaked Laughing Thrush *Trochalopteron lineatum gris secentior* (Hartert).

Dr. Clay of the British Museum (Natural History), London placed a collection from 15 different timaliids at my disposal. The following notes give my views regarding the specific status of this collection.

All the specimens, including *holotype* (male) *allotype* (female) and *paratypes* (males and females) are in the collection of British Museum (Natural History), London.

The linear measurements given against each species in the text were taken along the mid-line. The length of the preantennal region represents the distance between the front and the point passing through the posterior margin of the conus and the length beyond is represented by the hind-head. The width represents the maximum transverse measurement of the part concerned. The index (cephalic, preantennal and hind-head) is the ratio of the length to the width.

ACKNOWLEDGEMENTS

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TAXONOMIC CHARACTERS OF *BRUELIA* SPECIES IN GENERAL

The basic characters of the internal and external morphology are, in general, remarkably uniform throughout the Ischnoceran Mallophaga, occurring on Avian hosts. The proportions of the body and the development of sutures and of secondary lines of thickening, however, present important differences. These differences are reflected in numerous genera so far described. Many of these genera grade into each other and can hardly be regarded as more than "well-marked species groups". Clay (1949) has suggested that Ischnoceran lice acquired these basic characters early in their evolution, possibly while the birds had a more uniform feather covering and before their divergence into different groups with the ensuing modifications of the feather structure. The superficial characters, on which the ischnoceran genera are based, are mainly those which are adaptive to different ecological niches on the body of the bird and possibly to the different feather structures characterising the particular host group. According to Clay (1951) the generic category represents a convenient bundle of similar species of common phylogenetic

origin. *Bruelia* species are found on more than one host-order and the species found on each host-order cannot be conveniently segregated into distinct groups. This position raised one of the most difficult problems in the classification of this genus.

Head. The head in *Bruelia* species is either thimble-shaped, conical or triangular, like fir-cone with rounded or truncate front. The preantennal region is modified in a variety of ways. In one group the preantennal region is enclosed by entire marginal carina, in one section of which there is definite simple anterior plate while in the other it is absent. In others the marginal carina is entire, but medianly less heavily sclerotised or is medianly hanging posteriorly. In some forms it is definitely indented medianly and the head at this point is either hyaline or furnished with triangular sclerotisation. There is another category in which the marginal carina is distinctly interrupted medianly and incompletely laterally, anterior plate is well developed, dorsal suture is present but does not pass across the head and therefore, the posterior part of the anterior plate continues with the head while in others this carina is interrupted medianly and completely laterally, the dorsal suture and the anterior plates are well marked.

The ventral carina is interrupted in all the *Bruelia* species. In some it is sclerotised only proximally. In species with complete but indented marginal carina, the ventral carina is carried forward, each side, to fuse with the interrupted marginal carina.

The characters of post antennal region are remarkably constant throughout *Bruelia* species.

The cephalic setae are as described by Clay (1951). There are 2 pairs of ventral setae *viz.*, preconal and mandibular setae and 3 pairs of dorsal setae *viz.*, preantennal, post nodal and ocular setae which are always present and approximately in the same position in all Ischnocera while others do not maintain their position and number. In *Bruelia* species, in addition to the above, anterior ventral setae II and III are also constant in their position and size.

Antennae. There is usually slight difference in the male and female antennal segments. Various antennal segments, segment I in particular, are slightly longer and robust in males than in females. These differences are slight and usually vary little from one species to the other and, therefore, of no practical utility for the differentiation of various forms.

In the male of *Bruelia antennatus* Sp. Nov. from Sikkim Streaked Laughing Thrush—*Garrulax striatum sikkimensis* Vigors (text-figs. 2 and 3) the antennae are however typical. I antennal segment in male is 2.54 times as long as in the female and 1.57-3.71 times as long as in the males of other species occurring on Timaliidae cal. I antennal segment is 3.05 times as long as wide while in other species the length of this segment is 1.22—1.95 times the thickness. The I segment is 2.24 times as long as segment II whereas in other species this ratio varies from 0.8 to 1.32.

Miss Clay (1951) has suggested that the form of the conus was often correlated with the size of the antennae and that the sexual dimorphism in either of those structures was of little phylogenetic interest. The presence or absence of sexual dimorphism being found in closely related species.

Thorax. The shape of the prothorax is almost constant, but the variation, however small, deserves consideration. The pterothorax is trapozoidal in shape. Its posterior angle and the position and number of setae along the postero-lateral margin need to be carefully studied.

Abdomen. The tergal plates are more or less of constant pattern. In some forms the lateral sculptures vary considerably and therefore of specific value. The dorsal abdominal chaetotaxy is most important and should always be carefully studied. Both the number and position of dorsal setae has been found to vary considerably in different species.

Pleural plates though of constant pattern, more or less differ in various groups of species.

Sternal plates are usually simple and of constant pattern throughout the genus. In rare instances, however, the sternal plates extend to the lateral margin and are comparatively strongly sclerotised laterally so as to form complicated sculptures. Ventral chaetotaxy is remarkably constant throughout the genus. In rare instances, however, the number and position of the setae are not maintained.

Male genital armature in *Bruelia* species is of particular interest. Although it may be very similar throughout a group of species, it usually differs considerably in details.

There is usually marked sexual dimorphism in *Bruelia* species. Males & females differ considerably in dorsal abdominal chaetotaxy. The last abdominal segment is entire and more or less developed into a rounded squat finger-like projection in male, while indented medially in the female. The females of the allied species are usually indistinguishable. Slight differences, if at all, may be discovered in the form of subgenital plate and vulvar chaetotaxy. Characters of spermatheca may probably provide important clue to various species, but I have not made any extensive studies of this structure. My personal bias is, however, towards discarding females for specific distinction in the genus *Bruelia*.

CHARACTERS OF *BRUELIA* SPECIES OCCURRING ON BABBLERS

According to the form of the head and characters of the preantennal region, we can conveniently group this collection into three categories :

(1) The PENGYA group.—This group includes those species in which the head is conical. The marginal carina is not only less heavily sclerotised medially but also is hanging posteriorly at this point to form a triangular area of sclerotisation; *Bruelia longisternus*, *B. sternotransversa*, *B. ventratum*, *B. sternotypicus*, *B. pengya*, *B. brevipennis*, *B. chilchil*, *B. magnini*, *B. brueliodes*, *B. niveus* and *B. mahrastran*, fall in this group.

(2) The IMPRESSIFRONS group.—This category includes species with oblong head. Preantennal index is 1 : 1.115-1.273. The marginal carina is interrupted in the anterior region. The hyaline region in front is furnished with a quadrate plate. *Bruelia impressifrons* *B. novofacies* and *B. effronte* belong to this group.

(3) The SEHRI group.—This group includes those species in which the head is interrupted laterally and madially. The dorsal anterior plate is quadrate. *Bruelia avinus*, *B. sehri* and *B. nipalensis* are included in this group. The head in *B. antennatus* is distinctly interrupted medially but the lateral interruption is not clear. This species is also included in this category.

As far as the male genitalia is concerned, this collection may be grouped as follows:

(1) Species with oblong mesosomal plate. *Bruelia antennatus*, *B. avinus*, *B. nipalensis*, *B. longisternus*, *B. sternotransversa*, *B. sternotypicus*, *B. ventratum*, *B. impressifrons*, *B. novofacies* and *B. mahrastran* fall in this category.

(2) Species with transverse mesosomal plate: *Bruelia sehri*, *B. effronte*, *B. pengya*, *B. brevipennis*, *B. chilchil*, *B. magnini*, *B. brueliodes* and *B. niveus* are included in this category.

The point at which an entity is to be treated as a distinct species or subspecies is in some cases difficult to decide. With such doubtful forms nothing more can perhaps be done than attempted here, *viz.*, they are assigned a position either as species or subspecies in their proper context and apparently must remain intermediate until more information regarding them is available. I have mentioned else where (Ansari 1955), that the close similarity of appearance in *Bruelia* species is no absolute guarantee of specific identity. The females of several allied species are indistinguishable and it is always the male in such forms which is the deciding factor. It may be seen for example in the case of *Bruelia saleemi* Ansari and *B. molli* Ansari ; *B. tasnimae* Ansari and *B. variagatus* Ansari ; *B. uncinosa*, (Burm.) and *B. plena* Ansari; *B. saghirae* Ansari and *B. capitus* Ansari ; *B. longifrons* Ansari, *B. antiqua* Ansari : *B. iliaci* Denny, *B. brevicolor* Ansari and

B. indiansis Ansari and *B. turdinulae* Ansari and *B. eternitatus* Ansari and many other instances that may be given (Ansari 1955-56).

CLASSIFICATION OF *BRUELIA*

A word is required about the classification of *Bruelia*. In the superfamily Ischnocera, the head is basically similar throughout. The modern workers agree that this part of the body is most closely adapted to the environments. Superimposed on this basically similar structure are, therefore, found many variations. The species of *Bruelia* in particular show considerable diversity in superficial characters of head but are held together in a compact group by the characters of the abdomen. Any further attempt to separate the genus *Bruelia* on these characters means the erection of five or six genera. Each of these groups will be precisely determined by the form of the head, male genitalia, abdominal chaetotaxy and other minor characters. It would not, therefore, seem to be high an appreciation of the fact to accord these divisions some rank. I am personally inclined to recognise distinct stems and give these stems a subgeneric status.

There are, however, some practical objections to such a course. One being the paucity of our knowledge on the species infesting various families of the hosts. While the subgeneric divisions are very satisfactory in precision of definition, they are far from naturalness. The subdivisions on a natural bases seem difficult owing to the absence of definite characters that do not overlap in occasional instances. Clay (1951) has also pointed out that genera thus constituted do not only grade into each other but also completely obscure their relationships and in some cases mean the association of a number of species not forming a natural group. Such a degree of subdivision may perhaps be found useful in a loose and general sense and is clearly not required for ordinary systematic purposes and is only necessitated in the course of research on phylogeny and distribution. These names would merely illustrate what is known of the relationship of forms included in the larger definitely named systematic division and as such may be neglected except by those concerned in special study of the affinities, distribution and origin of the species.

Over one hundred and twenty-five species of *Bruelia* are now recognised. They occasionally occur on passerine birds and have definitely been recorded from the following families:—

Alaudidae, Bombycillidae, Corvidae, Dicruridae, Fringillidae, Graculidae, Hirundidae, Laniidae, Motacillidae, Muscopidae, Oriolidae, Pericrocotidae, Ploceidae, Pycnonotidae, Sittidae, Sylyiidae, Sturnidae, Timaliidae, Turdidae. Several species are also described from Hornbills, Bee-eaters (Bucertidae, Meropidae, Momotoides: Coraciiformes), Wood peckers, King-fishers, Barbets (Capitonidae and Picidae: Piciformes), and Trogonas (Trogoniformes).

A comprehensive systematic treatment of the species occurring on all these host-groups seem prerequisite to any decision in the above direction.

We have so far studied small amount of the material and a meagre fraction of the vast number of bird-hosts. A correct evaluation of this complex genus is probably not only early but also not possible at this stage.

SYSTEMATIC ACCOUNT

Key to the Species. The following key is based only on the characters of the males of the species discussed in the text. The characters of the subgenital plate of the female are sometimes provided in parentheses as probable aid to differentiate forms. It will, however, be advisable not to rely on this character by itself when dealing with females alone unless the evidence is available to show that the collection contained the opposite sex bearing the male specific characters.

1 (2) Antennal segment I 2.4 times as long as segment II, and three times as long as its own thickness. Basal plate 5.3 times as long as paramere. (Subgenital plate in female well developed, the cross bar of the anchor with a notch in the middle)—**Bruelia antennatus** Sp. Nov.

2 (1) Antennal segment I 0.8-1.32 times as long as segment II and 1.22-1.9 times as long as its thickness. Basal plate 1.5-3.9 times as long as paramere.

3 (8) Marginal carina interrupted both medially and laterally.

4 (7) Forehead truncate, and Hind-head 1.26-1.29 times as long as preantennal region. Pterothorax 2.06-2.44 times as wide as long. IX abdominal tergite with 4+4 or 4+4+4+4 setae. Basal plate 2.05-2.5 times as long ar paramere. Paramere 1.1-1.9 times as long as mesosome.

5 (6) Antennal segment I three times as long as conus. Pterothorax 2.06 times as wide as long. VIII abdominal tergite with 1+1+1+1 setae, IX with 4+4 setae. Pleural plates narrow. Mesosomal plate elongate, 2.3 times as long as the mesosome in *Bruelia sehri* Ansari. Parameres 1.4 times as long as in *B. sehri* and 1.1 times as long as mesosome, proximal head typical. Basal plate 2.05 times as long as paramere. (Posterior tip of subgenital plate in female about twice as wide as in *Bruelia sehri* Ansari.)—**Bruelia avinus** Sp. Nov.

6 (5) Antennal segment I 1.2 times as long as conus. Pterothorax 2.44 times as wide as long. VIII abdominal tergite with 1+3+4+1 setae, IX with 4+4+4+4 setae. Mesosome less than one half of the mesosome in *Bruelia avinus*. Paramere 1.9 times as long as mesosome. Basal plate 2.5 times as long as paramere. (Posterior tip of the subgenital plate in female at least half as wide as in *Bruelia avinus*.)—**Bruelia sehri** Ansari.

7 (4) Forehead parabolic in outline. Hind-head 1.66 times as long as preantennal region. Antennal segment I three times as long as conus. Pterothorax 2.62 times as wide as long, IX abdominal tergite with 6+6 setae. Sternal plates narrow and elongate. Basal plate 2.5 times as long as parameres. Parameres shorter than mesosome. Mesosome 3.1 times as long as in *Bruelia sehri* Ansari. Paramere with a shallow median socket. —**Bruelia nipalensis** Sp. Nov.

8 (3) Marginal carina interrupted only medially.

9 (16) Head almost as wide as long or considerably wider than long. Sternal plate extraordinarily developed, elongate, pulled out on both sides so as to reach more or less the lateral margin, outer margins characteristically pigmented and strongly sclerotised.

10(15) Mesosome with the opening at about the middle of the shield.

11(14) I antennal segment 2.9-3.4 times as long as conus. Proximal head of paramere with a narrow and shallow cavity.

12(13) Preantennal region (index 1 : 2.003) shorter than hind-head, and twice as long as wide. Hind-head 1.34 times as long as preantennal region. I antennal segment 3.4 times as long as conus. Pterothorax twice as wide as long. IX abdominal tergite with 2+5+5+2 setae. Genital armature 1.51 times as long as basal plate. Basal plate 1.8 as long as paramere. Paramere 1.4 times as long as mesosome. Mesosome blunt posteriorly. (Subgenital plate in female with 11+11 setae).—**Bruelia longisternus** Sp. Nov.

13(12) Preantennal region (index 1: 1.631) as long as hind-head, and 1.6 times as long as wide. I antennal segment 2.9 times as long as conus. Pterothorax 2.28 times as wide as long. IX abdominal tergite with 1+4+5+1 setae. Genital armature 1.36 times as long as basal plate. Basal plate 2.7 times as long as paramere. Paramere as long as mesosome. Mesosome pointed posteriorly. (Subgenital plate in female with 7+7 marginal setae.)—**Bruelia sternotransversa** Sp. Nov.

14(11) Preantennal region 1.8 times as wide as long. Hind-head slightly longer than preantennal region. I antennal segment 2.2 times as long as conus. Basal plate 3.1 times as long as paramere (Subgenital plate in female with 13+1 setae.)—**Bruelia sternotypicus** Sp. Nov.

15(10) Preantennal region 1.56 times as wide as long. Hind-head as long as preantennal region. I antennal segment three times as long as conus. Parameres 1.2 times as long as mesosome. Mesosome opening at the tip of the shield.—**Bruelia ventratum** Sp. Nov.

16 (9) Head always longer than wide. Sternal plates well developed, ractangular, confined to the middle portion of the ventral region, simple and uniformly sclerotised and pigmented throughout.

17(22) Head oblong. Anterior dorsal plate rectangular.

18(21) Preantennal region moderately rounded, subogival. Anterior dorsal plate simple. VIII abdominal tergite with 5—7 setae on each side of the middle line. Mesosomal plate rectangular, elongate. Paramere long.

19(20) Preantennal region simple. I antennal segment almost as long as conus. IV abdominal tergite with 1+1+1+1 setae. IX with 4+4 setae. Basal plate 3.8 times as long as paramere. (Cross piece of the subgenital plate in female rounded posteriorly).—**Bruelia impressifrons** Sp. Nov.

20(19) Preantennal region complicated, I antennal segment 1.5 times as long as conus. IV abdominal tergite with 5+1+1+5 setae, IX with 8+8 setae. Basal plate 2.5 times as long as paramere and 1.6 times as long as basal plate in *B. impressifrons*. Mesosome 2.4 times as long as in *B. impressifrons*. Cross piece of the subgenital plate in female sinuous posteriorly).—**Bruelia novofacies** Sp. Nov.

21(18) Preantennal region narrow, parabolic in front. VIII abdominal tergite with 1+9 setae. on each side of the middle line, IV with 3+1+1+3 setae. IX with 5+5 setae. Basal plate 3.9 times as long as paramere and 1.5 times as long as in *Bruelia novofacies*. Mesosome transverse. Parameres squat.—**Bruelia effronte** Sp. Nov.

22(17) Head squat, marginal carina is medially hanging posteriorly and forms a less heavily sclerotised triangular anterior plate.

23(30) Head fir-cone shaped. Male genitalia fragile and delicate, of the pattern seen in *Bruelia deficiens* and *B. iliaci*.

24(29) Forehead longer than hind-head, cephalic index 1: 0.77-0.88.

25(28) Pterothorax more than 1.5 times as wide as long. Genital armature three times as long as paramere.

26(27) I antennal segment 1.6 times as long as conus. Pterothorax 1.67 times as wide as long. Genital armature 1.53 times as long as basal plate. Basal plate 1.7 times as long as paramere. Mesosome almost as long as wide or slightly shorter than wide. Paramere 1.6 times as long as mesosome.—**Bruelia pengya** Ansari.

27(26) I antennal segment 1.9 times as long as conus. Pterothorax 2.05 times as wide as long. Genital armature 1.44 times as long as basal plate. Basal plate 2.4 times as long as paramere. Paramere 1.5 times as long as mesosome. Mesosome 1.5 times as long as wide.—**Bruelia brevipennis** Sp. Nov.

28(25) Pterothorax 1.17 times as wide as long. Genital armature 1.38 times as long as paramere. Basal plate 3.4 times as long as paramere. Mesosome and paramere equal in length.—**Bruelia chilchil** Ansari.

29(24) Forehead shorter than hind-head, ratio 1: 1.11. Pterothorax 1.89 times as wide as long. V abdominal tergite with 2+2+2+2 setae. Genital armature 1.61 times as long as basal plate. Basal plate 1.5 times as long as paramere. Paramere 2.4 times as long as mesosome. Mesosome as long as in *Bruelia chilchil*.—**Bruelia magnini** Sp. Nov.

30(23) Forehead thimble-shaped. Male genital armature very strongly developed and so are the parameres.

31(34) Preantennal region more or less equal to hind-head. Mesosomal plate rounded posteriorly.

32(33) I antennal segment 1.9 times as long as conus. Pterothorax 1.94 times as wide as long, with 9+9 setae. VIII abdominal tergite with one post spiracular and one on each side of the middle line, IX with 1+1 setae on the middle line. Basal plate 1.5 times as long as paramere. Paramere shorter than mesosome. Mesosome 4.4 times as long as in *Bruelia brueliodes*. (Subgenital plate in female at least one fourth of *B. brueliodes* at the posterior tip).—**Bruelia niveus** Sp. Nov.

33(32) Preantennal region as long as hind-head. I antennal segment 1.6 times as long as conus. Pterothorax 2.46 times as wide as long with 5+5 setae. VIII and IX abdominal tergites with one post-spiracular setae only. Basal plate 2.5 times as long as paramere. Paramere 2.1 times as long as mesosome. (Subgenital plate in female about twice as wide at the posterior tip as in *Bruelia niveus*).—**Bruelia brueliodes** Sp. Nov.

34(31) Preantennal region shorter than hind-head. I antennal segment 1.9 times as long as conus. Pterothorax 2.31 times as wide as long, with 7+7 setae. VIII abdominal tergite with 3+3 setae, IX with 4—6+6 setae on each side of the middle line. Sternal plate elongate. Basal plate 1.5 times as long as paramere. Paramere 1.5 times as long as mesosome. Mesosome 2.2 times as long as in *Bruelia brueliodes* and one half as long as in *Bruelia niveus*. Mesosome pointed posteriorly.—**Bruelia mahrastran** Sp. Nov.

1. BRUELIA ANTENNATUS Sp. Nov. (text-figs. 1-7).

Type-host: The Sikkim Striated Laughing Thrush—*Garrulax striatum sikkimensis* Vigors.

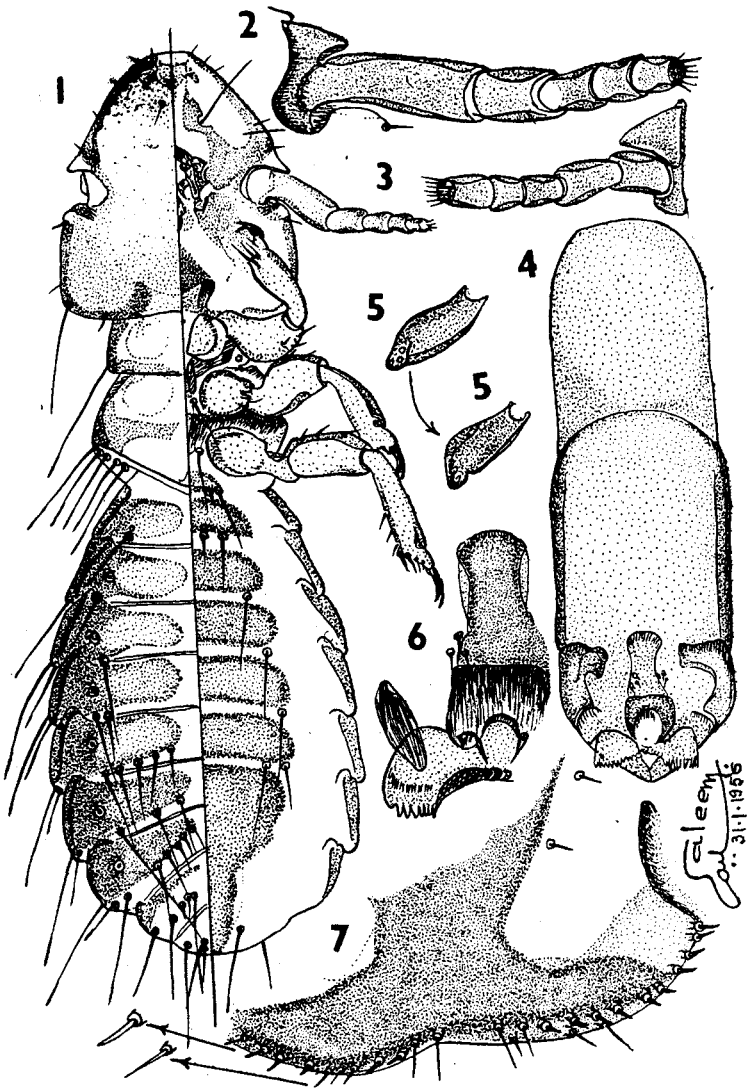
Male: 1.53×0.495 mm. Head 0.458×0.418 mm. cephalic index 1: 0.913, 1.21 times as wide as the width of pterothorax. Preantennal region 0.219×0.357 mm. index 1: 1.603. lateral margin rounded parabolically, Marginal carina well developed, interrupted medially, portion at this point hyaline; lateral interruption is incomplete, Dorsal suture does not pass across the head, Dorsal anterior plate polygonal, continuous with the dorsal sclerotisation of the head. Ventral carina well developed and well pigmented, Hind-head 0.239×0.418 mm., index 1: 1.749, 1.091 times longer than the preantennal region. Antennae exhibit a strong sexual dimorphism. 0.313 mm. long. Conus 0.039 mm. long. I antennal segment 2.24 times as long as the segment II.

Prothorax 0.107×0.265 mm. width 2.47 times as long as its length, latero-posterior angle with one long seta. Pterothorax 0.194×0.347 mm., width 1.79 times the length, Posterior angle obtusely angulate over II abdominal segment, latero-posterior margin with seven long setae placed almost at equal distances, lateral angle with one such seta, one-third of the postero-lateral margin towards the posterior angle bare.

Abdomen 0.821×0.495 mm. widest at the V-VI segments. Tergal plates interrupted in the middle, II-VI more or less quadrate, VII, VIII and IX triangular, II-IV, VII and IX with one lateral seta, V-VI with two sub-spiracular setae. VII with three, VIII with five and IX with 2+1+3 setae along the inner portion of posterior margin. Pleural plates II bare, III with one; IV, V and IX with two; VI with three, VII with four, VIII with six setae. Sternal plates II semilunar, with one long and a short seta, III-VI quadrangular, each with one seta on the outer posterior angle.

Male genitalia 0.2568 mm. long, 1.27 times as long as the basal plate. Basal plate 0.2194 mm. long, 5.3 times as long as parameres. Mesosomal plate 0.478×0.806 mm., width 1.7 times the length. Parameres 0.478 mm., long.

Female: 2.018×0.597 mm. Head 0.478×0.438 mm., cephalic index 1: 0.935. Preantennal region 0.229×0.362 mm. index 1: 1.515. Hind-head 0.239×0.438 mm., index 1: 1,833 Prothorax 0.123×0.271 mm. Pterothorax 0.239×0.351 mm. with five setae along the postero-lateral margin and a spine in the lateral angle. Abdomen 1.199×0.597 mm. Tergal plates II-VIII quadrate and interrupted in the middle, IX entire, II-IV and VIII bare, V-VII with one seta just behind spiracular Peritreme, IX with one long and a small seta. Subgenital plate well developed, tri-



Text-Figs. 1-7. *Bruelia antennatus* Sp. Nov. (1) Dorsal and ventral aspects of male, (2) male antenna, (3) female antenna, (4) male genital armature, (5) two aspects of paramere, (6) mesosome, (7) a portion of subgenital plate of the female showing the marginal chaetotaxy.

angular inform, posterior tip and the cross-bar of the anchor as shown in the figure, beset with four fine setae along the postero-lateral margin, cross bar with fourteen setae.

Material examined: HOLOTYPE (male), ALLOTYPE (female) and PARATYPES (one male and four females) from Sikkim Striated Laughing Thrush—*Garrulax striatum sikkimensis* Vigors, Meinertzhagen collection 19943 (B.M. 1952-143), Chungtang (Sikkim), February 16, 1952.

Remarks: This species resembles *Bruelia nipalensis* sp. nov. in the shape of the head and differs from it in the lateral interruption of the forehead and male antenna which has considerably longer I segment. The male genital armature is also of different pattern.

2. BRUELIA AVINUS Sp. Nov.

(text-figs. 8-12).

Type-host: The plain-coloured Laughing Thrush—(*Garrulax s. subunicolor* (Hodgson).

Male: 1.221 × 0.518 mm. Head 0.361 × 0.352 mm. cephalic index 1 : 0.975 Preantennal region 0.157 × 0.296 mm. index 1 : 1.885, anterior margin depressed in the middle. Marginal carina interrupted in front and laterally. Dorsal anterior plate as in *Bruelia marginata* (Burmeister), feebly sclerotised and interrupted medially and continuous with premarginal carinae. Hind head 0.204 × 0.352 mm. index 1 : 1.725, Antennae exhibit slight sexual dimorphism, insignificant when compared with *Bruelia antennatus* sp. nov. discussed above.

Prothorax 0.111 × 0.204 mm., with a long seta in the postero-lateral angle. Pterothorax 0.166 × 0.342 mm., lateral sides considerably dilated, postero-lateral margin with 8 long setae beset as far as two-third of the lateral region on both sides.

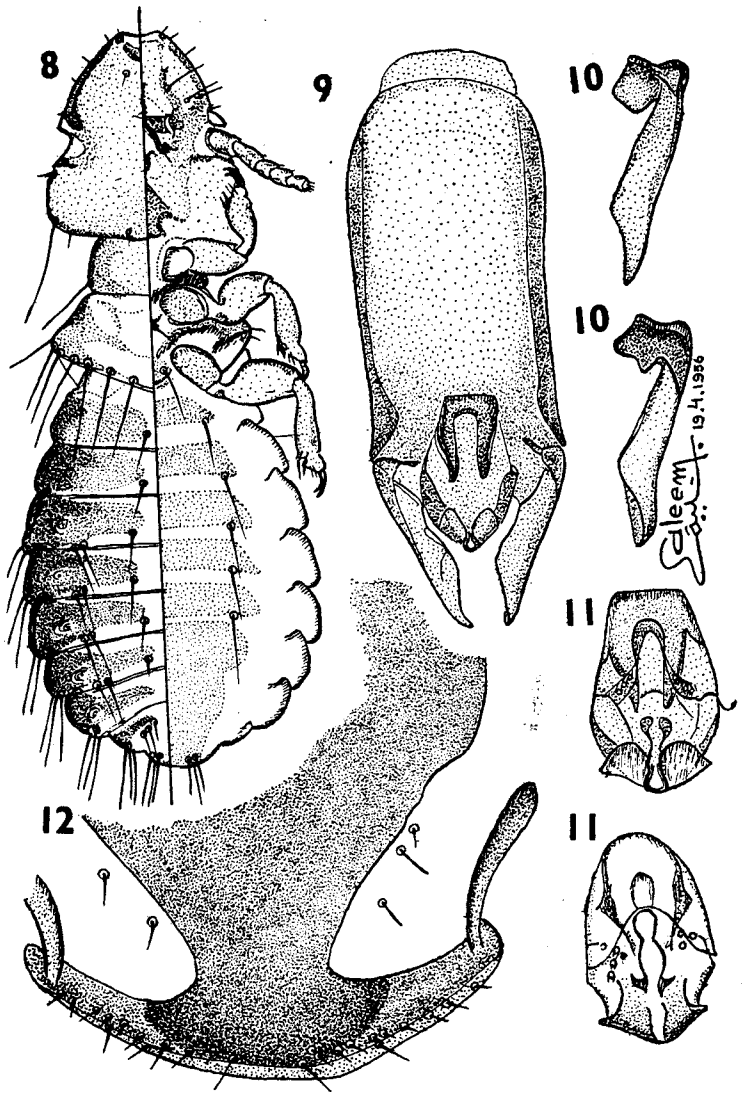
Abdomen 0.687 × 0.518 mm. Tergal plates II-VI more or less quadrangular, VII-IX triangular, II-VII and IX with one long seta on the postero-anterior angle, IV-VII with two long postero-spiracular setae IX with a group of four setae, X-XI with several fine setae on the dorsal aspect and along the margin. Pleural plates elongate, with well developed recurrent heads, II and III bare, IV with two, VI and VII with three, VIII with 5-6, IX with 2-2 setae. Sternal plates transverse, simple, II-VI with a long seta in the postero-lateral angle.

Male genital armature 0.2946 mm. long, sides slightly concave in the middle, anterior and posterior width almost equal. Basal plate 0.2103 mm., long. Parameres 0.1026 mm. long, well developed of the form shown in the figure, proximal head strongly developed, with a conspicuous socket to accommodate the rounded lateral piece of the basal plate. Mesosome elongate, 0.0890 × 0.1026 mm., with well sclerotised latero-posterior margin and central apophysis.

Female: 1.521 × 0.520 mm. Head 0.416 × 0.417 mm., cephalic index 1 : 1.002. Preantennal region 0.199 × 0.333 mm., index 1 : 1.717. Hind-head 0.222 × 0.417 mm., index 1 : 8.79. Prothorax 0.101 × 0.231 mm. Pterothorax 0.176 × 0.379 mm, beset with 6-6 seta on the postero-lateral margin. Abdomen 0.917 × 0.519 mm. Tergal plates II-VIII quadrangular and interrupted medially, IX complete, IX-XI narrow and triangular, II-VIII with a long seta in the postero anterior angle IV-VII with one post-spiracular seta, IX with one long and a short seta. Sternal plates quadrate, II-VI with a seta in the postero-lateral angle. Subgenital plate conical, wider anteriorly and pointed posteriorly and placed on an arched cross piece which is furnished with 11-12 marginal setae as shown in figure.

Material examined: HOLOTYPE (male), ALLOTYPE (female) and PARATYPES (one male and a female) from The Plain-coloured Laughing Thrush—*Garrulax s. subunicolor* (Hodgs), Meinertzhagen collection 19938 (B.M. 1952-143), Chungtang (Sikkim), February 16, 1952.

Remarks: This species is allied to *Bruelia glandarii* (Denny) from *Garrulus g. rufitergum* Hartert, from which it differs in the details of male genital armature and female subgenital plate. It resembles *Bruelia sehri* Ansari and *B. nipalensis* sp. nov. (*inf. cit.*) from which



Text-Figs. 8-12. *Bruelia avinus* Sp. Nov. (8) Dorsal and ventral aspects of male, (9) male genital armature, (10) two aspects of paramere, (11) two aspects of mesosome, (12) a portion of the subgenital plate of the female showing the marginal chaetotaxy.

it can be easily separated by the shape of the head. The details of the male genital armature are also very much different in the three species. It differs from *Bruelia antennatus* in the male antenna and male genital armature and dorsal abdominal chaetotaxy.

3. BRUELIA SEHRI Ansari
(text-figs. 13-16)

Bruelia sehri Ansari 1955 *Proc. VII Pak. Sci. Conf. (Abst. Biol.)* 58.

Type-host: The Himalayan Laughing Thrush—*Garrulax lineatus grisescentior* (Hartert).

Male: 1.00×0.395 mm. Head 0.341×0.325 mm. cephalic index 1: 0.959. Preantennal region 0.151×0.265 mm. index 1: 1.755. lateral margin almost straight. Marginal carina interrupted both laterally and in the middle. Anterior margin slightly concave and hyaline. Dorsal anterior plate as in *Bruelia avinus* sp. nov. (*sup. cit.*) Ventral carina well developed. Hind-head 0.191×0.325 mm, index 1: 1.702, lateral margin rounded, with narrow carina. Antennae 0.181 mm. long. Conus 0.039 mm. long.

Prothorax 0.071×0.195 mm. with a seta in the postero-lateral angle. Pterothorax 0.120×0.295 mm. laterally spread outwardly, posterior angle acute. Postero-lateral margin with six setae confined as far as the re-entrant heads of I pleural plate.

Abdomen 0.561×0.395 mm. Tergal palte II-VIII quadrate, II-VIII with a seta on the postero-anterior angle, IV-VII with two long postero-spiracular setae, VIII with 1+3 setae, IX with 1–4 setae and X-XI with several short setae on the dorsum and long marginal setae. Pleural plates as in *B. avinus* sp. nov. well developed, II and III bare, IV and V with one, VI with two; VII-IX with three setae. Sternal plates II-VI quadrangular, each with a postero-lateral seta. Subgenital plate conical.

Male genital armature: In the specimen available to us, the genital armature was protruding and turned upwards and therefore various parts cannot be properly demarcated.

Female: 1.351×0.435 mm. Head 0.371×0.365 mm. cephalic index 1: 0.987. Preantennal region 0.185×0.305 mm. index 1: 1.622. Hind-head 0.185×0.365 mm. index 1: 1.973. Prothorax 0.085×0.210 mm. Pterothorax 0.130×0.305 mm. Abdomen 0.885×0.435 mm. Tergal plates II-VII with a seta in the postero-anterior angle, IV-VII with a postero-spiracular seta, VIII with only pleural setae, IX-XI, with marginal setae. Sternal plates II-VI quadrate, each with a seta in the postero-lateral angle. Subgenital plate with 8+3 setae on the cross piece of the anchor, disposed of as shown in the figure.

Material examined: HOLOTYPE (male), ALLOTYPE (female) from the Himalayan Laughing Thrush—*Garrulax lineatum griscentior* (Hartert), Ansari collection, Kulu 1934. X. 14.

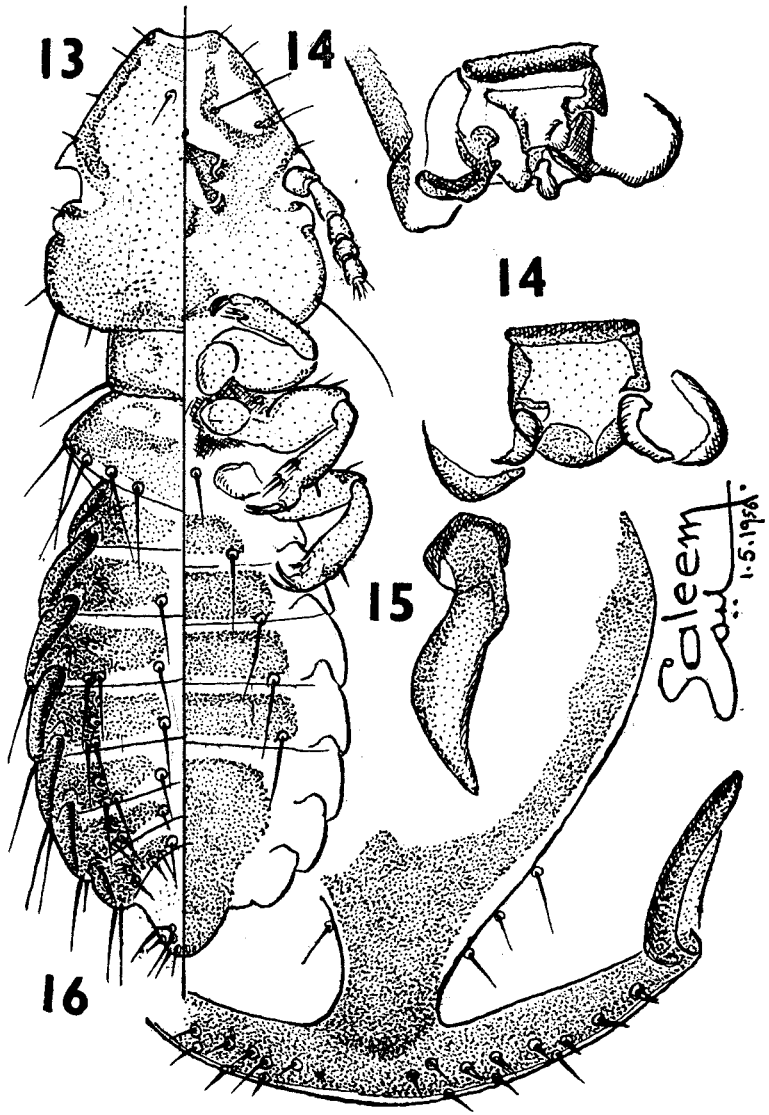
Remarks: This species differs from the allied forms in the ratio of preantennal region and hind-head. Mesosomal plate in this species is one-third as long as in *Bruelia nipalensis* sp. nov. and about one-half as long as the mesosomal plate in *Bruelia avinus* sp. nov.

4. BRUELIA NIPALENSIS Sp. Nov.
(text-figs. 17-23)

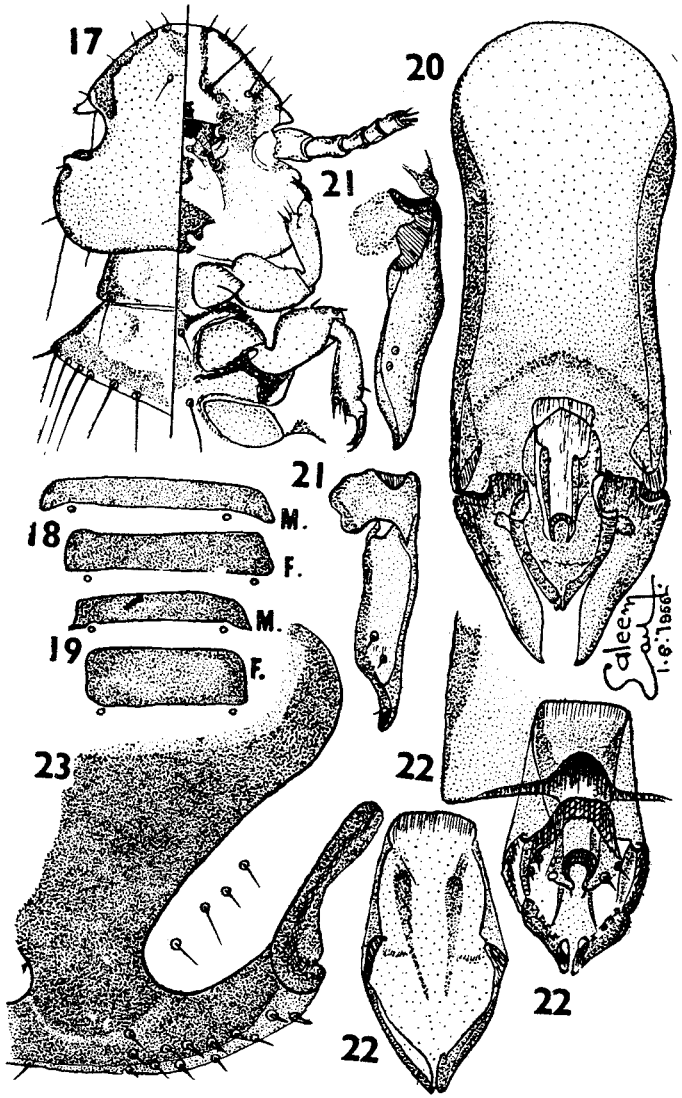
Type-host: The Striated Laughing Thrush—*Garrulax striatum sikkimensis* Vigors.

Male: 1.321×0.621 mm. Head 0.405×0.426 mm., cephalic index 1: 1.052. Preantennal region 0.166×0.352 mm., index 1: 2.121. Hind-head 0.239×0.426 mm., index 1: 1.782. Antennae 0.258 mm. long. Conus 0.029 mm. long. Prothorax 0.121×0.287 mm. with a seta in the postero-lateral angle. Pterothorax 0.166×0.435 mm., posterior angle very obtuse, postero-lateral margin furnished with 7+7 setae, distributed as far as the inner margin of the I tergal plate.

Abdomen 0.694×0.621 mm. Tergal plates very well developed, interrupted in the middle, II-IV of the shape of a broad spatula resembling the beak of a spoon-bill, V-VII narrow and spatulate, VIII-IX triangular, II-VIII with a seta in the postero-anterior angle, III and VIII with a post-spiracular seta, IV-VII



Text-Figs. 13-16. *Bruelia sehri* Ansari (13) Dorsal and ventral aspects of male, (14) two aspects of mesosomal plate, (15) paramere (16) a portion of female subgenital plate showing marginal chaetotaxy.



Text-Figs. 17-23. *Bruelia nipalensis* Sp. Nov. (17) Dorsal and ventral aspects of head and thorax of male, (18) sternal plate (M) male (F) female, (19) Sternal plate (M) male (F) female *B. avinus*, (20) male genital armature, (21) two aspects of paramere (22) two aspects of mesosome, (23) a portion of subgenital plate of female showing marginal chaetotaxy.

with two postero-spiracular setae, VIII with six subequal setae beset along the posterior margin, IX with four setae, X+XI with 6-8 setae along the outer margin. Sternal plates narrow and elongate, II-VI with a seta on each post-lateral angle. Subgenital plate conical with inwardly and then outwardly going lateral margins, well demarcated in the region of VIII segment. Pleural plates II bare, III with one, IV and VI with two, VII with three, VIII and IX with four, and X+XI with 7+7 setae along the outer margin. Sternal plates simple as in other species discussed above.

Male genital armature very strongly developed, extending as far as VI segment. 0.3405 mm., long. Basal plate 0.2487 mm., long. 1.3 times as long as in *B. avinus* and *B. sehri*. Mesosomal plate 3.1 times as long as in *B. sehri*, 0.1189×0.1189 mm. Parameres 1.3 times as long as in *B. sehri*, 0.1001 mm., long.

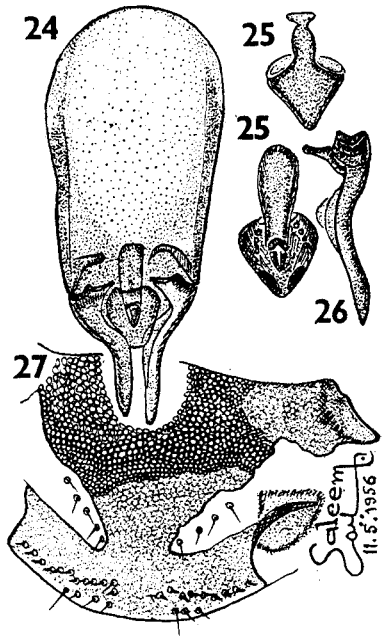
Female: 1.611×0.639 mm. Head 0.443×0.463 mm., cephalic index 1: 1.045. Preantennal region 0.204×0.388 mm., index 1: 1.902. Hind head 0.239×0.463 mm., index 1: 1.937. Prothorax 0.111×0.287 mm. Pterothorax 0.185×0.437 mm., with 6+6 setae on the posterior margin, posterior angle comparatively less obtuse than in the male and is more or less blunt. Abdomen 0.981×0.639 mm. Tergal plates II-VIII quadrangular, resembling the head of a spoon bill, IX entire, II-VIII with a seta in the posterior inner angle, IV-VI with one post-spiracular seta, VII and VIII with a long and a short post-spiracular seta, IX with one long and a short followed by a long seta on each side of the middle line. Sternal plates II-VI transverse, each with a long seta in the postero-lateral angle. Subgenital plate well developed, anterior portion top-shaped, with the blunt distal end placed on the arched cross bar. Vulvar plate with 13+13 setae, disposed of as shown in the figure. Pleural plate II bare, III with one, IV-VI with two, VII with three, VIII with four and IX with 9+3 setae.

Material Examined: HOLOTYPE (male), ALLOTYPE (female) from the Streaked Laughing Thrush—*Garrulax striatum sikkimensis* Vigors, Meinertzhagen collection 19942 (B.M. 1952-143), Chungtang (Sikkim), February 16, 1952.

Remarks: In this species the basal plate is 1.3 times as long as in *Bruelia sehri* Ansari, Mesosomal plate is 3.1 times as long as in *B. sehri* and 1.5 times as long as in *Bruelia avinus* sp. nov. Parameres are 1.3 times as long as in *B. sehri* Ansari.

5. BRUELIA LONGISTERNUS Sp. Nov.

(text-figs. 24-27)



Text-Figs. 24-27. *Bruelia longisternus* Sp. Nov. (24) male genital armature (25) two aspects of mesosome, (26) paramere, (27) a portion of subgenital plate of female showing marginal chaetotaxy.

Type-host: The Nipal Cutia—*Cutia n. nipalensis* Hodgson.

Male: 1.411×0.629 mm. Head 0.388×0.407 mm. cephalic index 1: 1.049. Preantennal region 0.166×0.333 mm. index 1: 2.003. Frontal margin rounded parabolically. Marginal carina of the pattern seen in the type species of the genus *Bruelia viz., B. brachythorax* (Giebel) from *Bombycilla g. garrulus* (Linn.) It is indented medially and the anterior margin of the head at this point is hyaline. There is a triangular-shaped area of sclerotisation in the indented part of the marginal carina. Ventral carina is uniformly sclerotised throughout. Hind-head 0.222×0.407 mm., index 1: 1.833. temporal margins straight, rounded posteriorly near the postero-lateral angle. Antenna 0.263 mm. long. Conus 0.018 mm. long. Antennae sexually dimorphic, but the difference is very slight.

Prothorax 0.111×0.259 mm. Pterothorax 0.213×0.426 mm., laterally diverging, posterior margin very obtusely angulate on II abdominal segment, furnished with eight long hairs along the lateral two-third on each side.

Abdomen 0.831×0.629 mm. Tergal plates more or less quadrangular, median one-third of the transverse depth interrupted. II-VIII slightly more sclerotised in the antero-lateral region so as to form a golf stick-pattern. II-VIII with a antero-posterior seta, III with one postero-spiracular seta, IV-VI with two post-spiracular setae, VII with two setae along the antero-posterior seta, VIII with one, IX with five setae in the antero-posterior margin followed by another row of these setae a little behind. Pleural well developed, triangular with well-developed anterior heads, III with one, IV-V with two, VI-VII with three, VIII with four, IX with three and X+XI with 10-11 setae along the margin on each side of the middle line. Sternal plates very well developed, transverse, with well developed antero-lateral regions. Subgenital plate extends from VII segment, anterior region confined to the VII segment with cross-bars resembling sternal plate in front, posterior region triangular with a globular sclerotised area on both sides and posterior to the anterior cross-bar.

Male genital armature: 0.2648 mm. long. Basal plate 0.1757 mm. long, wide in the anterior region and narrow posteriorly, sides more or less straight beyond the anterior one-fourth of the length. Parameres 0.0946 mm. long, of the shape shown in the figure, proximal heads typical. Mesosomal plate 0.0648×0.0811 mm., of the shape shown in the figure.

Female: 2.032×0.694 mm. Resembles male in all the important specific characters. Head 0.463×0.454 mm. cephalic index 1: 0.981. Preantennal region 0.204×0.379 mm. index 1: 1.858. Hind-head 0.259×0.454 mm. index 1: 1.753. Prothorax 0.139×0.259 mm. Pterothorax 0.231×0.444 mm. with 6+6 marginal setae. Abdomen 1.333×0.694 mm. Tergal plates II-VI with a postero-anterior seta, IV-VII with a post-spiracular seta, IX tergite entire with one short and a long seta followed by a short seta on each side of the middle line. Sternal plates as in the male. Subgenital plate very typical of the shape shown in the figure. Posterior cross piece with a median invagination, and marginally beset with 11−12+4 setae as shown in the figure. Pleural plates as in the male, III with one, IV-V with two, VI and VIII with four, VII with three and IX with 2+4 setae. Subgenital plate with 11+4+4+11 setae, tegument with conspicuous raticulation.

Material examined: HOLOTYPE (male), ALLOTYPE (female) and PARATYPE (one male) from the Nipal Cutia—*Cutia nipalensis nipalensis* Hodgson, Meinertzhagen collection 1934 (B.M. 1952-143), Dikchu (Sikkim), February 15, 1952.

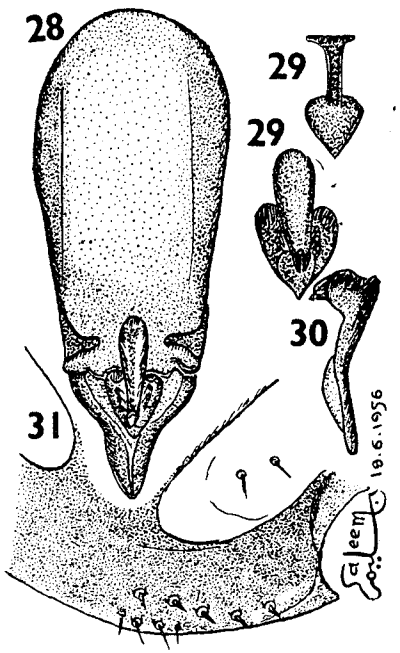
Remarks: This species is allied to *Bruelia sternotypicus* sp. nov., *Bruelia sternotransversa* sp. nov. and *Bruelia ventratum* sp. nov. All these resemble in general body form, abdominal chaetotaxy, tergal and ventral plates and male genitalia. It differs from the allied forms in the details of genital armature.

6. BRUELIA STERNOTRANSVERSA Sp. Nov.

(text-figs. 28-31)

Type-host: The White-throated Laughing Thrush—*Garrulax albogularis albogularis* Goulden.

Male: 1.311×0.555 mm. Head 0.352×0.351 mm., cephalic index 1 : 0.997. Preantennal region as long as hind-head, 0.176×0.287 mm., index 1 : 1.631. Hind-



Text-Figs. 28-31. *Bruelia sternatransversa* Sp. Nov. (28) male genital armature, (29) two aspects of mesosome, (30) paramere (31) a portion of the subgenital plate showing marginal chaetotaxy.

head 0.176×0.351 mm. index 1 : 1.994. Antenna 0.233 mm. long. Conus 0.021 mm. Prothorax 0.101×0.231 mm. Pterothorax 0.166×0.379 mm. 8+8 setae along posterior margin, one long and a short seta towards the ventral aspect of the lateral angle. Abdomen 0.787×0.555 mm. Tergal plates, both in shape and chaetotaxy, resemble *Bruelia longisternus* sp. nov. IX tergite is with 1+4+5+1 setae. Basal plate is 0.248 times the abdomen. Pleural plates III-V with one, VI-VII with three, VIII and IX with four and the last segment with 5-5 setae on each side. Sternal plates as in the above species.

Male genital armature 0.2649 mm. long, of the pattern seen in *Bruelia longisternus* sp. nov., however it differs in the form of mesosomal plate and parameres. Basal plate 1.2 times as long as in *Bruelia ventratum* sp. nov., 0.1946 mm. long. Mesosomal plate 1.04 times as long in *Bruelia longisternus*, 0.0675×0.0676 mm. Parameres 0.0703 mm. long.

Female: It closely resembles the female of *Bruelia longisternus* sp. nov. 1.852×0.551 mm. Head 0.388×0.379 mm. cephalic index 1 : 0.977. Preantennal region 0.194×0.324 mm. index 1 : 1.669. Hind-head 0.194×0.379 mm. index 1 : 1.953. Prothorax 0.111×0.231 mm. Pterothorax 0.176×0.379 mm. Abdomen 1.315×0.551 mm. Abdominal chaetotaxy as in *Bruelia longisternus*, IX tergite with a short and a long seta on each side of the middle line. The shape of the subgenital plate is slightly squat and differs considerably in chaetotaxy, there being 5+4 setae on each side and disposed of as shown in the figure.

Material examined: HOLOTYPE (male), ALLOTYPE (female) from the White-throated Laughing Thrush—

Garrulax albogularis albogularis Goulden, Meinertzhagen collection 11196, Nepal, February 1938.

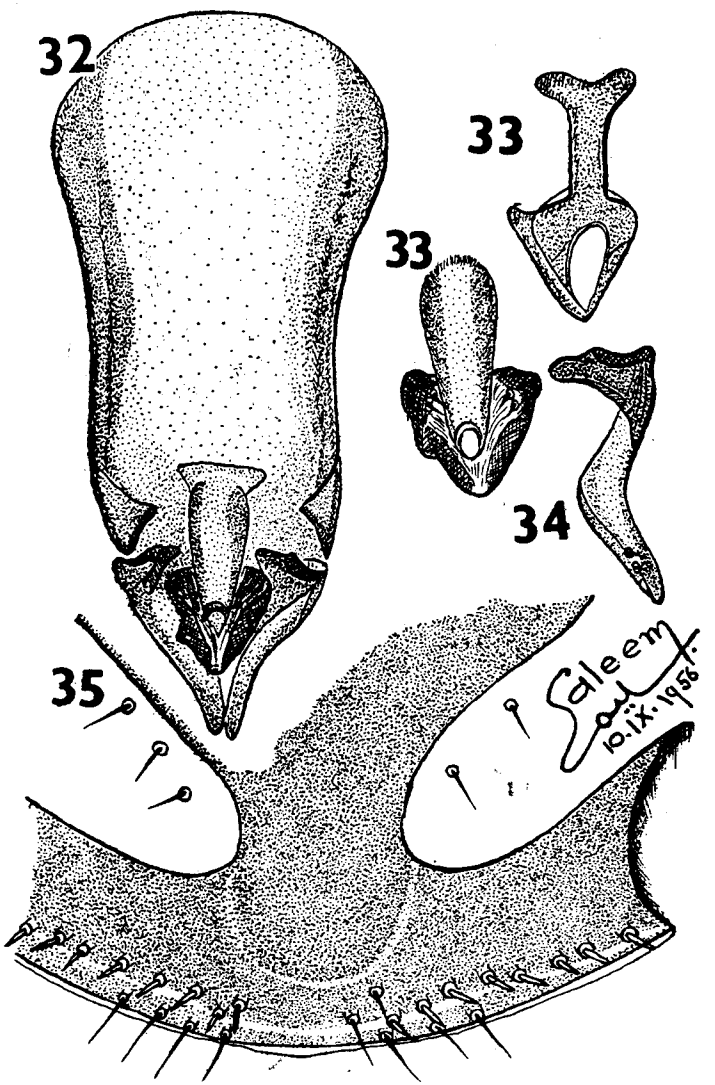
Remarks: This species resembles *Bruelia longisternus* sp. nov., *Bruelia sternotypicus* sp. nov., and *Bruelia ventratum* in body form, abdominal chaetotaxy and tergal and ventral plates. It differs from *Bruelia longisternus* in the ratio of preantennal region and hind-head. From other allied species it differs in the details of male genital armature, particularly in the proximal heads of parameres. The subgenital plate of the female in this species has comparatively few (5+4) setae on the posterior margin of the cross piece of the anchor.

7. BRUELIA STERNOTYPICUS Sp. Nov.

(text-figs. 32-35)

Type host: The Indian Black-gorgeted Laughing Thrush—

Garrulax pectoralis pectoralis Goulden.



Text-Figs. 32-35. *Bruelia sternotypicus* Sp. Nov. (32) male genital armature, (33) two aspects of mesosome (34) paramere, (35) a portion of subgenital plate showing marginal chaetotaxy.

Male: 1.530×0.648 mm. Head 0.388×0.417 mm. cephalic index 1 : 1.075. Preantennal region 0.185×0.333 mm. index 1 : 1.8. Hind-head 0.203×0.417 mm. index 1 : 2.044. Antenna 0.2333 mm. long. Conus 0.034 mm. long. Prothorax 0.101×0.259 mm. Pterothorax 0.185×0.426 mm. posterior margin with 8+8 setae. Abdomen 0.963×0.648 mm. Tergal plates as in *Bruelia longisternus* sp. nov. both in shape and chaetotaxy, IX tergite with 2+5 setae on each side. Pleural plate II bare, III-V with two, VI-VIII with three and IX with four setae. Last segment with 4+5 setae on each side. Sternal plates as in *Bruelia longisternus* sp. nov.

Male genital armature 0.2811 mm. long. Basal plate 1.5 times as long as in *Bruelia ventratus* sp. nov. and *B. longisternus* sp. nov., 0.2432 mm. long. Mesosomal plate 1.2 times as long as in *Bruelia longisternus*, 0.0783 mm. long. Parameres as long as in *Bruelia sternotransversa*, and of the pattern seen in *Bruelia longisternus*, the proximal heads, however, are comparatively more developed and transverse, 0.0783 mm. long.

Female: 1.881×0.713 mm. Head 0.453×0.436 mm., cephalic index 1 : 0.963. Preantennal region 0.222×0.371 mm. index 1 : 1.671. Hind-head 0.231×0.436 mm., index 1 : 1.887. Prothorax 0.101×0.259 mm. Pterothorax 0.203×0.444 mm. Abdomen 1.222×0.713 mm. Abdominal chaetotaxy as in *Bruelia longisternus* sp. nov., VII with one post-spiracular and one postero-lateral seta on each side, IX with one short and a long seta. Vulvar plate with 9−10+3−4 setae along the margin. Pleural plate III with one, IV-VI with two, VII with three, VIII with four and IX with 4+2 setae, last segment with a short setae on the posterior angle of the invagination.

Material examined: HOLOTYPE (male), ALLOTYPE (female) from the Indian Black-georgated Laughing Thrush —*Garrulax pectoralis pectoralis* (Goulden) Meinertzhagen collection 19864 (B.M. 1952-143), Kangpokoi (Manipur State), January 26, 1952.

Remarks: This species is separated from the allied forms (*Bruelia longisternite*, *B. sternotransversa* and *B. ventratum*) in male genitalia. Basal plate is 1.5 as long as in *Bruelia ventratum*. The parameres are almost as long as the mesosome and 3.1 times as long as basal plate. The parameres are considerably turned outwards from the middle.

8. BRUELIA VENTRATUM
Sp. Nov.

(text-figs. 36-40)

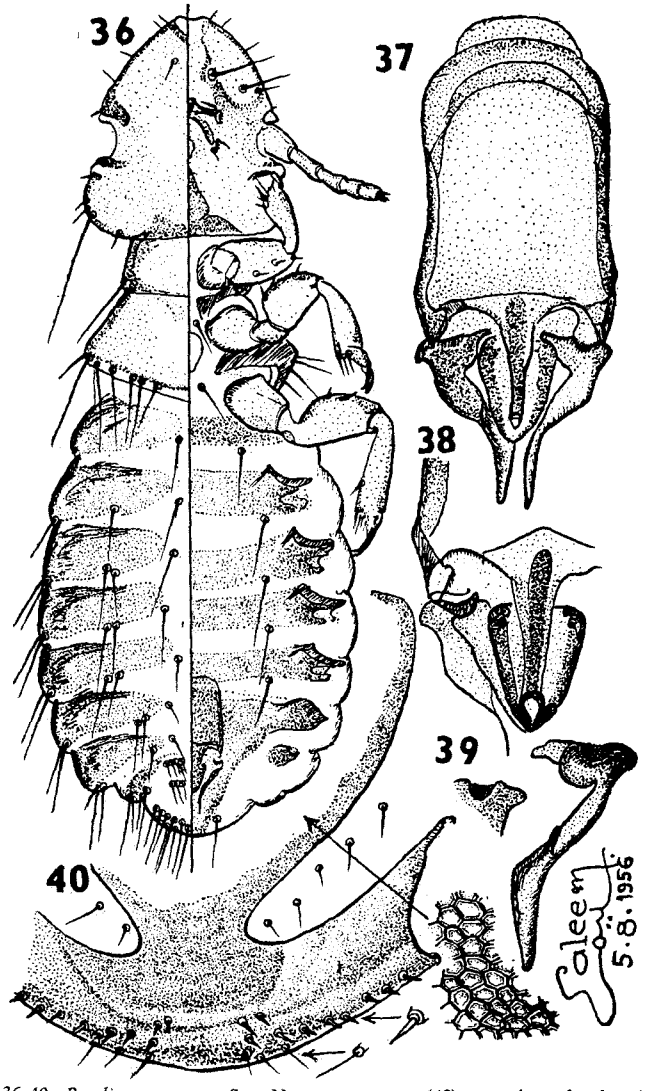
Type-host: The Rufous-necked Laughing Thrush—

Garrulax ruficollis Jard. and Selby.

Male: 1.421×0.574 mm. Head 0.37×0.371 mm., cephalic index 1 : 1.003. Preantennal region 0.185×0.296 mm. index 1 : 1.56. Hind-head 0.185×0.371 mm. index 1 : 2.005. Antenna 0.25 mm. long. Conus 0.029 mm. long. Prothorax 0.101×0.231 mm. Pterothorax 0.166×0.379 mm. posterior margin with 7+7 setae. Abdomen 0.824×0.574 mm. Tergal plates as in *Bruelia longisternus*, IX with 5+5 setae. Pleural plates III with one, IV-V two, VI-VIII with three, IX with four setae, last segment with 5-6 setae on each side. Sternal plates as in *Bruelia longisternus*.

Male genital armature of the pattern seen in the allied forms, 0.2513 mm. long. Basal plate 0.1648 mm. long, almost as long as in *Bruelia longisternus* and considerably shorter than *Bruelia sternotypicus* and *Bruelia sternotransversa*. Mesosomal plate as long as in *Bruelia sternotypicus* and longer than in other allied forms, 0.0783 mm. long. Parameres almost as long as in *Bruelia longisternus* but consider longer than in other species of this group, 0.0919 mm. long.

Female: 1.872×0.666 mm. Head 0.416×0.398 mm., cephalic index 1 : 0.956. Preantennal region 0.203×0.333 mm. index 1 : 1.641. Hind-head 0.213×0.398 mm., index 1 : 1.8. Prothorax 0.101×0.231 mm. Pterothorax 0.185×0.407 mm. Abdomen 1.251×0.666 mm. Abdominal chaetotaxy as in *Bruelia sternotransversa* sp. nov. Vulvar plate with 2+8+3 setae on each side. Sternal plates as in the allied forms. Pleural plates III with two, IV-VI and VIII with three, VII with four



Text-Figs. 36-40. *Bruelia ventratum* Sp. Nov. (36) Dorsal and ventral aspects of male (37) male genital armature, (38) mesosome, (39) paramere, (40) a portion of subgenital plate of female showing marginal chaetotaxy.

setae and IX with 4+2+3 setae on each side.

Material examined: HOLOTYPE (male), ALLOTYPE (female) from the Rufous-necked Laughing Thrush—

Garrulax ruficollis ruficollis Jard. and Selby, Meinertzhagen collection 19868 (B.M. 1952...143), Kangpokoi (Manipur State), January 26, 1952.

Remarks: This species differs from the allied forms in the mesosomal plate and parameres. It differs from *Bruelia sternotransversa* and *Bruelia sternotypicus* in the ratio of basal plate and total length of the genital armature, in the ratio of parameres and basal plate and ratio of mesosomal plate and parameres. From *Bruelia longisternus* it differs in the details of mesosomal plate and proximal heads of the parameres.

9. BRUELIA IMPRESSIFRONS Sp. Nov.

(text-figs. 41-43)

Type-host: The Black-faced Laughing Thrush—

Garrulax affine affine Hodgson.

Male: 1.751×0.392 mm. Head 0.458×0.336 mm. cephalic index 1 : 0.734. Preantennal region 0.252×0.281 mm. index 1 : 1.115. Marginal carina interrupted in the middle and the anterior margin at this point hyaline, there is a triangular sclerotisation superimposed with a squarish plate. Ventral carina as in other *Bruelia* species. Hind-head 0.206×0.336 mm. index 1 : 1.631, temples straight, postero-lateral angle rounded. Antenna 0.175 mm. long. Conus 0.037 mm. exhibiting slight sexual dimorphism.

Prothorax 0.112×0.233 mm. rounded laterally, postero-lateral angle with a seta. Pterothorax 0.187×0.299 mm., trapezoidal in shape, posterior angle well developed. Three long and a short seta along the postero-lateral margin, confined as far as the origin of the abdominal segment I.

Abdomen 1.122×0.392 mm. laterally straight as far as III segment, from it onwards it steadily slopes down or narrows towards the posterior segment. Tergal plates II-VIII rectangular, interrupted in the middle so as to form two similar components, and considerably pigmented laterally, II-VIII with a seta in the postero-anterior angle. IV-VII with a post-spiracular seta, VII with two setae between the post-spiracular and anterior seta, VIII with two setae on the postero-anterior angle and two such setae between the space posterior to spiracle and anterior angle, IX with two long and a short seta. Sternal plates quadrate, II-V with one and VI with two setae in the postero-lateral angle. Pleural plates well developed with conspicuous reentrant heads. IV-V with one, VI-VII with two, and VIII with four setae.

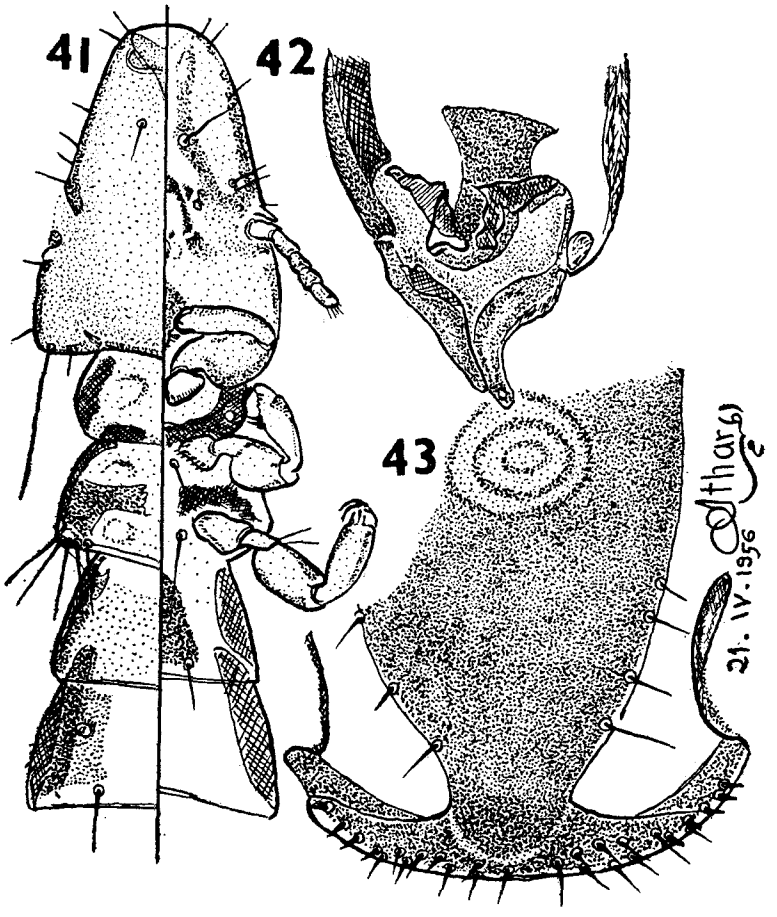
Male genital armature shortest than in all the allied forms, 0.194 mm. long. narrow posteriorly and wide anteriorly, Parameres 0.033 mm. long. Mesosomal plate 0.033×0.064 mm. a dorsal and a transverse spatulate sclerotisation on the ventral aspect.

Female: Resembles male in all the important salient characters. 2.181×0.429 mm. Head 0.504×0.374 mm. cephalic index 1 : 0.742. Preantennal region 0.289×0.299 mm., index 1 : 1.034. Hind-head 0.215×0.374 mm., index 1 : 1.744. Prothorax 0.122×0.252 mm. Pterothorax 0.178×0.318 mm. with 5+5 postero-lateral setae. Abdomen 1.439×0.429 mm. The abdominal chaetotaxy is, however, very scarce. Tergal plate II-VIII quadrate, interrupted in the middle, IV-VII with one post-spiracular seta., IX tergal plate entire, with two long hairs in the lateral half on each side. Pleural plates as in male, IV-V with one, VI-VII with two, VIII with five, IX with seven setae on latero-ventral aspect. Subgenital plate simple, meniscus posterior piece with 10+4 marginal setae on each side.

Material examined: HOLOTYPE (male), ALLOTYPE (female) and PARATYPES (five females) from the Black-faced Laughing Thrush—

Garrulax affine affine Hodgson, Meinertzhagen collection 4853, Nepal, December 1935.

Remarks: This species resembles *Bruelia novofacies* sp. nov. and *Bruelia effronte* sp. nov. in general body characters. It differs from *Bruelia effronte* in the shape of the forehead and in male genital armature. It differs from both in abdominal chaetotaxy.



Text-Figs. 41-43. *Bruelia impressifrons* Sp. Nov. (41) Dorsal and ventral aspects of head, thorax and a portion of abdomen, (42) tip of the genital armature, (43) a portion of subgenital plate showing marginal chaetotaxy.

10. BRUELIA NOVOFACIES Sp. Nov.

(text-figs. 44-47)

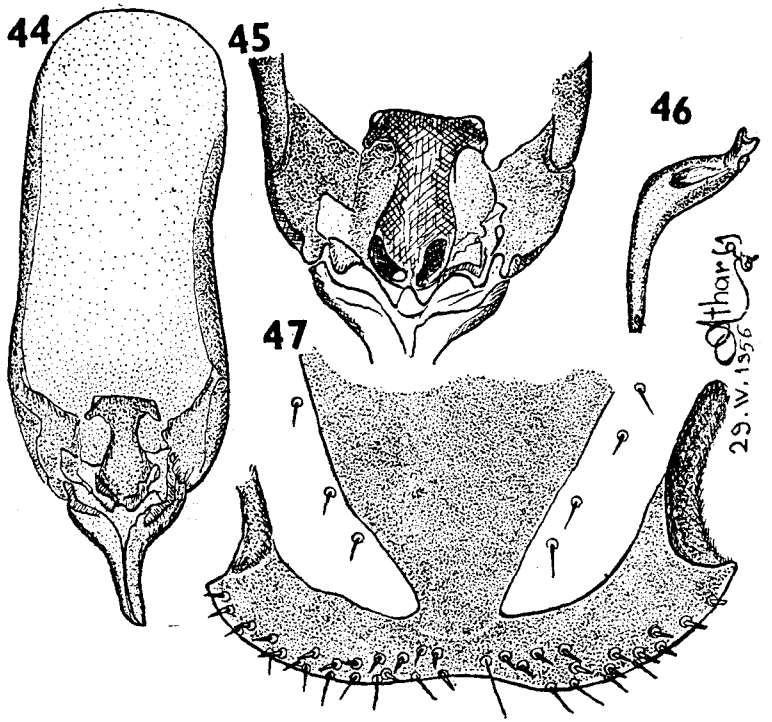
Type-host: The Plain-coloured Laughing Thrush—

Garrulax subunicolor subunicolor (Hodgson).

Male: 1.671×0.448 mm. Head 0.411×0.321 mm. cephalic index 1 : 0.782. Preantennal region 0.234×0.261 mm. index 1 : 1.115. Marginal carina interrupted in the middle. Anterior dorsal plate squarish, ventral component wedge-shaped. Ventral carina well developed and well pigmented, uniformly sclerotised as far as the middle and then feebly. Antenna 0.179 mm. long. Conus 0.031 mm. long. Hind-head 0.177×0.387 mm. index 1 : 1.348.

Prothorax 0.112×0.234 mm., postero-lateral margin rounded, each side with a short seta. Sternal plate narrow and feebly sclerotised. Pterothorax 0.196×0.318 mm. trapezoidal postero-lateral margin with five long and feeble dorsally beset setae, confined submarginally, and one small and a long seta situated ventrally. Sternal plate rounded or oval with two posterior setae.

Abdomen 0.981×0.448 mm., elongate, sides subparallel. Dorsal plates well developed, interrupted in the middle, more or less rectangular in form. II with one seta on each side of the middle line, III with one inferior to spiracle, and one on each side of the inner margin of the plate, IV with one inferior to the spiracles and five in the posterior row, V with 6-7, VI with 7-8 and VIII with seven setae, VII with 9-10, VIII with seven submedian, IX with eight setae on each side of the middle line. X+XI with only one seta. Pleural plates II and III bare, IV-V and IX with one and VI-VIII with two setae. Sternal plates I triangular, II-VII rectangular, VIII and IX fused to form an inverted cone. II-VI with one seta on each side.



Text-Figs. 44-47. *Bruelia novofacies* Sp. Nov. (44) Male genital armature, (45) mesosome, (46) paramere, (47) a portion of subgenital plate of female showing marginal chaetotaxy.

Male genital armature 0.3405 mm. long, of the pattern already described for *Bruelia deficiens* (Piaget) from *Cyanopica cyanus cooki* Boneparte. Basal plate 1.6 times as long as in *Bruelia impressifrons* sp. nov., 0.1973 mm. long and 0.1216 mm. wide at the base where a more or less squarish mesosomal plate articulates with it. Mesosomal plate 2.4 times as long as in *B. impressifrons*, 0.0784 mm. long, presenting a characteristic dorsal and ventral sclerotisation as shown in the figure. Parameres 2.2 times as long as in *B. impressifrons* 0.0784 mm. long, with feeble articulating head, outer margins going in and then straight, inner surface almost straight, posterior point sharp.

Female: 2.21×0.495 mm. Head 0.486×0.388 mm. cephalic index 1 : 0.0798. Preantennal region 0.271×0.313 mm. index 1 : 1.155. Hind-head 0.215×0.388 mm., index 1 : 1.805. Prothorax 0.121×0.281 mm. Pterothorax 0.224×0.359 mm. Abdomen 1.448×0.495 mm., II, III and VIII tergites with 1+1, IV-VII with 1+1+1+1 and IX with 3+3 setae. Sternal plates II-VII with 1+1 seta. Pleural plates IV and V with one, VI-VIII with two and IX with nine setae. Vulvar plate as shown in the figure, posterior margin of the anchor with 11-12 setae.

Material examined: HOLOTYPE (male), ALLOTYPE (female) from the Plain-coloured Laughing Thrush—

Garrulax subunicolor subunicolor (Hodgson), Meinertzhagen collection 20023 (B.M. 1952-143), Laehen (Sikkim), February 26, 1952.

Remarks: This species resembles *Bruelia impressifrons* sp. nov. and allied forms in general morphological characters. The abdominal chaetotaxy in male is, however, more profuse than in the other allied forms. The male genitalia is more or less twice as long as in *Bruelia impressifrons* sp. nov. (*vide sup.*) Mesosomal plate is 2.45 times as long as in *B. impressifrons* and the parameres are also twice as long as in this species.

11. BRUELIA EFFRONTE Sp. Nov.

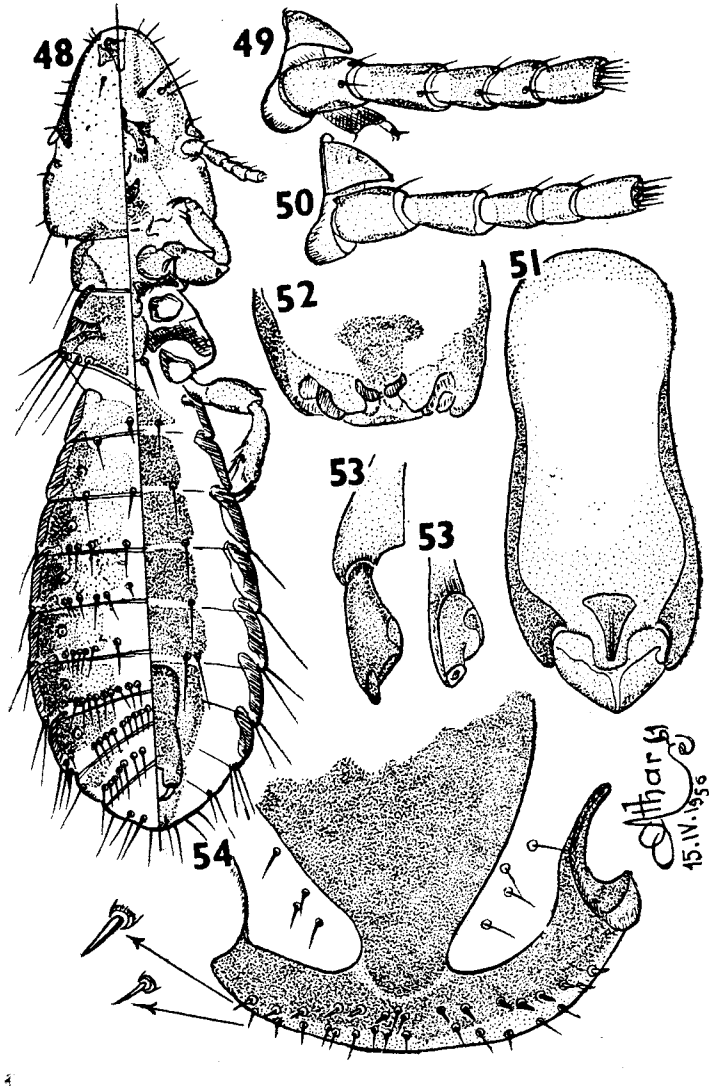
(text-figs. 48-54)

Type-host: The Blue-winged Laughing Thrush—*Garrulax squamatum* Goulden.

Male: 1.512×0.481 mm. Head 0.416×0.352 mm., cephalic index 1 : 0.0846. Prentennal region 0.222×0.287 mm., index 1 : 1.293. Antennae 0.179 mm., long. Conus 0.039 mm. Hind-head 0.194×0.352 mm., index 1 : 1.814. Prothorax 0.101×0.241 mm. Pterothorax 0.176×0.305 mm., with 5-6 setae along the posterio-lateral margin. Abdomen 0.879×0.481 mm. Tergal plates II-VII quadrate, VIII-IX triangular, II-III with one seta inferior to spiracles and one seta on each side of the inner margin of the plate, IV with one seta on each side of the inner margin of the plate and three post-spiracular setae, V with 5+1, VI with 5-7+1, VII with 9-11, VIII with 1+9 and IX with 6-7 setae on each side. Last segment with 6-9 setae along the posterior margin. Pleural plates II-III bare, IV-V and IX with one, VI-VII with two and VIII with three setae. Sternal plates simple, II triangular, III-VI quadrate each with a seta on postero-lateral angle.

Male genital armature shorter than *Bruelia novofacies* sp. nov. and longer than *B. impressifrons*, sp. nov. 0.2703 mm. long. Basal plate 1.5 times as long as in *B. impressifrons* and almost as long as in *Bruelia novofacies*. 0.1881 mm. long. Mesosomal plate 1.5 times as long as in *B. impressifrons*, 0.0484 mm. long. Parameres 1.5 time as long as in *B. impressifrons*. 0.0486 mm. long.

Female: 0.201×0.518 mm. Head 0.472×0.379 mm., cephalic index 1 : 0.788. Preantennal region 0.268×0.315 m.m., index 1 : 1.175. Hind-head 0.204×0.379



Text-Figs. 48-54. *Bruelia effronte* Sp. Nov. (48) Dorsal and ventral aspects of male, (49) male antenna, (50) female antenna, (51) male genital armature (52) mesosome, (53) two aspects of paramere, (54) a portion of subgenital plate showing marginal chaetotaxy.

mm., index 1 : 1.858. Prothorax 0.111×0.268 mm. Pterothorax 0.204×0.333 mm. Abdomen 1.342×0.518 mm. Abdominal chaetotaxy as in allied species. Subgenital plate as shown in the figure, cross piece of the anchor with 6+7 marginal setae.

Material examined: HOLOTYPE (male), ALLOTYPE (female) from Blue-winged Laughing Thrush—

Garrulax squamatum squamatum Gouldden, Meinertzhagen collection, 19879 (B.M. 1952—143), Kangpokoi (Manipur), January 29, 1952.

Remarks: This species resembles *Bruelia novofacies* sp. nov. and *Bruelia impressifrons* sp. nov. It however differs from *B. impressifrons* in the abdominal chaetotaxy and both of them in the shape of the head and male genital armature.

12. BRUELIA PENGYA (Ansari)

(text-figs. 55-59)

Painjunirmus pengya Ansari 1947 *Proc, Nat. Inst. Sci, India*, 13 : 285, fig. 10.

Type host: The Bengal Jungle Babbler—

Turdoides terricolor terricolor Hodgson.

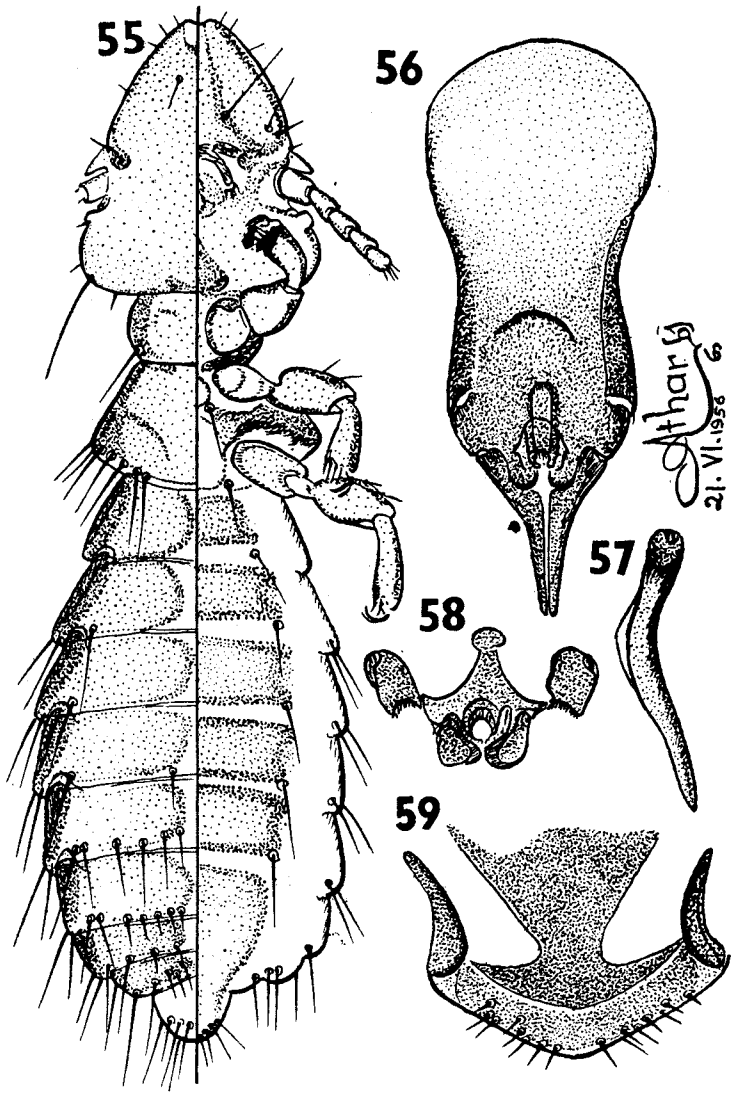
Male: 1.331×0.489 mm., yellowish white with distinct, narrow, slightly deeply coloured marginal markings; tergal and sternal plates. Head conical, resembling a fir-cone or a thimble, 0.387×0.331 mm., cephalic index 1 : 0.855. Preantennal region 0.204×0.271 mm. index 1 : 1.328. Marginal carina indented medianly and the anterior margin at this point hyaline. The indented part of the anterior marginal carina with a triangular-shape area of sclerotisation. Ventral carina interrupted and sclerotisation carried forward as a flattened surface each side and is more or less fused with the marginal carina. Chaetotaxy as described by Clay (1951). Antenna 0.181 mm. long. Conus 0.031 mm. long. Hind-head 0.183×0.331 mm., index 1 : 1.809. Temporal margin rounded inwardly towards the posterior margin. Marginal temporal carina narrow.

Prothorax rectangular, outer margin rounded anteriorly and then posteriorly, postero-lateral angle with a long seta, 0.093×0.193 mm. Pterothorax 0.204×0.342 mm., projecting laterally, posterior margin rounded on the abdominal segments, with 6-7 long setae.

Abdomen 0.755×0.489 mm., segments slightly projecting laterally, Tergal plates II-VII quadrate, interrupted in the middle, VIII-IX more or less triangular. II bare, III-V with a postero-spiracular seta, V with a seta in antero-posterior angle in addition, VI-VII with two postero-spiracular setae and four and five setae respectively along the posterior margin, VIII and IX with 1+3+3+1, X+XI with an inverted v-shaped genital apophyses furnished with three short setae. Pleural plates II-VIII well developed, rod-like with well developed re-entrant heads, each with 2-3 long setae, IX with four setae. X+XI with 3+5+5+3 setae along the rounded posterior margin. Sternal plates II-VII quadrangular, each with a seta in the postero-lateral angle. Subgenital plate triangular.

Male genitalia of the pattern seen in *Bruelia deficiens* (Piaget), 0.2358 mm. long. Basal plate 0.1537 mm. long, forming two-third of the total length, slightly more wide anteriorly than posteriorly, with a conspicuous lateral concavity in the middle. Parameres 0.0895 mm. long, narrow, fragile spike-like structures. Mesosomal plate 0.0567×0.0672 mm., transverse, of the shape shown in the figure.

Female: It resembles male in general shape of the body. It, however, differs from it in the abdominal chaetotaxy, 1.782×0.582 mm. Head 0.430×0.367 mm., cephalic index 1 : 0.853. Preantennal region 0.235×0.301 mm., index 1 : 1.281. Hind-head 0.195×0.367 mm., index 1 : 1.882. Prothorax 0.107×0.193 mm. Pterothorax 0.183×0.367 mm. Abdomen 1.102×0.582 mm. Tergal plates II-V bare, VI-VII with one postero-spiracular seta. Sternal plate II-VI with a seta on the postero-lateral angle. Pleural plates III-IX with two setae on each side. Subgenital plate with a conical anterior sclerotisation, placed on an arched cross-piece so as to form an anchor-shaped



Text-Figs, 55-59. *Bruelia pengya* Ansari (55) Dorsal and ventral aspects of male, (56) male genital armature, (57) paramere, (58) mesosome, (59) a portion of subgenital plate of female showing marginal chaetotaxy.

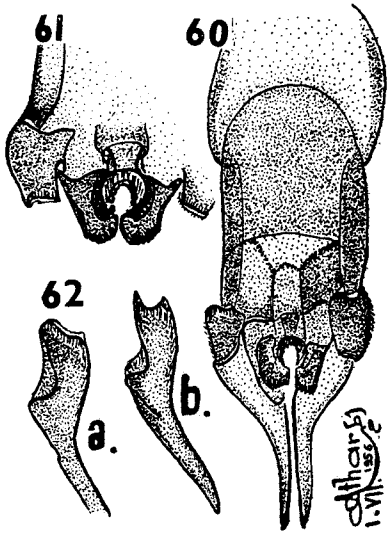
plate posterior margin with 5+3-4 setae on each side.

Material examined: PARATYPES (males and females) from the Bengal Jungle Babbler—

Turdoides terricolor terricolor Hodgson, Ansari collection, Lyallpur 1932. III. 16, 1932. II. 3, 1932. IV. 6, 1926, III. 8. Two females from *Turdoides somervillei* (Sykes) in British Museum collection 1951: 441 from Lucknow (Utrer Perdesh) are also not distinguishable from the above species.

Remarks: This species resembles *Bruelia deficiens* (Piaget) from *Cyanopica cyanus cooki* Bonaparte (Corvidae) and *Bruelia iliaci* (Denny) from *Turdoides musicus musicus* Linn. (Turdidae) in general body form and in the pattern of male genital armature. Parameres 1.7 times as long as in *Bruelia chilchil* Ansari. Basal plate 1.7 times as long as the parameres.

13. BRUELIA BREVIPENNIS
Sp. Nov.
(text-figs. 60-62)



Text-Figs. 60-62. *Bruelia brevipennis* Sp. Nov. (60) Male genital armature, (61) mesosome, (62) two aspects of paramere.

Type-host: Argyia squamiceps

Male: 1.571×0.528 mm. Head 0.426×0.371 mm., cephalic index 1: 0.8719. Preantennal region 0.241×0.269 mm., index 1: 1.162. Hind-head 0.185×0.371 mm., index 1: 2.0054. Antenna 0.233 mm. long. Conus 0.039 mm. long. Prothorax 0.101×0.203 mm. Pterothorax 0.203×0.417 mm., postero-lateral margin with 7 setae on each side. Abdomen 0.954×0.528 mm. Tergal plates as in *Bruelia pengya* (Ansari), II bare, III-V with one seta on each side of the inner margin of the plate, IV with 1-2, VIII with one seta inferior to spiracles, V-VII with two setae inferior to spiracles, VI with two, VII with five and VIII with four setae along the posterior margin, IX with 1+3 setae. X+XI with 5+5 setae. Pleural plates narrow with well drawn in proximal heads, II bare, III-VII with two, VIII with three and IX with six setae. Sternal plates as in *B. pengya*.

Male genital armature of the pattern seen in *Bruelia pengya*, but differs in having stronger parameres, narrow mesosomal plate. Male genitalia 0.2777 mm. long. Basal plate 0.1917 mm. long, 1.2 times as long as in *B. pengya*. Mesosomal plate 0.555 mm. long. Parameres slightly shorter and comparatively robust than in allied species, 0.0805 mm. long.

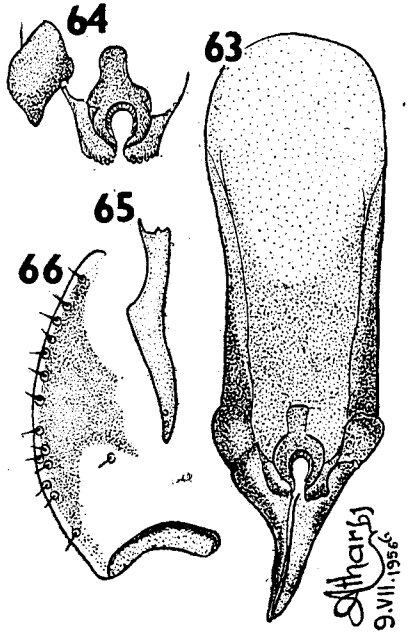
Material examined: HOLOTYPE (male), PARATYPES (2 males) from the Palestine Common Babbler—

Argya squamiceps, P. A. Buxton collection, I. B. E. 170, Jericho (Palestine), November 24, 1922.

Remarks: This species resembles *Bruelia pengya*, *B. chilchil*, *B. magnini*. Head is as in *B. pengya* and *B. chilchil*, ratio of preantennal region of head is 1: 0.77 against 1: 0.079 and 0.082, in these species respectively. (Forehead is longer than hind-head). I antennal segment 1.9 times as long as conus. Ratio of parameres and basal plate 1: 2.4 as against 1.5, 1.7 and 3.4 in *B. pengya B. magnini* and *B. chilchil* respectively. Mesosomal plate longer than broad. Ratio of mesosomal plate and parameres as in *B. pengya* as against *B. chilchil* (1: 1) and *B. magnini* (1: 2.4), parameres one-third of the total length of genital armature.

14. BRUELIA CHILCHIL Ansari

(text-figs. 63-66)



Text-Figs. 63-66. *Bruelia chilchil* Ansari (63) Male genital armature, (64) mesosome, (65) two aspects of parameres, (66) a portion of subgenital plate of female showing marginal chaetotaxy.

Bruelia chilchil Ansari 1955 *Proc. VII Pak. Sci. Conf. Bahawalpur (Abst. Biol.)* : 72.

Type-host: The Common Indian Babbler—

Turdoides c. caudata (Dumont).

Male: 1.651×0.528 mm. Head 0.389×0.342 mm., cephalic index 1 : 0.879. Preantennal region 0.213×0.278 mm., index 1 : 1.305. Antenna 0.221 mm. long. Conus 0.045 mm. long. Hind-head 0.176×0.342 mm., index 1 : 1.943. Prothorax 0.121×0.204 mm. Pterothorax 0.231×0.371 mm. Postero-lateral margin with six setae on each side. Abdomen 1.019×0.528 mm. Tergal plates as in *Bruelia pengya* Ansari, II and III bare, IV, V and VIII with one seta inferior to spiracles, V with one seta on each side of the inner margin of the plate, VI-VII with two setae inferior to spiracles and five setae along the posterior margin of the plate, IX segment with 1+4 setae, X+XI with 4-5 setae in a transverse row and eight setae along the posterior margin. Pleural plates III-VII with three, VIII with four and IX with 1+1 setae. Sternal plates as in the allied forms II-VI rectangular, each with a seta in the postero-lateral angle.

Male genital armature 0.2702 mm. long. Basal plate 1.3 times as long as in *Bruelia pengya*, 0.1945 mm. long. Mesosomal plate 1.1 times as long as in *Bruelia magnini*. Parameres are shorter than all the allied species, 0.0513 mm. long.

Female: 2.03×0.621 mm. Head 0.463×0.398 mm. long, cephalic index 1 : 0.859, Preantennal region 0.259×0.306 mm., index 1 : 1.181. Hind-head 0.204×0.398 mm., index 1 : 1.951. Prothorax 0.111×0.204 mm. Pterothorax 0.231×0.417 mm., with six long setae along the posterior margin. Abdomen 1.371×0.621 mm. Tergal plates II-V naked, VI-VIII with one seta inferior to spiracles, IX with a long and a short seta. Subgenital plate as shown in the figure with ten setae on each side. Pleural plate as in male, II bare, III-VI and VIII with three, VII with two and IX with four setae.

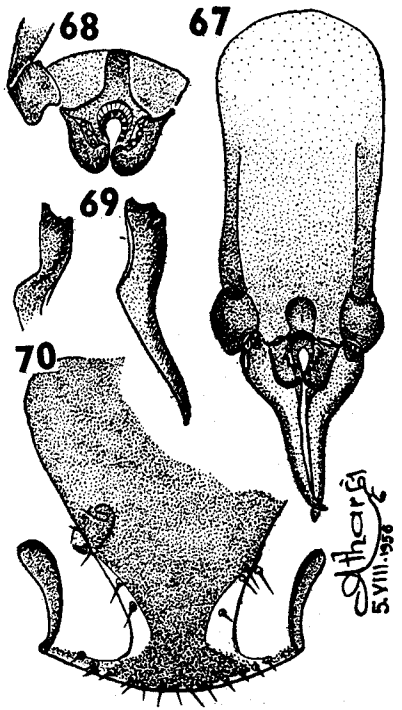
Material examined: One male and two females from the Indian Common Babbler—

Turdoides caudata caudata Dumont in Meinertzhagen collection 19670 (B.M. 1952-143), Bharatpur (Rajputana), January 3, 1952. PARATYPES (fifteen males and twenty females) from the type-host in Ansari collection, Lyallpur, 1932. V. 11.

Remarks: This species is separated from the allied forms by the combination of the following characters. Fore-head longer than hind-head, length of mesosomal plate shorter than its width, first antennal segment 1.4 times as long as conus. Parameres are one-fifth of the total length of the genital armature. The basal plate is 3.4 times as long as the parameres.

15. BRUELIA MAGNINI Sp. Nov.

(text-figs. 67-70)



Text-Figs. 67-70. *Bruelia magnini* Sp. Nov. (67) Male genital armature, (68) mesosome, (69) two aspects of paramere, (70) a portion of subgenital plate of female showing marginal chaetotaxy.

Type-host: Turdoides fulvus acaciae.

Male: 1.411×0.486 mm. Head 0.373×0.336 mm., cephalic index 1 : 0.901. Preantennal region 0.177×0.271 mm., index 1 : 1.531. Antenna 0.221 mm. long. conus 0.047 mm. Hind-head 0.196×0.336 mm., index 1 : 1.714. Prothorax 0.112×0.224 mm. Pterothorax 0.187×0.355 mm. Abdomen 0.794×0.486 mm. Tergal plates II-III bare, IV and VIII with one seta inferior to spiracles, V-VII with two setae inferior to spiracles, VI-VIII with four and IX with three setae along the posterior margin of the plate, last segment with eight setae along the posterior margin. Pleural plates III-VI and IX with two setae, VII and VIII with three setae on each side. Sternal plates as in the other allied forms.

Male genital armature is longer than in *Bruelia pengya* (Ansari) but shorter than in other allied species, 0.2641 mm. long. Basal plate is very slightly shorter than *B. pengya*, 0.1641 mm. long. Mesosomal plate is shorter than of all the allied species, 0.0461 mm. long. Parameres twice as long as in *B. chilchil* Ansari but slightly shorter than other allied species. Basal plate is 1.5 times as long as parameres, 0.1092 mm.

Female: 2.012×0.589 mm. Head 0.430×0.383 mm., cephalic index 1 : 0.891. Preantennal region 0.234×0.299 mm., index 1 : 1.277. Hind-head 0.196×0.383 mm., index 1 : 1.954. Prothorax 0.112×0.234 mm. Pterothorax 0.234×0.401 mm., with six setae on each side of postero-lateral margin. Abdomen 1.309×0.589 mm. Tergal plates as in allied species, VI-VIII with one seta inferior to spiracles, IX with two setae. Subgenital plate with 12+12 setae along the posterior margin.

Material examined: HOLOTYPE (male), ALLOTYPE (female) and PARATYPES (five males and five females, and three nymphs), from *Turdoides fulvus acaciae* in Meinertzhagen collection 17066-88, Sudan, December 1947.

Remarks: This species resembles *Bruelia pengya*, *Bruelia brevipennis*, *Bruelia chilchil* in all the salient characters. In this species the head is comparatively narrower in front. The fore-head is shorter than the head. The ratio of preantennal region and hind-head is 1 : 0.77-0.89 in the allied species while in this species this ratio is 1 : 1.11. The ratio of the mesosomal plate and parameres is 1 : 1-1.5 in the allied forms while 1 : 2.4 in this species. Ratio of parameres and basal plate is 2.4-3.4 in *Bruelia brevipennis* and *B. chilchil* respectively but is only 1 : 1.7 and 1.5 in *Bruelia pengya* and in the species under discussion.

16. BRUELIA NIVEUS Sp. Nov.

(text-figs. 71-76)

Type-host: *Turdoides leucopygia hartlandi.*

Male: 1.312 × 0.509 mm. Head 0.369 × 0.324 mm., cephalic index 1 : 0.878, conical, resembling a thimble. Preantennal region 0.185 × 0.259 mm., index 1 : 1.4. Marginal carina indented medially, anterior margin at this point moderately concave and hyaline, indented portion with a triangular sclerotisation. Ventral carina as in *Bruelia pengya*. Antenna 0.208 mm. long. Conus 0.026 mm. Hind-head 0.184 × 0.324 mm., index 1 : 1.978. Temples rounded, posterior margin like an arch. Marginal temporal carina narrow.

Prothorax 0.102 × 0.221 mm. transverse, lateral margin straight and slightly projecting laterally, latero-posterior angle with a long seta. Pterothorax 0.176 × 0.342 mm., projecting laterally, posterior margin rounded on the abdomen, beset with 6+4 setae on each side of the middle line.

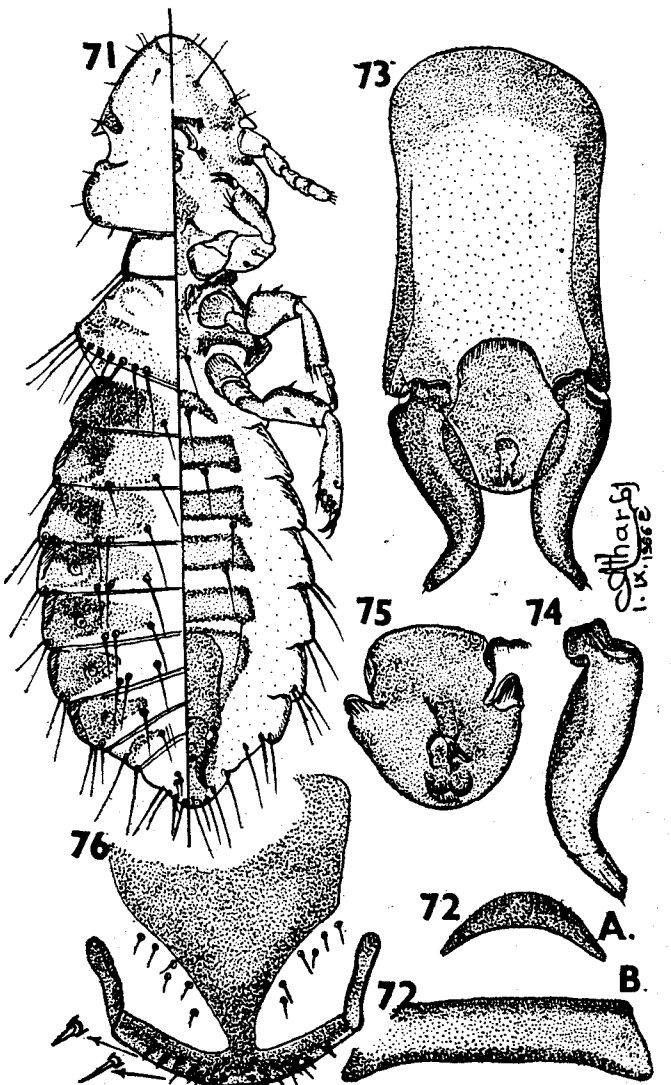
Abdomen 0.778 × 0.509 mm. Tergal plates as in *Bruelia pengya*, II-IX with a moderately long postero-anterior seta, III (sometimes II also) with one postero-spiracular seta, IV-VII with two postero-spiracular setae, VIII with one median and a short antero-posterior seta on each side, IX with three setae, X+XI with 3-4 setae along the inverted V-shaped genital aperture and 6+3 marginal setae. Pleural plates well developed with conspicuous, rounded reentrant heads, III with one, IV-V with two, VI-VII with three, VIII with four, IX with 2+2 setae. Sternal plate II menuscus-like in form, III-VI transverse with slightly projecting posterior margin, each with one seta on each postero-lateral angle. Subgenital plate conical as in *Bruelia pengya*.

Male genital armature 0.2917 mm. long. Basal plate 0.1833 mm. long, posterior and anterior width almost equal 0.1389 mm., sides subparallel with slight antero-lateral concavity. Parameres 0.1208 mm. long, robust and steadily reducing in width, towards the tip, turned outwards from about two-thirds of the total length onwards, proximal heads characteristic. Mesosomal plate 0.1667 × 0.0702 mm., broad shield-shaped with rounded posterior margin, resembling an antique morian helmet with ear coverts.

Female: 1.851 × 0.556 mm. Resembles male in all respects. Head 0.436 × 0.371 mm., cephalic index 1 : 0.851. Preantennal region 0.232 × 0.296 mm., index 1 : 1.276. Hind-head 0.204 × 0.371 mm., index 1 : 1.818. Prothorax 0.121 × 0.232 mm. Pterothorax 0.176 × 0.371 mm., postero-lateral margin with eight setae on each side. Abdomen 1.185 × 0.556 mm. Tergal plates II-VIII with an antero-posterior seta, IV-VII and VIII with one long seta and V-VI with two postero-spiracular setae, IX with one short, one long and one short seta on each side. Pleural plates III with one, IV with two, V and VII with three, VI and VIII with four, IX with 1+5+3 and X+XI with one long and one short submarginal seta. Sternal plates quadrate, narrow as compared to male, II-VI with a long seta in the postero-lateral angle. Subgenital plate of the shape shown in the figure, cross piece of the anchor with 6+5 setae on each side.

Material examined: HOLOTYPE (male), ALLOTYPE (female) from *Turdoides leucopygia hartlandi* in British Museum (Natural History) collection 1954-137-ML-104. Luansbya river (North Rhodesia), October 3, 1953.

Remarks: This species resembles *Bruelia pengya* Ansari and allied species in the form of the head. From which it can be distinguished by the abdominal chaeotaxy, shape of the prothorax and pterothorax, and male genitalia. Head in *B. pengya* is more or less pointed in frontal region while in this species it is broadly rounded in front. The shape of the parameres and mesosomal plate are definitely of different pattern and of robust built.



Text-Figs. 71-76. *Bruelia niveus* Sp. Nov. (71) Dorsal and ventral aspects of male, (72) sternal plate (A) II and (B) V, (73) male genital armature (74) paramere, (75) mesosome, (76) a portion of subgenital plate of female showing marginal chaetotaxy.

17. BRUELIA BRUELIODES Sp. Nov.

(text-figs. 77-80)

Type-host : Turdoides aylemeri aylemeri.

Male : 1.492×0.509 mm. Head 0.370 ×0.333 mm., cephalic index 1 : 0.90, Preantennal region 0.185 ×0.277 mm., index 1 : 1.497. Antennal 0.2 mm. long. Conus 0.037 mm. Hind-head 0.185×0.333 mm., index 1:1.8, Prothorax 0.093× 0.213 mm, Pterothorax 0.139×0.342 mm., with seven setae on each side of the postero-lateral margin. Abdomen 0.944 ×0.509 mm. Tergal plates II-VIII with one seta on each side of the inner margin of the plate, III, IV and VIII with one postero-spiracular seta also, V-VII with two post-spiracular setae, IX with three setae in a row. Sternal plates as shown in the figure, each with a seta on each side of postero-outer margin of the plate. Pleural plate IV with one, V-VII and IX with two setae, VIII with three setae and IX with 1+2+4+1 setae along the margin.

Male genital armature : Basal plate slightly longer than *Bruelia niveus* sp. nov. and shorter than *Bruelia mahrastran* sp. nov. 0.2 mm. long, slightly wider posteriorly than anteriorly, sides almost straight. Parameres of the form seen in *Bruelia niveus*, considerably pointed and abruptly turned outwards in the distal one-third, 0.0781 mm. long. Mesosomal plate quadrate, of the pattern seen in *Bruelia niveus*, somewhat inverted in the specimen under observation, it is therefore cannot be accurately drawn, half as long as in *Bruelia mahrastran* and one-fourth as long as in *Bruelia niveus*, 0.0378 mm. long.

Female : 1.752×0.539 mm. Head 0.417×0.388 mm., cephalic index 1 : 0.931. Preantennal region 0.218×0.324 mm., index 1 : 1.521. Hind-head 0.204×0.388 mm., index 1 : 1.902. Prothorax 0.101× 0.232 mm. Pterothorax 0.166×0.388 mm., with five setae along the postero-lateral margin. Abdomen 1.204×0.539 mm. Tergal plates II-IX with one seta on each side of the inner margin of the plate. IV-VII with one seta inferior to spiracles, IX with two short and a long seta along the posterior margin. Pleural plates III with one, IV-VII with two, VIII with four and IX with 3+5 setae. Last segment with one marginal seta. Subgenital plate ractangular anteriorly, triangular posteriorly, placed on a meniscus cross piece, marginally beset with 1+8+4 setae on each side.

Material examined : HOLOTYPE (male), ALLOTYPE (female) from *Turdoides aylmeri aylmeri* in Meinertzhagen collection 18686, Somaliland, February 1949.

Remarks : This species resembles *Bruelia niveus* sp. nov. in all the salient characters. It, however, differs from it in male genitalia and female subgenital plate. Mesosomal plate is one-fourth of the mesosomal plate shown in *B. niveus* and one-half as long as in *Bruelia mahrastran*. Parameres are considerably shorter than the two species. Parameres are considerably shorter than seen in the two species. The parameres also differ in shape and detail of the proximal heads.

18. BRUELIA MAHRASTRAN Sp. Nov.

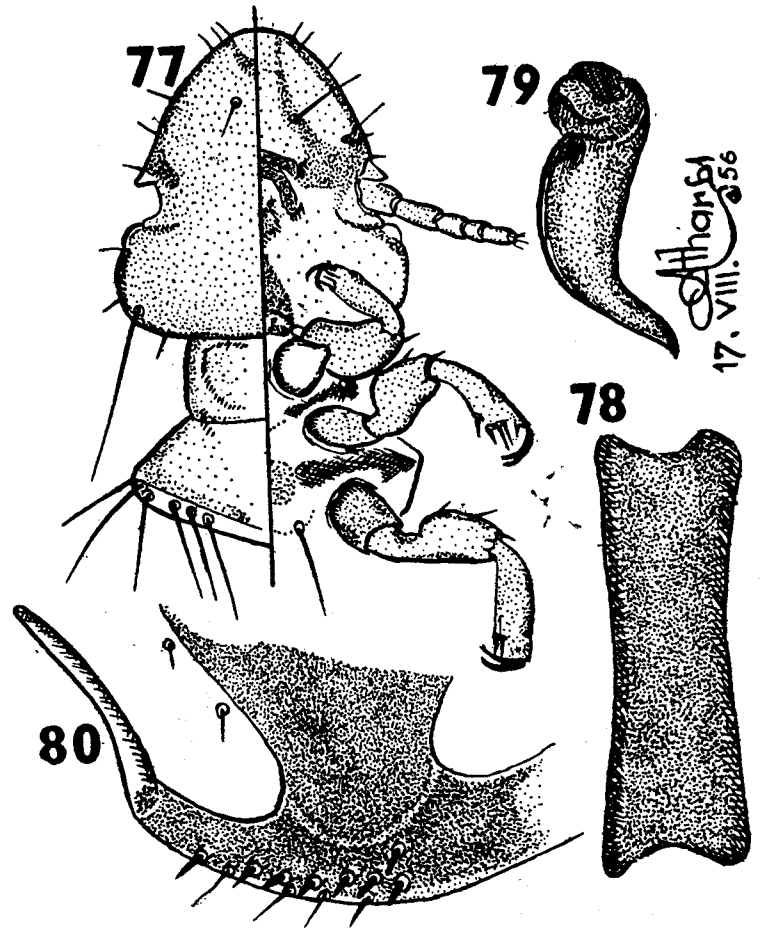
(text-figs. 81-83)

Type-host : The Bombay Babbler — *Turdoides somervillei* (Sykes).

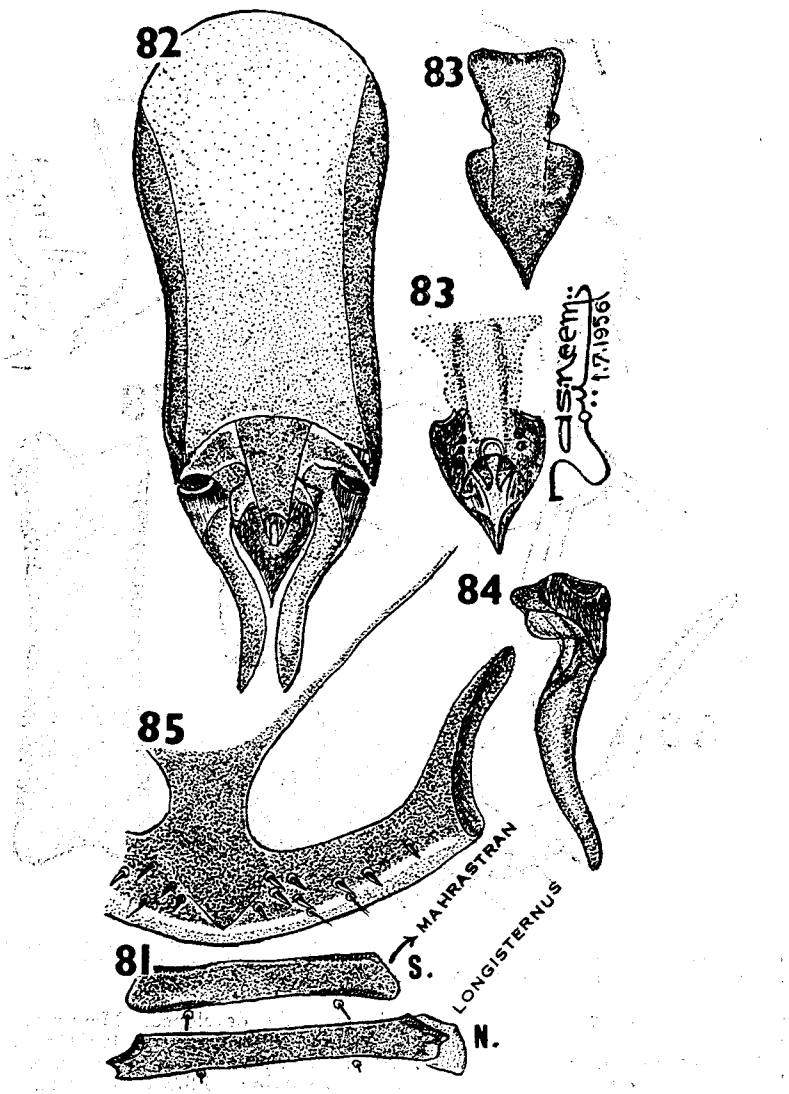
Male : 1.322×0.601 mm. Head 0.389 ×0 379 mm., cephalic index 1 : 0.974. Preantennal region 0.185×0.324 mm., index 1 : 1.751. Antenna 0.254 mm. long. Conus 0.039 mm. long. Hind-head 0.204×0.379 mm., index 1 : 1.835. Prothorax 0.111×0.231 mm. Pterothorax 0.185×0.426 mm., postero-lateral margin with seven setae. Abdomen 0.750× 0.601 mm. Tergal plates II-VIII with one seta in the postero-inner margin of the plates, IV-VII with two setae inferior to spiracles, VIII with one post-spiracular seta and one beyond it. IX with a row of six setae, X+XI with three short setae. Sternal plates narrow and transverse but not of the form seen in *Bruelia longisternus* sp. nov. and other allied forms. Pleural plates III and IV with one, V with two, VI and VII with three, VIII and IX with four setae on each side, X+XI with 13+13 marginal setae.

Male genital armature 0.3109 mm. long. Basal plate as shown in *Bruelia sternotypicus* sp. nov. (*vide* supra), 0.2243, mm. long, Parameres of the type seen in *Bruelia longisternus* and allied forms, 0.1352 mm. long, proximal heads typically developed. Mesosomal plate elongate and pointed, 0.0892 mm. long, of the shape shown in the figure.

Female : 1.873×0.601 mm. Head 0.426×0.417 mm., cephalic index 1 : 0.978. Preantennal region 0.213×0.361 mm., index 1 : 1.695. Hind-head 0.213×0.417 mm., index 1 : 1.958. Prothorax 0.111×



Text-Figs. 77-80. *Bruelia brueliodes* Sp. Nov. (77) Dorsal and ventral aspects of head and thorax of male, (78) sternal plate V, (79) paramere, (80) a portion of the subgenital plate of female showing marginal chaetotaxy.



Text-Figs. 81-85. *Bruelia mahrastran* Sp. Nov. (81) Sternal plate V (S) *B. mahrastran* and (N) *B. longisternus*, (82) male genital armature. (83) two aspects of mesosome (84) paramere, (85) a portion of subgenital plate showing marginal chaetotaxy.

0.231 mm. Pterothorax 0.241 × 0.426 mm., with six setae on each side of posterior margin. Abdomen 1.213 × 0.601 mm. Tergal plates II-VIII with a seta in the inner margin of the plate, IV-VII with a seta inferior to the spiracle, IX with a short long seta on each side of the middle line. Sternal plates as in the male. Pleural plates III with one, IV-V with two, VI and VII with three, VIII with four, and IX with 2+4+3 setae. Last segment with three short setae. Subgenital plate with 5-6+5 setae arranged as shown in the figure.

Material examined: HOLOTYPE (male), ALLOTYPE (female) from the Bombay Babbler—*Turdoides somervillei* (Sykes), in Meinertzhagen collection, 8442-3, Bombay, February 1937, PARATYPES (three males and eight females), data as given above.

Remarks: This species resembles *Bruelia niveus* sp. nov. and *Bruelia brueliodes* sp. nov. It differs from both of them in the shape of the forehead, sternal plates and male genitalia. According to the form of male genital armature it can be conveniently grouped with *Bruelia longisternus* sp. nov. and allied species. It differs from this group in the head which is longer than broad and in the form of sternal plates which are simple and uniformly sclerotised and pigmented throughout.

SUMMARY

All the known species of *Bruelia* from the babblers and laughing thrushes (Timallidae) are discussed in detail. Fifteen new species are described. The species of previous authors are also redescribed and figured.

POSTSCRIPT-CORRECTIONS

1. I most recently described *Bruelia saghirae* var. *capitus* nov. from *Turdus fuscater quindio* Chapman (*Pak. Jour. Hlth.*, 5, 56, figs. 5*a-e*). Dr. Clay has invited my attention to article XVII of the International Rules of Nomenclature, which says 'any name of less than specific rank published after 1950 (including a variety) is not valid unless in its original publication the author clearly regards it as of specific rank.' In order to prevent future misunderstanding regarding this name (*B. capitus*), I take this opportunity to record that I actually considered *capitus* at the time of publication as a subspecies of *Bruelia saghirae*. The two allied forms differ in the form of the head, male genitalia, dorsal chaetotaxy and female subgenital plate.

2. *Penenirmus serwatae* Ansari (*Pak. Jour. Hlth.*, 5, 73, fig. 19*a-g*). These specimens were re-examined. A critical study of the head and male genitalia has convinced me that these are referable to the genus *Sturnidoecus*. The parameres in the specimen under study are distorted and therefore erroneously referred to *Penenirmus* while the head is typically that of the *Sturnidoecus*. In *Penenirmus* the parameres are continuous with the basal plate and have no sclerotised head as in *Sturnidoecus*. It is my pleasant duty to acknowledge my thanks to Dr. Clay for very kindly drawing my attention to these errors.

Table I.—Showing Dimensions of Various Parts of the Body in BRUELIA Species Occurring on Babblers and Laughing Thrushes (Timaliidae).

Bruelia Species	Head	Preantennal region	Hind-head
1. *antennatus* ...	0.458×0.418 (1 : 0.913)	0.219×0.351 (1 : 1.603)	0.239×0.418 (1 : 1.749)
2. *avinus* ...	0.361×0.352 (1 : 0.975)	0.157×0.296 (1 : 1.885)	0.204×0.352 (1 : 1.725)
3. *sehri* ...	0.341×0.325 (1 : 0.959)	0.151×0.265 (1 : 1.755)	0.191×0.325 (1 : 1.702)
4. *nipalensis* ...	0.405×0.426 (1 : 1.052)	0.166×0.352 (1 : 2.121)	0.239×0.426 (1 : 1 762)
5. *longisternus* ...	0.388×0.407 (1 : 1.049)	0.166×0.333 (1 : 2.003)	0.232×0.407 (1 : 1.833)
6. *sternotransversa* ...	0.352×0.351 (1 : 0.997)	0.176×0.287 (1 : 1.631)	0.176×0.351 (1 : 1.994)
7. *sternotypicus* ...	0.388×0.417 (1 : 1.075)	0 185×0.333 (1 : 1.800)	0.204×0.417 (1 : 2.044)
8. *ventratum* ...	0.370×6 371 (1 : 1.003)	0.185×0.296 (1 : 1.560)	0.185×0.371 (1 : 2.005)
9. *impressifrons* ...	0.458×0.336 (1 : 0.734)	0.252×0.281 (1 : 1.115)	0.206×0.336 (1 : 1.631)
10. *novofacies* ...	0.411×0.321 (1 : 0.782)	0.234×0.261 (1 : 1.115)	0.177×0.327 (1 : 1.848)
11. *effronte* ...	0.416×0.352 (1 : 0.846)	0.222×0.287 (1 : 1.293)	0.194×0.352 (1 : 1.814)
12. *pengya* ...	0.387×0.331 (1 : 0 855)	0.204×0.271 (1 : 1.328)	0.183×0.331 (1 : 1.809)
13. *brevipennis* ...	0.426×0.371 (1 : 0 871)	0.241×0 269 (1 : 1.162)	0.185×0.371 (1 : 2.005)
14. *chilchil* ...	0.389×0.342 (1 : 0.879)	0 213×0.278 (1 : 1.305)	0.176×0.342 (1 : 1.943)
15. *magnini* ...	0.373×0.336 (1 : 0.901)	0.177×0.271 (1 : 1.531)	0.196×0.336 (1 : 1.714)
16. *brueliodes* ...	0.370×0.333 (1 : 0.900)	0.185×0.277 (1 : 1.497)	0.185×0.333 (1 : 1.800)
17. *niveus* ...	0.369×0.324 (1 : 0.780)	0.185×0.259 (1 : 1.400)	0.184×0 324 (1 : 1.978)
18. *mahrastran* ...	0.389×0.379 (1 : 0.974)	0.185×0.324 (1 : 1.751)	0.204×0.379 (1 : 1.835)

N.B.—Ratio between the length and width is given in parentheses.

Table I.—*Continued*

Bruelia Species	Prothorax	Pterothorax	Abdomen	Preantennal : Hind-head	Abdomen : Basal plate
1. *antennatus* ...	0.107×0265 (1 : 2.47)	0.194×0.347 (1 : 1.79)	0.821×0.495	1 : 1.09	1 : 0.267
2. *avinus* ...	0.101×0.204 (1 : 2.02)	0.166×0 342 (1 : 2.06)	0.687×0.518	1 : 1.29	1 : 0.305
3. *sehri* ...	0.071×0.195 (1 : 2.74)	0.121×0.295 (1 : 2.44)	0.561×0.395	1 : 1.26	1 : 0.337
4. *nipalensis* ...	0.121×0.287 (1 : 2.18)	0.166×0.435 (1 : 2.62)	0.694×0.621	1 : 1.66	1 : 0.358
5. *longisternus* ...	0.111×0.259 (1 : 2.33)	0.213×0 426 (1 : 2.00)	0 831×0.629	1 : 1.34	1 : 0.211
6. *sternotransversa* ...	0.101×0.231 (1 : 2.28)	0.166×0.379 (1 : 2.28)	0.787×0.555	1 : 1 00	1 : 0.248
7. *sternotypicus* ...	0.101×0.259 (1 : 2.56)	0.185×0.426 (1 : 2.31)	0.963×0.648	1 : 1.09	1 : 0.252
8. *ventratum* ...	0.101×0.231 (1 : 2.28)	0.166×0.379 (1 : 2.28)	0.824×0.574	1 : 1.00	1 : 0.200
9. *impressifrons* ...	0.112×0.233 (1 ; 2.08)	0.187×0.299 (1 : 1.59)	1.122×0.392	1 : 0.82	1 : 0.112
10. *novofacies* ...	0.112×0.234 (1 : 2.18)	0.196×0.318 (1 : 1.62)	0.981×0.448	1 : 0.76	1 : 0.201
11. *effronte* ...	0.101×0.241 (1 : 2.38)	0.176×0.305 (1 : 1.73)	0.879×0.481	1 : 0.88	1 : 0.214
12. *pengya* ...	0.092×0.193 (1 : 2.09)	0.204×0.342 (1 : 1.67)	0.755×0.489	1 : 0.89	1 : 0.203
13. *brevipennis* ...	0.101×0.203 (1 : 2.01)	0.203×0.417 (1 : 2.05)	0.954×0.528	1 : 0.77	1 : 0.201
14. *chilchil* ...	0.121×0.204 (1 : 1.68)	0.231×0.371 (1 : 1.17)	1.019×0.528	1 : 0.82	1 : 0.191
15. *magnini* ...	0.112×0.224 (1 : 2.00)	0.187×0.355 (1 : 1.89)	0.794×0.486	1 : 1.11	1 : 0.207
16. *brueliodes* ...	0.093×0.213 (1 : 2.29)	0.139×0.342 (1 : 2.46)	0.944×0.509	1 : 1.00	1 : 0.212
17. *niveus* ...	0.102×0.221 (1 : 2.16)	0.176×0.342 (1 : 1.94)	0.778×0.509	1 : 0.99	1 : 0.236
18. *mahrastran* ...	0.111×0.231 (1 : 2.08)	0.185×0.426 (1 : 2.31)	0.750×0.601	1 : 1.10	1 : 0.291

N.B.—Ratio between the length and width is given in parentheses.

Table II.—Showing Dimensions of Male Genital Armature in BRUELIA Species Occurring on Babblers and Laughing Thrushers (Timaliidae).

Bruelia Species	Total length of male genitalia (TG)	Length of basal plate (BP)	BP × index = TG	Mesosome length × width (L : W).	Length of paramere	Paramere : basal plate	Mesosome: paramere 1 :—....	BP : abdomen	Abdomen BP :
1. *antennatus* ...	0.2568	0.2194	1.27	0.0478 × 0.0806 (1 : 1.7)	0.0478	5.3	1.1	3.19	0.267
2. *avinus* ...	0.2946	0.2103	1.4	0.0890 × 0.1026 (1 : 1.2)	0.1026	2.05	1.1	3.27	0.305
3. *sehri* ...	...	0.1894	...	0.0890 × 0.1025 (1 : 2.2)	0 0757	2.5	1.9	2.92	0.337
4. *nipalensis* ...	0.3405	0.2487	1.4	0.1189 × 0.1189 (1 : 1)	0.1001	2.5	0.9	2.79	0.358
5. *longisternus* ...	0.2648	0.1751	1.51	0.0648 × 0.0811 (1 : 1.3)	0 0946	1.8	1.4	4.73	0.211
6. *sternotransversa*	0.2649	0.1946	1.36	0.0675 × 0.0675 (1 : 1)	0.0703	2 7	1.04	4.03	0.248
7. *sternotypicus* ...	0.2811	0.2432	1.15	0 0783 × 0 0783 (1 : 1)	0.0783	3.1	1.0	3.96	0.252
8. *ventratum* ...	0.2513	0 1648	1.53	0.0784 × 0.0919 (1 : 1.2)	0.0914	1.8	1.2	5 00	0 200
9. *impressifrons* ...	0.1941	0 1261	1.54	0.0331 × 0.0641 (1 : 1.9)	0.0331	3.8	1.0	8.83	0.112
10. *novofacies* ...	0.3405	0.1973 × 0.1216	1.72	0.0784 × 0.1216 (1 : 1.55)	0.0784	2.5	1.0	5 22	0.201
11. *effronte* ...	0.2703	0.1881	1.43	0.0486 × 0.1135 (1 : 1.33)	0.0486	3.9	1.0	4.67	0.214
12. *pengya* ...	0.2358	0.1537	1.53	0 0667 × 0.0672 (1 : 1.2)	0.0895	1.7	1.6	4.91	0.203
13. *brevipennis* ...	0.2777	0.1917 × 0.0944	1.44	0.0555 × 0.0371 (1 : 0.7)	0 0805	2.4	1.5	4.97	0.201
14. *chilchil* ...	0.2702	0.1945 × 0.784	1.38	0 0513 × 0 0432 (1 : 0 8)	0.0513	3.4	1 0	5.23	0 191
15. *magnini* ...	0.2641	0.1641	1.61	0.0461 × 0.0431 (1 : 0 9)	0.1091	1.5	2.4	4.84	0.207
16. *brueliodes* ...	...	0.2001	...	0 0378 ...	0.0781	2.5	2.1	4.72	0.212
17. *niveus* ...	0.2917	...	1.58	0.1667 × 0.0707 (1 : 0.4)	0.1208	1.5	0.7	4.25	0 2 6
18. *mahrastran* ..	0.3109	0.2843 × 0.1389	1.38	0.0892 × 0.0892 (1 : 1)	0.1352	1.6	1.5	3.34	0.291

Table III—Showing the Length of Antennal Segments and Conus of BRUELIA Species Occurring on Babblers and Laughing Thrushes (Timaliidae).

Bruelia Species	I (Width X—)	II	x II=I	III	IV	V	Total	Conus	x C=I	x C=Total
1. *antennatus* ...	1.37 × 0.45 (3.05)	0.61	2.24	0.47	0.34	0.29	0.313	0 39	3 C	8.07 C
2. *avinus* ...	0.61 × 0.37 (1.65)	0.53	1.16	0.31	0.26	0.37	0.213	0 23	3 C	9.26 C
3. *sehri* ...	0.45 × 0.31 (1.45)	0.50	0.09	0.37	0.31	0 34	0.181	0.39	1.2 C	4.62 C
4. *nipalensis* ...	0.87 × 0.55 (1.59)	0.66	1.32	0.50	0.34	0.37	0.258	0.29	3 C	8.89 C
5. *longisternus* ...	0.61 × 0.50 (1.22)	0.63	0.09	0 51	0.37	0 39	0.263	0.18	3.4 C	14.61 C
6. *sternotransversa* ...	0.61 × 0 39 (1.55)	0.58	1.05	0.47	0.39	0.42	0.233	0 21	2 9 C	11.09 C
7. *sternotypicus* ...	0 61 × 0.50 (1.48)	0.63	1.10	0 45	0.45	0.45	0.239	0 34	2.2 C	6.79 C
8. *ventratum* ...	0.74 × 0.45 (1.69)	0.58	1.3	0.50	0.39	0.37	0.250	0.29	3 C	8.62 C
9. *impressifrons* ...	0.37 × 0.23 (1.61)	0.45	0.08	0.31	0.29	0.37	0 175	0.37	1 C	4 73 C
10. *novofacies* ...	0.47 × 0.29 (1.62)	0.51	0.09	0.39	0.29	0 37	0.179	0.31	1.5 C	5 77 C
11. *effronte* ...	0 39 × 0.26 (1.50)	0.47	0.09	0.39	0.34	0.39	0.179	0.39	1 C	4.59 C
12. *pengya* ...	0.51 × 0.34 (1.50)	0.45	1.13	0.34	0.34	0 34	0.181	0.31	1.6 C	5.84 C
13. *brevipennis* ...	0.76 × 0.39 (1.95)	0.61	1.25	0.37	0 45	0.37	0.233	0.39	1.9 C	5.97 C
14. *chilchil* ...	0.63 × 0.34 (1.95)	0.63	1.00	0.47	0.34	0.34	0.221	0.45	1.4 C	4.91 C
15. *magnini* ...	0.69 × 0.37 (1.86)	0.58	1.20	0.39	0.34	0.34	0.221	0.47	1.5 C	4.69 C
16. *brueliodes* ...	0.51 × 0.31 (1.64)	0.55	0.91	0.37	0.34	0.39	0.200	0.37	1.4 C	5.41 C
17. *niveus* ...	0.51 × 0.37 (1.37)	0.51	1.0	0.34	0 34	0.39	0.208	0.26	1.9 C	8.00 C
18. *mahrastran* ...	0.69 × 0.47 (1.47)	0.65	1.05	0.47	0 37	0.39	0.254	0.39	1.9 C	6.39 C

Table IV.—Showing Dorsal Abdominal Chaetotaxy in BRUELIA Species Occurring on Babblers and Laughing Thrusher (Timaliidae).

Bruelia Species	II	III	IV	V	VI	VII	VIII	IX	X+XI	Ptero-thorax
1. *antennatus*	... −1+1−	−1+1−	1——1	2——2	2——2	1——1	4+4	3+2+2+3	...	7+7
2. *avinus*	... −1+1−	−1+1−	2+1+1+2	2+1+1+2	2+1+1+2	2+1+1+2	1+1+1+1	−4+4−	3+3	6+6
3. *sehri*	... −1+1−	−1+1−	2+1+1+2	2+1+1+2	2+1+1+2	2+1+1+2	1+3+4+1	4+6+6+4	...	5+5
4. *nipalensis*	... −1+1−	1+1+1+1	2+1+1+2	2+1+1+2	2+1+1+2	2+1+1+2	1+1+1+1	−6+6−	3+3	6+6
5. *longisternus*	... −1+1−	1+1+1+1	2+1+1+2	2+1+1+2	2+1+1+2	2+1+1+2	1+1+1+1	2+5+5+2	3+3	7+7
6. *sternotransversa*	... −1+1−	1+1+1+1	2+1+1+2	2+1+1+2	2+1+1+2	2+1+1+2	1+1+1+1	1+4+5+1	3+3	8+8
7. *sternotypicus*	... −1+1−	1+1+1+1	2+1+1+2	2+1+1+2	2+1+1+2	2+1+1+2	1+1+1+1	−4+4−	3+3	7+7
8. *ventratum*	... −1+1−	1+1+1+1	2+1+1+2	2+1+1+2	2+1+1+2	2+1+1+2	1+1+1+1	−5+5−	3+3	5+5
9. *impressifrons*	... −1+1−	−1+1−	1+1+1+1	1+1+1+1	2+1+1+2	3+1+1+3	3+2+2+3	2+2+2+2	...	3+3
10. *novofacies*	... −1+1−	1+1+1+1	5+1+1+5	1+6+6+1	1+6+5+1	1+8+8+1	1+6+6+1	1+7+7+1	1+1	5+5
11. *effronte*	... 1+1+1+1	1+1+1+1	3+1+1+3	5+1+1+5	7+1+1+7	1+10+10+1	1+9+9+1	1+4+4+1	3+3	4−5+5
12. *pengya*	... ...	1——1	1——1	1+1+1+1	2+4+4+3	2+5+5+2	1+3+3+1	1+3+3+1	3+3	7+7
13. *brevipennis*	... ...	−1+1−	1——1	1+3+2+1	2+5+4+2	2+6+6+2	1+5+5+1	1+4+4+1	5+5	7+7−8
14. *chilchil*	... ...	...	1——1	1+1+1+1	2+4+5+2	2+5+4+2	1+4+3+1	1+4+4+1	4+5	6+6
15. *magnini*	... ...	...	1——1	2+2+2+2	2+4+4+2	2+4+4+2	1+4+4+1	1+3+3+1	3+4	7+7
16. *brueliodes*	... −1+1−	−1+1−	1+1+1+1	2+1+1+2	2+1+1+2	2+1+1+2	1+1+1+1	−3+3−	3+3	7+7
17. *niveus*	... −1+1−	1+1+1+1	2+1+1+2	2+1+1+2	2+1+1+2	2+1+1+2	1+1+1+1	−3+3−	3+4	9+9
18. *mahrastran*	... −1+1−	1+1+1+1	2+1+1+2	2+1+1+2	2+1+1+2	2+1+1+2	1+2+2+1	4−6+6−	3+3	7+7

HOST-PARASITE INDEX

TIMALIIDAE	*BRUELIA* SPECIES
1. *Argyia squamiceps*	*brevipennis* sp. nov.
2. *Cutia n. nipalensis* Hodgson	*longisternus* sp. nov.
3. *Garrulax a. albogularis* Goulden	*sternotransversa* sp. nov.
4. *Garrulax a. affine* Hodgson	*impressifrons* sp. nov.
5. *Garrulax lineatum grisescentior* (Hartart)	*sehri* Ansari
6. *Garrulax p. pectoralis* (Goulden)	*sternotypicus* sp. nov.
7. *Garrulax r. ruficollis* Jard. & Selby	*ventratum* sp. nov.
8. *Garrulax squamatum* Goulden	*effronte* sp. nov.
9. *Garrulax striatum sikkimensis* Vigors	*antennatus* sp. nov. *nipalensis* sp. nov.
10. *Garrulax s. subunicolor* (Hodgson)	*avinus* sp. nov. *novofacies* sp. nov.
11. *Turdoides a. aylemeri*	*brueliodes* sp. nov.
12. *Turdoides c. caudata* Dumont	*chilchil* Ansari
13. *Turdoides fulvus acaciae*	*magnini* sp. nov.
14. *Turdoides leucopygia hartlandi*	*niveus* sp. nov.
15. *Turdoides somervillei* (Sykes)	*mahrastran* sp. nov.
16. *Turdoides t. terricolor* Hodgs	*pengya* Ansari

LIST OF *Bruelia* SPECIES DISCUSSED

BRUELIA SPECIES	TIMALIIDAE
1. *antennatus* sp. nov.	*Garrulax striatum sikkimensis* Vigors.
2. *avinus* sp. nov.	*Garrulax s. subunicolor* Hodgson
3. *brevipennis* sp. nov.	*Argyia squamiceps*
4. *brueliodes* sp. nov.	*Turdoides a. aylemeri*
5. *chilchil* Ansari	*Turdoides c. caudata* (Dumont)
6. *effronte* sp. nov.	*Garrulax squamatum* Goulden.
7. *impressifrons* sp. nov.	*Garrulax a. affine* Hodgson.
8. *longisternus* sp. nov.	*Cutia n. nipalensis* Hodgson.
9. *magnini* sp. nov.	*Turdoides fulvus acaciae*
10. *mahrastran* sp. nov.	*Turdoides somervillei* (Sykes).
11. *nipalensis* sp. nov.	*Garrulax striatum sikkimensis* Vigors
12. *niveus* sp. nov.	*Turdoides leucopygia hartlandi*
13. *novofacies* sp. nov.	*Garrulax s. subunicolor* Hodgson.
14. *pengya* Ansari	*Turdoides t. terricolor* Hodgson.
15. *sehri.* Ansari	*Garrulax lineatum griscentior* (Hartart)
16. *sternotransversa* sp. nov.	*Garrulax a. albagularis* Goulden
17. *sternotypicus* sp. nov.	*Garrulax p. pectoralis* (Goulden)
18. *ventratum* sp. nov.	*Garrulax r. ruficollis* Jard. & Selby

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