Reprinted from **Biologia**, *Vol. 3, No. 1, June, 1957.*

Bruelia elegans sp. nov., a new louse parasitic on the Australian crow, *Gymnohorina tibicen*, with a supplementary note on the genus *Bruelia* Keler

(Mallophaga : Ischnocera)

MUHAMMAD ATIQUR RAHMAN ANSARI
M. Sc., Ph. D. (Panjab), D. Sc. (Paris), F. R. E. S.
Institute of Hygiene and Preventive Medicine, Lahore.

INTRODUCTION

The genus *Bruelia* Keler 1936 was based on *B. brachythorax* (Giebel 1874) (= *B. rossittensis* Keler 1936), a louse occurring on the Waxwing *Bombycilla garrulus garrulus* (Linne) : Bombycillidae. Since then several species, formerly included in the genus *Degeeriella* Neumann 1906 (= *Nirmus* Nitzsch 1818) have been transferred to this genus with the result that now it is composed of 125 species, out of which 36 are described from corvine hosts.

The British Museum (Natural History) at London received eight specimens of *Bruelia* collected by R. Mykytowycz from the crow *Gymnohorina tibicen* shot in Canberra (Australia). These specimens were forwarded to me for comparison with other species described from crows, ravens and rooks. They were found to belong to a new species described below.

ACKNOWLEDGEMENTS

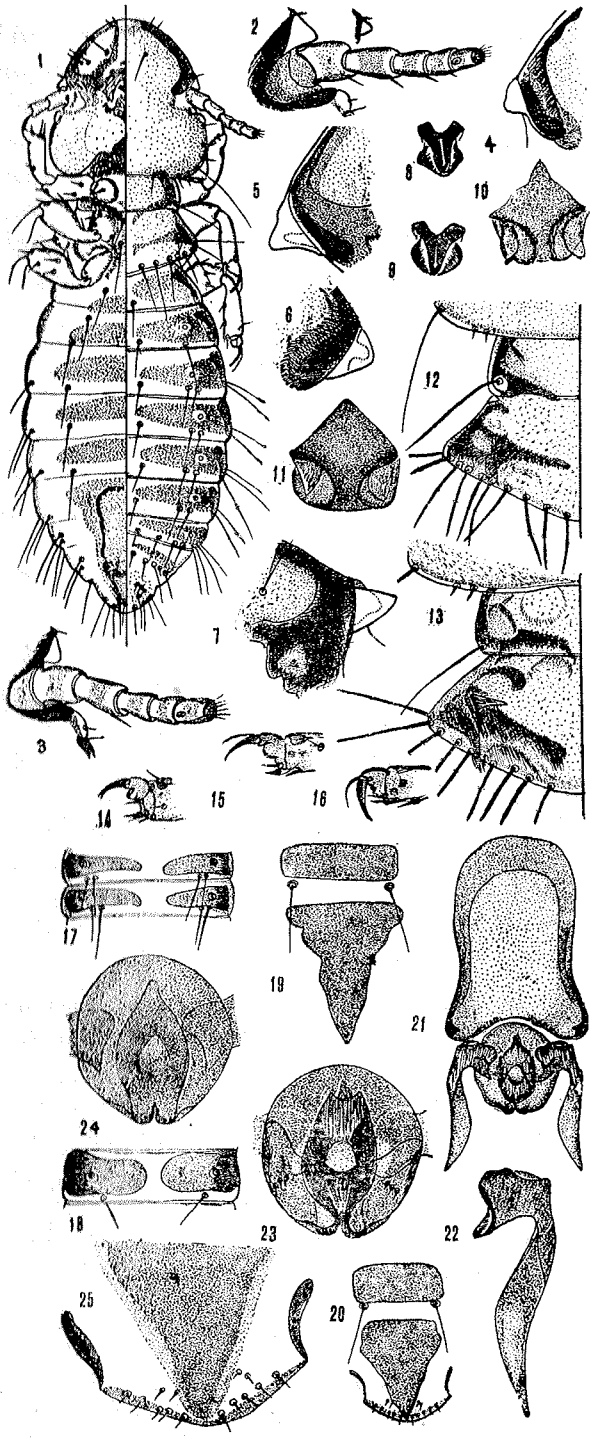
I am greatly indebted to Dr (Miss) Theresa Clay for the loan of specimens. My thanks are also due to Miss Athar, Miss Tasneem and Mr Saleem for making the drawings.

Bruelia elegans sp. nov.

(Text-figs. 1—25)

TYPE-HOST :—The Australian Crow, *Gymnohorina tibicen*.

This species is distinguished from other species of the genus occurring on Corvidae in the male genital armature and female vulvar chaetotaxy.



MALE (Holotype) 1.548 x 0.502 mm., fairly well built with conspicuous and heavily sclerotised dorsal plates.

Head 0.397 x 0.389 mm., cephalic index 1 : 0.979. Preantennal region 0.163 x 0.321 mm. (index 1 : 1.969), marginal carina well developed, depressed centrally with small hyaline margin, ventral counterpart narrow, interrupted medianly and then continuous with the premarginal carina. Preantennal chaetotaxy as shown by Clay (1951). Antennae showing very slight sexual dimorphism, basal segment 0.055 mm. long, more robust than other

Bruelia elegans sp. nov.

(1) Dorsal and ventral aspects of male, (2) Male antenna, (3) Female antenna, (4) Dorsal aspect of male conus, (5) Ventral aspect of male conus, (6) Dorsal aspect of female conus, (7) Ventral aspect of female conus, (8) Pharyngeal sclerite of male, (9) Pharyngeal sclerite of female, (10) Gular plate of male, (11) Gular plate of female, (12) Male thorax, (13) Female thorax, (14) Fore-leg tarsus of male, (15) Meso-leg tarsus of male, (16) Meta-leg tarsus of male, (17) Male tergal plates V-VI, (18) Female tergal plate V, (19) Male VII sternite and subgenital plate, (20) Female VII sternite and subgenital plates, (21) Male genital armature, (22) Paramere, (23-24) Two different aspects of mesosomal plate, (25) Female genital plate showing vulvar chaetotaxy

segments, segments II - V 0.055 mm., 0.036 mm., 0.036 mm. and 0.32 mm. respectively. Conus exhibits sexual dimorphism as shown in text-figs. 4-7. Male conus shorter and blunt while in female this structure is longer and pointed. Post-antennal region 0.211 x 0.389 mm. (index 1 : 1. 843), temples rounded, marginal temporal carina narrow, the number and arrangement of setae as in other species of *Bruelia* described from corvine hosts (Ansari, 1956c). Gular plate as shown in the text-figs. 10-11, exhibits considerable sexual dimorphism (text-figs. 8-11). Pharyngeal sclerite in male squat and narrow (text-figs. 8-9).

Prothorax 0.092 x 0.238 mm., transverse, with a long dorsal hair in the postero-lateral angle. Pterothorax 0.158 x 0.405 mm., posterior margin rounded, slightly diverging laterally, posterior margin with 8-9 dorsal and a small, often spine-like, ventral seta on each side. Legs concolorous with the body, outer margins well sclerotised, terminal parts of the three legs as shown in the text-figs. 14-16.

Abdomen 0.901 x 0.502 mm., elliptical, with broadly rounded last composite segment, widest at segment V or VI. Segments II-VIII with well developed tergal plates (text-fig. 17), approximated and varying considerably in form, area and pigmentation in various specimens, the pattern, however, is invariable, IX tergite triangular and considerably narrow. Sternal plates II-VI well developed, transverse, narrow and confined in the middle. Subgenital plate as shown in the figure (text-fig. 19). Chaetotaxy as shown in the figure and table below. The setae are definite in number and position except some minute setae on the terminal segments which generally vary from species to species.

Genital armature 0.298 mm. long, well developed, almost constant in all the specimens examined. Basal plate 0.178 x 0.103 mm., rounded anteriorly, laterally well sclerotised. Mesosomal plate more or less rounded, 0.079 x 0.063 mm., simple with well developed central portion, does not resemble any of the mesosomal plates so far encountered in corvine *Bruelia*. Parameres 0.126 mm. long, widest in the middle, proximal head strongly developed, with a transverse socket to accommodate the rounded condyle of the basal plate, anterior lateral margin modified to move freely along the mesosomal plate.

FEMALE (Allotype) more or less resembles the male, the important differences are, however, shown in the text figures 3,6,7,9,11,13,18,20 and 25. The dorsal abdominal setae scarce, of the pattern seen in *Bruelia*

glandarii (Denny) and allied forms (Ansari, 1956a), given in the table below.

ABDOMINAL CHAETOTAXY OF MALE AND FEMALE *Bruelia elegans* SP. NOV.

Holotype (Male)			Allotype (Female)		
Tergal	Sternal	Pleural	Tergal	Sternal	Pleural
Pterothorax 8-9+8-9	1+1	1+1	7—8+7—8	1+1	1+1
Abdominal segment II —1+1—	1+1	——	0—1+1—0	1+1	——
III 1+1+1+1	1+1	——	0—1+1—0	1+1	——
IV 2+1+1+2	1+1	2+2	1+1+1+1	1+1	1+1
V 2+1+1+2	1+1	2+2	1—2+1+1+1	1+1	2+2
VI 2+1+1+2	1+1	3+3	1+1+1+1	1+1	3+3
VII 2+1+1+2	——	3+3	1+1+1+1	——	3+3
VIII 3+1+1+3	——	4+4	1+1+1+1+1+1	——	3 V—
IX 6—7+7—6	——	2 Vent	1+1+1+1+1+1+.....	——	2 V+1
X——XI 3+3	6+6 marginal		Vulva—Chaetotaxy scarce	(text-fig. 25)	

NOTE ON CHAETOTAXY : In male the VIII tergite is with two subequal post spiracular, one posterior and one tergocentral seta on each side. IX with one long lateral, one short and a long post-spiracular and four short setae on each side. X-XI with three short tergo-central setae on both sides arranged obliquely so as to form an inverted 'V' with the component row of setae on the other side. Other setae long, of subequal length. In female the VIII tergite is with one long lateral, one long post spiracular

MEASUREMENTS (IN MILLIMETERS) OF *Bruelia elegans* SP. NOV.

IN CANADA BALSAM.

Holotype (male)		Allotype (female)	Paratypes (males 3)	Paratypes (females 3)
Head : total	0.397x0.389	0.444x0.444	0.401-0.406x0.389-0.412	0.444-0 467x0.444-0.464
pre-antennal	0.163x0.321	0.203x0.373	0.163-0.168x0.325-0.341	0.191-0.193x0.361-0.369
post antennal	0.211x0.389	0.226x0.444	0.126-0.234x0.389-0.412	0.203-0.230x0.444-0.454
Prothorax	0.092x0.238	0.111x0.269	0.084-0.095x0.242-0.244	0.092-0.098x0.262-0 266
Pterothorax	0.158x0.405	0.174x0.405	0.146-0.168x0.353-0.401	0.168-0.178x0.393-0.400
Abdomen	0.901x0.502	1.242x0.548	0.891-0.941x0.502-0.541	1.187-1.242x0.535-0.540
Head index	1:0.979	1 : 1.000	1 : 0.905—1.014	1 : 1.000—1.049
L:B, preantennal	1:1.969	1 : 1.856	1 : 1.996—2.017	1 : 1.891—1.232
L:B, postantennal	1:1.843	1 : 1.965	1 : 1.766—1.849	1 : 1.765—2.187
Antennal segments :				
I—	0.064	0,064	Genital armatute :	
II—	0.055	0.055	total : 289—0.309+0.103—0.127	
III—	0.040	0.040	B.P. : 168—0.194+0.071—0.092	
IV—	0.032	0.032	M.P. : 079—0.092	
V—	0.032	0.032	P.M. : 111—0.126	

and one tergo-central seta. IX with one short and a long lateral seta, followed by two short and a long seta arranged on posterior margin of the united tergal plate and a long tergo-central on both sides. On the ventrum there are two long antero-lateral, three short (one above the other) and one long and a short postero-lateral seta. Vulvar plate with two setae in the superior row and five spinous setae in the posterior row. Other setae do not call for any special remarks.

MATERIAL EXAMINED : Holotype (male), Allotype (female) from *Gymnohorina tibicen* from Canberra, Australia in R. Mykytowycz collection, 19. VI. 1956. Paratypes (two males and two females, 19. VI. 1956 and one male and a female ACT. VII. 1956) from *Gymnohorina tibicen* (other data as given above).

REMARKS : The form of the head of this species resembles *Bruelia multipunctata* (Clay). The dorsal abdominal chaetotaxy is as seen in *Bruelia glandarii* (Denny). It differs from all the species of *Bruelia* so far described from the corvine hosts in the male genital armature and the female vulvar chaetotaxy.

A Supplementary Note on the Genus *Bruelia* Keler 1936.

The genus *Bruelia* Keler 1936, has aroused great interest in recent years on account of wide distribution amongst distantly related groups of birds, viz., Coraciiformes, Piciformes, Troganiformes and Passeriformes. The passers, however, form the major hosts. A perusal of the host-list (Hopkins & Clay, 1951) will show that a very meagre proportion of passerine birds have so far been examined and consequently it is not possible to draw any conclusive inference from our present scanty knowledge of bruelias occurring on perching birds.

The genus *Bruelia* does not form a clear cut and homogeneous group. It is composed of a large number of puzzling similar species and it is not surprising that old authors based several species on females alone (which are very much alike in very closely related species) and thus failed in many cases to establish the correct specification. So many interesting features appeared during the consideration of the systematics of these lice that a general review of the whole series is worth while although it might involve some repetition.

Through the kindness of the trustees of the British Museum (Natural History), London, I have been able to examine 37 species from Corvidae,

17 from Turdidae and 18 from Timallidae. Five species from the New World were, however, loaned to me by Mr M.A. Carriker Jr. All the species show various degrees of morphological similarity and are obviously related and derived from a common ancestral stock. Some of the important features of the species occurring on corvine hosts are given below.

The *Bruelia* species infesting crows and ravens fall within the range of 1.423-2.111 mm. in length and none of the species is separable on the basis of size. The presence or absence of characteristic colour pattern (marginal carinae on the preantennal region of head, cephalic dorsal plate, temporal carina preantennal, preocular and postocular nodus, gular plate, thoracic and abdominal plates, viz., paratergal, tergal pleural and sternal plates) is often a very useful guide to the identity of species.

The shape of the head and characters of the carinae have been found very useful features throughout the genus. Proportional length and width of the head, preantennal region and hind head have been found considerably variable in different groups of species. According to the characters of the cephalic carinae these species fall into the following clear-cut categories.

1 (8) Marginal carina entire.

2 (5) Marginal carina runs along the entire outer rim of the preantennal region, uniformly sclerotised throughout.

3 (4) Anterior plate simple.

4 (3) Anterior plate wanting. [ex *B. biguttata* (Kellogg et Paine), *B. b. docilis* Ansari, *B. koslovae* (Clay)].

5 (2) Marginal carina feebly sclerotised in the middle. (ex *B. argula* (Burmeister), *B. leucocephalus* (Nitzsch) Ansari, *B. quadrangularis* (Rudow), *B. afzali* Ansari].

6 (7) Marginal carina although feeble in the middle, yet also borders the entire rim of the preantennal region. [ex *B. multipunctata* (Clay), *B. uncinosa* (Burmeister), *B.u. plena* Ansari, *B. nawabi* Ansari].

7 (6) Marginal carina not only feebly sclerotised in the middle but also hanging posteriorly at this point. [ex *B. tasnimae* Ansari, *B. t. variegatus* Ansari, *B. saleemi* Ansari, *B. atharae* Ansari, *B. cryptoleucus* Ansari; *B. perweenae* Ansari].

8 (1) Marginal carina distinctly interrupted at one or two points.

9 (12) Marginal carina interrupted or indented in the middle only. ex *B. biocellata* (Piaget).

10 (11) Margin at the interrupted point hyaline.

11 (10) Margin at the interrupted point furnished with a triangular pigmented area. [ex *B. deficience* (Piaget), *B. zavattariornis* Ansari, *B. zohrae* Ansari]

12 (9) Marginal carina interrupted both medianly and laterally.

13 (14) Lateral interruption incomplete, anterior plate distinct, merging posteriorly with the dorsal tegument.

14 (13) Lateral interruption complete, anterior plate well separated from the dorsal cephalic integument. [ex *B glandarii* (Denny), *B.g. perscoreus* Ansari, *B. clayae* Ansari, *B. nitzschi* Keler, *B. hopkinsi* Ansari, *B. meinertzhageni* Ansari, *B. husaini* Ansari].

More recently Eichler (1944-*Cervinirmus* for *B. uncinosus* N.), Conci (1941-*Meropsiella* for *B. apiastri* Denny), Ansari (1947- *Painjunirmus* for *B. pengya* Ansari and *Traihoriella* for *B. punjabensis* Ansari), and Eichler (1949-*Guimaraesiella* for *B. rotundifrontalis* Eichler and *Xobugirado* for *B. menuraelyrae* Conde) have suggested the introduction of generic names for some of these groups. If such names are acceptable, it is well to remember that each group is connected with the other by intermediate forms (Clay, 1951). On this account, I would rather prefer to retain for these assemblages the vague term Group, since the term genus implies a compact group, distinctly limited and separated by some closely recognisable features from other related species.

In a few instances the antennal characters, particularly the length and robustness of basal segments, are of value (ex *B. husaini* Ansari, *B. biguttata* Kellogg et Paine). The size and shape of the conus, number of facets and size of the individual facet in eyes seem to vary from species to species. Unfortunately these features are not easy to be estimated and therefore cannot be readily appreciated. I have considered these characters unreliable for the time being.

The form of the prothorax and pterothorax as a whole is the most important reliable external feature by which some of the species may be

recognised. In some species the prothorax is usually with a distinct dorsal posterior pigmented area, while in others this area is rudimentary or is not well demonstrated. The apparent shape, however, depends upon the sides, which may be straight or projecting. The posterior margin of the pterothorax is either strongly angulate or broadly rounded on the abdominal segment II. Pterothoracic dorsal setae vary considerably from one group to another.

The form of the abdomen is more or less constant throughout the genus. Excluding obvious teneral forms and considering only adults, the tergal sclerites range from those in which these plates are irregular, triangular pieces confined to the sides through those with very faint areas to those in which the tergal plates show no signs of pigmentation and hardness (ex *B. glandarii* Denny, *B. zohrae* Ansari, *B. multipunctata* Clay and *B. elegans* Ansari). Variation of tergal chaetotaxy is considerable. A primary separation of species into various groups based upon the abdominal chaetotaxy is a feature of great importance and convenience. In some there are only tergo-central and post-spiracular setae, while in others there is a continuous row of setae (ex B. *nitzschi* Keler, *B. zohrae* Ansari, *B. biocellata* Piaget). Sternal plates do not exhibit any important specific distinction. In some the sternal plates are narrow, transverse rectangles while in others wide, squat blocks.

Most authors who have studied the genus would emphasize the high degree of variability found in most allied forms. My work is based entirely upon external morphological features but I cannot deny the fact that in many species the only completely reliable characters are those provided by the male genitalia. This organ serves only one function, is located internally and is probably less affected as compared to other morphological features by environmental conditions. The male genital armature is also less subject to adaptive changes during phylogenetic history. A comparative study of these may, therefore, help to trace the interrelation of the group more clearly than the external characters on which the current classification is mostly based.

Specific differentiation based upon male genitalia, of course, would lead at times to problems of nomenclature, as it may be difficult or even impossible to determine the specific identity of forms described before the importance of the male genitalia was even realized. Some of the earlier eminent workers did not only ignore the real value of male genitalia

as a check to specific determination but also did not pay any serious and special attention to males with the result that they frequently did not hesitate in establishing species on female specimens. Even very carefully written descriptions in such cases have been found to lend no guidance to species. As I have pointed out in earlier papers (Ansari, 1955;1956a-d), the female in the genus *Bruelia* are helpful only as far as the grouping of allied species is concerned. In some cases, either through loss of original specimens, failures to make a sufficiently accurate description by the authors, descriptions based on females or for some other reasons, I have not found it possible to satisfy myself about the application of a name and such names are introduced as unidentified species (*Nomina dubis*).

In this connection it is well to point out that specific features are little developed in the female genitalia. The differences which may sometimes be found in the vulvar chaetotaxy and subgenital plate are of subspecific value alone. Although under the International rules of Zoological Nomenclature, a specification of a FEMALE HOLOTYPE is prefectly admissible, it might prove impossible to determine the specific identity of such a specimen and the description therefore would be valueless for taxonomic purposes. In the case of the genus *Bruelia*, at least, the workers will earn a gratitude of future systematists if they always base their species on MALE HOLOTYPE alone. An elaborate note on sexual differences, based on a typical FEMALE HOLOTYPE will, however, be a supplementary attribution to a confident specific identity, and should be invariably added to all the descriptions of species, wherever possible.

As I have pointed out above, the females in *Bruelia* serve a useful purpose in grouping allied forms. Allotypes, therefore, serve a necessary evil. A recent move to discard this designation (de Mellon & Zumpt, 1951 and 1953) will probably prove detrimental to the systematic studies of Phthiropteran parasites in general and *Bruelia* species in particular (Ansari, 1956a-d).

REFERENCES

Ansari, M. Atiqur Rahman, 1947. Mallophaga (Ischnocera) infesting birds in the Punjab (India). Proc. Nat. Inst. Sci. India Calcutta, **13** (6) : 253-303.

———1955. Studies on Ischnoceran Mallophaga parasitic on Turdidae. Pak. Jour. Hlth. Lahore, **5** (2) : 47-76.

———1956a. Studies on *Bruelia* species (Mallophaga) occurring on true thrushes. Biologia, Lahore, **2** (1) : 102-143.

———1956b. A brief survey of *Bruelia* species (Ischnocera : Mallophaga) parasitic on the babblers and laughing thrushes (Timallidae). Pak. Jour Hlth. Lahore, **6** (3) : 133-154.

———1956c. A revision of *Bruelia* (Mallophaga) species infesting the Corvidae, Part I. Bull. Brit. Mus. (Nat. Hist.). London, **4** (8) : 371-406.

———1956d. A note on Allotype as applied to Mallophaga. Pak. Jour. Hlth. Lahore, **6** (4) : 190.

———1957, A revision of *Bruelia* (Mallophaga) species infesting the Corvidae. Part II. Bull. Brit. Mus. (Nat. Hist.). London. (in press).

Clay, T., 1951. An introduction to the classification of Avian Ischnocera (Mallophaga), Part I. Trans. Roy. Ent. Soc. London, **102** (2) : 171-195.

Conci, C., 1941. Due nouvi generi e tre nouve specie di Mallophagi dei Meropes. Boll. Soc. Ent. Ital., **73** (7) : 99-107.

de Mellon, B. & Zumpt, F., 1951. Restrictions of types. Jour. Ent. Soc. Africa, **14** : 150.

Eichler, W., 1944. (Rev. Appl. Ent., B. 1944). Stettin. Ent. Ztg., **105** : 80.

———1949. (Rev. Appl. Ent., B. 1949). Boll. Soc. Ent. Ital; **79** : 11.

Hopkins, G. H. E. & Clay, T., 1951. A check list of the genera and species of Mallophaga. Brit. Mus. (Nat. Hist.) London.

Keler, S., 1936. Ueber einige Mallophagen aus rositten. Arb. Morph. Tax. Ent. Berlin-Dahlem, **3** : 256-364.

Zumpt, F., 1953. Why worship types. Rev. Ecuat. Ent. Parasit. Ecuador, **1** (3) : 87-89.