Reprinted from Pakistan Journal of Health, Vol. 6, No. 4, Jan. 1957

A Note on the Mensuration of an Ischnoceran Mallophaga, *Goniodes pavonis* (Linnaeus), Infesting the Indian Common Pea-Fowl (*Pavo c. cristatus* Linnaeus)

BY

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INTRODUCTION

THE measurements of the whole mounts or body parts in Mallophaga are in most cases not important criterion of a good species. The reasons which may be advanced to support the views are varied and numerous. All workers have invariably observed that under tropical conditions, soon after the death, the soft parts of these insects begin to dry up, shrivel and distort if not preserved immediately in a suitable media. The measurements of such specimens, therefore, always represent considerably shrunken size and put it in a fallacious position. In such specimens the antennae are comparatively short, the hard, tergites and sternites are partly telescoped into each other so as to shorten abdomen considerably. In most cases the prothoracic sclerites project considerably beneath the head. The protrusion of the head from the body is usually more pronounced in living, full fed lice than in an unfed, partly fed dead lice. The retracted position detracts significant proportion of the linear measurement.

The dry specimens, when soaked in water or in 10 per cent caustic potash, take in sufficient amount of the liquid and assume more or less normal body contour. These specimens when dehydrated, stained and mounted in canada balsam usually shrink and if extra precautions are not observed, frequently fail to retain the original form and sometimes under the pressure of coverslip flatten to some extent.

The size of an insect may also depend upon the amount of food present in the alimentary canal. The abdomen of a full fed male and female is always swollen to the limit of its capacity. The abdomen of an immature, gravid or a spent female differs considerably in dimensions. The number of eggs contained in the body cavity also alter the length and width of the abdomen in female specimens.

It is convenient to recognise the dimensions of various species as approximations, merely indicating general size and proportional differences of sexes. These measurements may have practical importance if pertaining to a large number of fully distended specimens. A comparative study of collections obtained both from type-hosts, hailing from different farflung localities and other hosts will probably bear useful results. A methodical classification of the data so obtained and observed and calculated average dimensional differences will probably furnish means of distinctions and favour trinomial system of nomenclature.

Although to appraise the effect the fixation, staining and mounting have on our measurements, it is necessary to ascertain the measurements of the living specimens of louse. We had not had any such opportunity to measure an

appreciable number of living specimens of any one species. Such studies would certainly lead to deductions of greater interest and importance and therefore we appeal to all who are interested in the subject and have sufficient opportunities of obtaining material of the same species to investigate the wide variation. We made a beginning with preserved collection of *Goniodes pavonis* (Linnaeus). For the comparison, the data collected is set out in tabulate form in this paper.

GONIODES PAVONIS (LINNAEUS. 1758)

1758 *Pediculus pavonis* Linnaeus *Syst. Nat.* ed. 10 : 613.

It was recorded from the common pea fowl--*Pavo cristatus* Linnaeus in 1758. Since then it has been reported from most parts of the world, where the type-host occurs. In addition it is also said to be present on *Pavo spiciferus*, the domestic Guinea fowl—*Numida meleagris domestica* Linnaeus. These records are probably referable to faulty method of collection or to contamination on the collection board. The specimens refeıred to here were taken by the author from birds collected by him at Wagah (near Lahore) on 1935. VII. 19.

Goniodes pavonis is a strong and stout species. General body colour is tawny brown with dark marginal markings and tergal plates. Abdomen is fairly convex dorsally and comparatively less convex ventrally. It is fairly common on the host, all the birds shot from Wagah had a well represented population of this louse. On one fairly healthy bird (male) there occurred 66 males, 45 females and 51 nymphs. The ratio between males and females varied from 60 to 68 with an average of 55 females to every 100 males. Some females collected were mutilated, the last abdominal segments were pinched off so as to show that this louse being very large in size is likely to be injured while the host preens its body.

Male: Head circumfasciate, clypeal margin broadly rounded with prominent trabiculae. Marginal carina well developed with prominent, thickened dorsal preantennary nodus and similar ventral component fused with the articulation of the mandibles. Preocular nodus and post ocular nodus well formed and pigmented. Temples strongly divergent as shown in text-fig. 1. Marginal temporal carina well developed, forming a uniform rim. Preantennal region with 3 anterior setae, 3 antero-ventral setae, two ventral submarginal setae, one preconal seta, one dorsal submarginal seta, one antero-dorsal seta and a preantennal seta. Hind head with one ocular seta, one post nodal seta, two long and three short and fine setae. Temporal setae beset as shown in figure. Eyes well developed, single cornea, well rounded. Posterior magin fairly concave with a slight convexity in the middle. Antennae very strongly developed. Segment I robust with a finger like projection on its inner face, II cylindrical, III modified into a claw, IV and V cylindrical and almost half the II similar segment, tucked in the middle of the claw-shaped preceding segment. Prothorax short and narrow, trapezoidal in form, postero-lateral angle projecting slightly and furnished with a long seta, posterior margin arched like a broomerang. Pterothorax laterally divergent, without lateral indications of meso- and meta thoracic junctions. Lateral margin rounded with two anterior and two posterior long setae. Posterior margin strongly angulate on the abdomen, one seta in the middle of postero-lateral angles and another on each side of the posterior angle. Legs characteristic of the genus. Abdomen large and elongate, segments subequal in length. Abdominal chaetotaxy as given below. Tergal plates I-VII well developed, confined submarginally, of the shape of a bird's head. Segments VIII and IX-X modified, VIII narrow, IX-X rounded flat posteriorly, with long setae as shown in the figure.

CHAETOTAXY

	Dorsal 1+1	Ventral 1+1	Pleural 2+2+2+2
Pterothorax			
Abdomen I	4+5+5+4	...	1+1
II	3+5+5+3	...	1+1
III	3+4+5+3	...	2+2
IV	2+4+2+2	...	2+2
V	2+3+3+2	...	2+2
VI	2+1+1+2	...	2+2
VII	2+1+1+2−3	...	3+3
VIII	...	...	3+3
IX-X	12+12, posterior margin beset with a number of small setae arranged both dorsally and ventrally.		

Male genital armature very strongly developed, distinctive and prominent extending from segment IV to segment X.

MEASUREMENTS (IN MM.)

Correlation Table giving Length and Greatest Width of the Preantennal region of 100 Males mounted in Chloral Gum

Length	0.212	0.292	0.328	0.346	0.364	Totals
Width						
1.110	10	...	17	26	9	62
1.146	...	8	11	19	...	38
Totals	10	8	28	45	9	100

	Length	Width
Measurements (MM.) ...	0.212−0.364	1.110−1.146
Mean ...	0.358	1.124
Standard deviation $\sqrt{\frac{FD^2}{N}-\left(\frac{FD}{N}\right)^2}$	0.038	0.004
Coefficient of variation $\frac{Sd.}{Mean} \times 100$	= 10.54	0.35

Ratio between Length : Width 1 : 3.11−5.24
(average 3.46)

Correlation Table giving Length and Width of the Hindhead of 100 Males

Length	0.601	0.618	0.636	0.656	0.672	Totals
Width						
1.128	11	35	18	8	9	81
1.200	...	...	19	...	...	19
Totals	11	35	37	8	9	100

	Length	Width
Measurements (MM.) ...	0.601–0.672	1.128–1.200
Mean ...	0.631	1.141
Standard deviation $\sqrt{\frac{FD^2}{N}-\left(\frac{FD}{N}\right)^2}$	0.011	0.017
Coefficient of variation ...	1.7	1.5

Ratio between Length : Width 1 : 1.68–1.89 (average 1.81)

Correlation Table giving Length and Width of the Head of 100 Males

Length	0.908	0.909	0.946	0.964	0.982	0.984	Totals
Width							
1.128	11	10	8	26	18	9	82
1.200	...	...	...	...	18	...	18
Totals	11	10	8	26	36	9	100

	Length	Width
Measurements (MM.) ...	0.908–0.984	1.128–1.200
Mean ...	0.958	1.141
Standard deviation $\sqrt{\frac{FD^2}{N}-\left(\frac{FD}{N}\right)^2}$ ...	0.015	0.018
Coefficient of variation ...	1.6	1.6

Ratio between Length : Width 1 : 1.15–1.22 (average 1.20)

Correlation Table giving Length and Width of the Prothorax of 100 Males

Length	0.254	0.364	0.382	0.401	0.418	0.436	Totals
Width							
0.764	...	...	9	...	...	...	9
0.836	11	17	...	26	19	18	91
Totals	11	17	9	26	19	18	100

	Length	Width
Measurements (MM.) ...	0.254–0.436	0.764–0.836
Mean ...	0.386	0.829
Standard deviation $\sqrt{\frac{FD^2}{N}-\left(\frac{FD}{N}\right)^2}$ ...	0.045	0.067
Coefficient of variation $\frac{\text{Sd.}}{\text{Mean}}\times 100$	11.6	0.84

Ratio between Length : Width 1 : 2.0–3.3 (average 2.15)

Correlation Table giving Length and Width of the Pterothorax of 100 Males

Length / Width	0.546	0.564	0.582	0.618	Totals
1.128	...	...	10	...	10
1.164	...	...	...	9	9
1.200	...	17	53	...	70
1.254	11	...	...	...	11
Totals	11	17	63	9	100

		Length	Width
Measurements (MM.)	...	0.546–0.618	1.128–1.254
Mean	...	0.578	1.195
Standard deviation $\sqrt{\frac{FD^2}{N}-\left(\frac{FD}{N}\right)^2}$		0.005	0.009
Coefficient of variation $\frac{Sd.}{Mean}\times 100$		0.93	0.77

Ratio between Length: Width 1: 1.94–2.39 (average 2.07)

Correlation Table giving Length and Width of the Abdomen of 100 Males

Length / Width	2.072	2.128	2.146	2.164	2.192	2.198	2.211	2.238	Totals
2.000	...	...	...	...		...	8	...	8
2.092	...	...	...	...	10	...	...	...	10
2.146	7	8	...	11	11	...	...	...	37
2.218	...	...	8	9	9	10	...	9	45
Totals	7	8	8	20	30	10	8	9	100

		Length	Width
Measurements (MM.)	...	2.072–2.238	2.000–2.218
Mean	...	2.173	2.166
Standard deviation $\sqrt{\frac{FD^2}{N}-\left(\frac{FD}{N}\right)^2}$	...	0.029	0.038
Coefficient of variation $\frac{Sd.}{Mean}\times 100$		1.334	0.083

Ratio between Length : Width 1 : 0.991–1.04 (average 0.996)

FEMALE resembles males in all the important specific characters, it however differs in the form of antennae and the large abdominal segments. The antennae are simple and filiform (text fig. 4). The abdomen is slightly well developed, the tergal plates are submarginal, although triangular but not as narrow anteriorly as in male ; the last abdominal segment is notched. The abdominal chaetotaxy slightly more than found in male.

CHAETOTAXY

		Tergal	Sternal	Pleural
Pterothorax		1+1	1+1	2+2+2+2
Abdomen	I	2+8+9+2	...	1+1(?)
	II	2+9+9+2	...	1+1
	III	2+9+9+2	...	1+1
	IV	2+9+9+2	...	2+2
	V	2+5+5+2	...	1+2+2+1
	VI	2+1+1+2	...	1+2+2+1
	VII	2+1+1+2	7+7.7+7 latero-ventral.	1+2+2+1
	VIII	2+2 lateral 9 setae in two rows.	13+14 setae disposed lateroin posterior view.	2+2

Correlation Table giving Length of the Preantennal Region and Greatest Width in 100 Females Mounted in Chloral Gum

Length	0.418	0.436	0.454	Totals
Width				
1.311	20	41	9	70
1.346	12	...	...	12
1.364	8	...	...	8
1.472	...	10	...	10
Totals	40	51	9	100

Measurements (MM.)	Length 0.418–0.454	Width 1.311–1.472
Mean ...	0.431	1.334
Standard deviation ...	0.006	0.006
Coefficient of variation	1.39	0.45

Ratio between Length: Width 1 : 2.89–3.39 (average 3.09)

Correlation Table showing Length and Greatest Width of the Hind Head

Length	0.582	0.601	0.618	0.728	Totals
Width					
1.418	32	18	20	10	80
1.511	...	...	12	...	12
1.554	...	...	8	...	8
Totals	32	18	40	10	100

Measurements (MM.)	0.582–0.728	1.418–1.554
Mean ...	0.612	1.493
Standard deviation ...	0.0304	0.181
Coefficient of variation	4.95	12.12

Ratio between Length : Width 1 : 1.94–2.52 (average 2.44)

Correlation Table giving Length and Greatest Width of Head

Length	1.000	1.018	1.036	1.054	1.164	Totals
Width						
1.418	8	27	31	10	8	84
1.511	...	...	...	9	...	9
1.554	...	...	7	...	...	7
Totals	8	27	38	19	8	100

		Length	Width
Measurements (MM.)	...	1.000–1.164	1.418–1.554
Mean	...	1.043	1.438
Standard deviation	...	0.031	0.042
Coefficient of variation	...	2.772	2.921

Ratio between Length : Width 1 : 1.218–1.433 (average 1.378)

Correlation Table giving Length and Greatest Width of Prothorax

Length	0.346	0.364	0.382	0.401	0.436	Totals
Width						
0.836	8	12	19	31	9	79
0.872	...	...	...	21	...	21
Totals	8	12	19	52	9	100

		Length	Width
Measurements (MM.)	...	0.346–0.436	0.836–0.872
Mean	...	0.399	0.842
Standard deviation	...	0.018	0.092
Coefficient of variation	...	4.571	1.092

Ratio between Length : Width 1 : 2.148–2.174 (average 2.111)

Correlation Table giving Length and Width of Pterothorax

Length	0.618	0.636	0.672	0.692	0.746	Totals
Width						
1.111	...	10	...	...	...	10
1.218	10	...	31	29	...	70
1.272	...	...	...	9	11	20
Totals	10	10	31	38	11	100

		Length	Width
Measurements (MM.)	...	0.618–0.746	1.111–1.272
Mean	...	0.678	1.218
Standard deviation	...	0.0218	0.0382
Coefficient of variation	...	3.215	3.136

Ratio between Length : Width 1 : 1.7–1.9 (average 1.8)

Correlation Table giving Length and Greatest Width of Abdomen

Length	1.436	2.200	2.254	2.328	2.400	2.418	2.436	2.454	2.528	Totals
Width										
2.000	...	...	...	9	...	...	...	...	...	9
2.182	...	...	...	...	...	...	...	10	...	10
2.218	...	7	8	13	9	11	...	...	...	48
2.272	10	...	...	...	...	..	12	...	...	22
2.346	...	...	...	...	...	...		...	11	11
Totals	10	7	8	22	9	11	12	10	11	100

		Length	Width
Measurements (MM.)	...	1.436 – 2.258	2.000 – 2.346
Mean	...	2.278	2.216
Standard deviation	...	0.091	0.027
Coefficient of variation	...	3.9	1.2

Ratio between Length : Width 1 : 08 – 1.5 (average 0.9)

THE VARIABILITY IN SIZE OF MALES AND FEMALES

As far as the males and females of *Goniodes pavonis* are concerned, there are no observable average morphological differences between any two individuals. The ornamentation so characteristic of the species also remains constant throughout a given population. There occur some variation in the abdominal chaetotaxy in some specimens but the difference is not so great as to invite any special attention. Such differences have however been detected in the right and left side of some specimens. A casual observation of a number of specimens obtained from one host however show a great range in size. In this note measurements of a number of individuals collected under natural conditions, are critically examined. A perusal of these tables shows that although the minimum and maximum figures differ considerably, the individuals tend to group themselves about the means. A correlation diagram and a frequency curve will probably show the actual and virtual differences better than the figures alone. The number of measurements available to us were too small to resort to these ways of interpretation. Moreover the results will be more fruitful if compared with the figures obtained from a collection obtained from a host hailing from far flung countries. On receipt of such figures alone it could be decided if the differences in size are due to an intermingling of races which are difficult to separate or to the variability of single species.

NYMPHAL INSTARS OF *GONIODES PAVONIS* (LINNAEUS)

The young louse resembles the parents closely. It however differs in size, development of carinae, chaetotaxy and dorsal and ventral markings and plates. The last abdominal segments are also very similar in the three instars and do not agree in morphology of the adults. The genitalia and secondary genital characters are very much undeveloped in the nymphs, with the exception of the third instar nymph the other stage nymphs cannot be separated into male and female nymphs.

First Stage Nymph. A newly hatched nymph is small, yellowish white in colour with delicate leathery integument. In the newly hatched nymph, there are absolutely no body markings. After the first meal, the colour slowly begins to change to pale yellow and the carinae, and transverse abdominal markings begin to make their appearance. The tergal plates, however remain simple and do not resemble the pattern seen in adults. The head is squarish with flatly convex clypeal margin. The marginal carinae narrow. In a well prepared

slide the carinae appear transparent. The chaetotaxy of the head is more or less as seen in the adult. The prothorax is trapezoidal in form, postero-lateral angle with a long seta. Pterothorax more or less of the shape shown in the figure, lateral margins rounded with one short and a long seta, posterior margin is obliterated, bluntly rounded with a long seta on each side of the middle line. In a newly hatched nymph the abdomen is very narrow, narrower than the head. After having a couple of meals it however becomes ovate. Dorsally the abdominal segments are not clearly demarkated, last segment however, with a distinct transverse line. There are 7 rows each of two setae, one on either side of the middle line. The short setae present on the pleural plates however give an idea of the various segments. Lateral margins without specific markings in most early stage nymphs, but little blotches begin to appear afrer 2-3, days. Pleural setae as shown in the figure pleural notches indicate the abdominal segments.

CHAETOTAXY

	Tergal	Sternal	Pleural
Pterthorax	1+1	1+1	2+1+1+2
Abdomen I	1+1+1+1	...	...
II	1+1+1+1	...	1+1
III	1+1+1+1	...	1+1
IV	1+1+1+1	...	1+1
V	1+1+1+1	...	1+1
VI	1+1+1+1	...	1−1+1−1
VII	1+1+1+1	...	1−1+1−1
VIII	1+1+1+1	...	1−1+1−1
IX-X	2———2	...	1+1

Correlation Table showing Length and Greatest Width of Preantennal Region in First Stage Nymph.

Length / Width	0.16	0.17	0.18	0.19	0.20	Totals
0.53	3	...	...	...	...	3
0.58	1	1	8	2	3	15
0.60	...	1	1	...	...	2
0.64	...	...	...	1	4	5
0.67	...	...	...	...	1	1
0.75	...	...	...	...	1	1
Totals	4	2	9	3	9	27

Measurements (MM.)	Length 0.16—0.20	Width 0.53—0.75
Mean ...	0.18	0.58
Standard deviation ...	0.008	0.03
Coefficient of variation ...	4.4	5.2

Ratio between Length : Width 1 : 2.8—3.7 (average 3.2)

Correlation Table giving Length and Greatest Width of Hindhead in First Stage Nymph.

Length / Width	0.27	0.28	0.29	0.30	0.31	0.32	0.33	0.34	0.35	0.36	Totals
0.60	1	...	...	...	1	...	1	...	...	1	4
0.61	1	1	1	1	1	...	...	...	...	...	5
0.63	1	...	...	2	...	...	...	...	...	...	3
0.64	...	...	...	...	1	...	...	...	...	...	1
0.65	...	...	...	...	2	...	1	...	...	1	4
0.66	...	...	..	1	2	3	...	1	...	...	7
0.69	...	...	...	...	1	...	...	...	...	...	1
0.75	...	...	...	...	...	...	...	...	1	...	1
0.82	...	...	...	...	...	...	...	...	...	1	1
Totals ...	3	1	1	4	8	3	2	1	1	3	27

		Length	Width
Measurements (MM.)		0.27 – 0.36	0.60 – 0.82
Mean	...	0.31	0.65
Standard deviation	...	0.017	0.35
Coefficient of variation	...	5.51	5.41

Ratio between Length : Width 1 : 1.6 – 2.4 (average 2.1)

Correlation Table giving Length and Greatest Width of the Head in First Stage Nymph.

Length / Width	0.42	0.44	0.45	0.46	0.47	0.48	0.49	0.50	0.51	0.52	0.53	0.54	0.55	0.56	Totals
0.60	...	...	...	...	1	...	1	...	...	...	1	...	...	...	3
0.61	...	...	1	1	1	...	1	...	1	...	...	...	...	...	5
0.63	...	1	...	...	...	1	...	1	...	...	...	...	...	...	3
0.64	1	...	...	...	...	...	...	...	...	...	...	...	...	...	1
0.65	...	...	...	...	...	...	...	...	3	...	...	...	1	...	4
0.66	...	...		...	...	1	1	1	2	2	...	1	...	...	8
0.69	...	...	...	...	...	...	1	...	...	...	...	...	...	...	1
0.75	...	...	...	...	...	...	...	...	...	...	1	...	...	...	1
0.82	...	...	...	...	...	...	...	...	...	...	...	...	...	1	1
Totals	1	1	1	1	2	2	4	2	6	2	2	1	1	1	27

		Length	Width
Measurements (MM.)		0.42 – 0.56	0.60 – 0.82
Mean	...	0.49	0.63
Standard deviation	...	0.02	0.038
Coefficient of variation	...	4.1	6.03

Ratio between Length : Width 1 : 1.1 – 1.5 (average 1.2)

Correlation Table giving Length and Width of the Prothorax in First Stage Nymph.

Length	0.17	0.18	0.19	0.20	0.21	0.22	0.23	Totals
Width								
0.40	...	2	...	1	...	...	...	3
0.42	3	1	2	...	...	...	...	6
0.43	..	...	2	1	...	...	...	3
0.44	...	...	...	1	1	1	...	3
0.45	...	1	...	1	...	2	...	4
0.46	...	...	...	1	4	1	...	6
0.55	...	...	...	...	...	1	1	2
Total	3	4	4	5	5	5	1	27

		Length	Width
Measurements (MM.)		0.17–0.23	0.40–0.55
Mean	...	0.20	0.44
Standard deviation	...	0.009	0.007
Coefficient of variation	...	4.25	1.06

Ratio between Length : Width 1 : 2.0–2.5 (average 2.2)

Correlation Table giving Length and Greatest Width of Pterothorax in First Stage Nymph.

Length	0.22	0.23	0.24	0.25	0.26	0.27	0.28	0.29	0.30	0.31	0.33	0.36	0.38	Totals
Width														
0.53	...	...	...	...	1	...	1	1	...	...	...	...	...	3
0.55	...	...	...	2	...	1	...	...	...	...	1	...	...	4
0.56	1	1	...	...	1	2	1	...	...	...	...	...	...	6
0.58	...	...	1	1	...	...	...	...	...	1	...	...	...	3
0.59	...	...	...	...	2	...	1	...	2	...	...	...	...	5
0.60	...	...	...	...	...	1	...	...	...	1	...	1	...	3
0.62	...	...	...	...	...	...	...	...	...	1	...	...	...	1
0.65	...	...	...	...	...	...	..	...	...	1	...	...	...	1
0.76	...	...	...	...	...	...	...	...	...	...	...	...	1	1
Totals	1	1	1	3	4	4	3	1	2	4	1	1	1	27

		Length	Width
Measurements (MM.)		0.22–0.38	0.53–0.76
Mean	...	0.28	0.58
Standard deviation	...	0.026	0.024
Coefficient of variation	...	9.3	4.1

Ratio between Length : Width 1 : 1.7–2.6 (average 2.1)

Correlation Table giving Length and Widest Width of Abdomen in First Stage Nymph.

Length / Width	0.58	0.62	0.63	0.64	0.65	0.70	0.71	0.72	0.75	0.81	0.84	0.85	0.87	0.88	0.91	0.93	1.10	Totals
0.40	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1
0.58	...	...	1	...	.	...	...	...	...	...	...	...	...	...	...	...	...	1
0.62	...	1	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	2
0.65	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	1
0.67	1	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	2
0.70	...	...	...	...	2	1	...	1	...	...	...	...	...	...	...	...	...	4
0.74	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	1
0.75	...	...	...	...	...	1	...	...	1	...	...	...	...	...	...	...	...	2
0.85	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	1
0.89	...	...	...	...	...	...	...	...	...	...	1	...	2	...	...	...	...	3
0.91	..	...	..	...	...	...	...	...	...	...	1	...	...	...	...	...	...	1
0.92	...	...	...	...	...	...	...	...	...	...	...	...	1	1	...	...	...	2
0.96	...	...	...	...	...	...	...	...	...	...	...	1	1	...	1	1	...	4
0.97	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	1
1.16	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	1
Totals ...	2	1	1	1	4	2	1	1	1	1	2	1	4	1	1	2	1	27

	Length	Width
Measurements (MM.)	0.58 – 1.10	0.40 – 1.16
Mean ...	0.77	0.81
Standard deviation ...	0.123	1.57
Coefficient of variation ...	4.06	5.12

Ratio between Length : Width 1 : 07 – 1.5 (average 1.25)

THE SECOND INSTAR NYMPH is dirty yellow in colour. The cephalic carinae and the tergal plates, although do not resemble the markings seen in the adults, are present. Tergal plates quadrate, confined marginally. The segments are well demarkated marginally and obliterated in the middle. The chaetotaxy is more or less as in the first stage nymph. Last abdominal segment as in the former stage, without any modifications observed in adults.

DORSAL CHAETOTAXY

Pterothorax	$(\frac{1}{2})+1+1+(\frac{1}{2})$	1+1	...
Abdomen I	1+1	...	...
II	1+1+1+1	...	1+1
III	1+1+1+1	...	1+1
IV	1+1+1+1	...	2+2
V	2+1+1+2	...	2+2
VI	1−2+1+1+1	...	2+2
VII	1+1	...	3+3
VIII	1+1	...	2+2
IX	1+1+1+1	...	1+1
		ventral	3+3

last segment bilobed, with one small seta on each side.

In the first stage nymph the eye spot are not very distinct, in the second stage nymph the eye spot is very clear, jet black. The second stage nymph differs from third stage in abdominal chaetotaxy and from the male in the form of antennae.

Correlation Table giving Length and Widest Width of Preantennal Region in Second Stage Nymph

Length	0.21	0.22	0.24	0.25	0.26	0.27	0.29	Totals
Width								
0.58	...	...	1	...	...	...	...	1
0.64	...	1	...	...	...	...	...	1
0.71	1	...	...	1	...	...	...	2
0.75	...	1	...	1	...	...	...	2
0.77	...	...	...	...	1	...	...	1
0.80	...	2	1	1	...	1	...	5
0.81	...	...	...	1	...	1	...	2
0.85	...	1	3	3	1	2	1	11
0.93	...	...	...	1	...	...	...	1
Totals	1	5	5	8	2	4	1	26

	Length	Width
Measurements (MM.)	0.21−0.29	0.58−0.93
Mean ...	0.25	0.81
Standard deviation ...	0.012	0.04
Coefficient of variation ...	4.8	5.0

Ratio between Length : Width 1 : 2.4−3.7 (average 3.2)

Correlation Table giving Length and Greatest Width of Hind Head in Second Stage Nymph.

Length / Width	0.25	0.33	0.35	0.36	0.37	0.38	0.40	0.42	0.44	Totals
0.64	1	...	...	...	...	...	...	...	...	1
0.65	...	1	...	...	...	...	...	...	...	1
0.75	...	...	...	...	...	1	...	...	...	1
0.76	...	...	...	1	...	...	...	...	...	1
0.77	...	1	...	2	...	...	...	...	...	3
0.82	...	...	2	2	3	...	1	1	...	9
0.85	...	...	1	...	...	...	...	...	...	1
0.91	...	...	...	...	...	1	5	2	2	10
Totals	1	2	3	5	3	2	6	3	2	27

Measurements (MM.)		Length 0.25–0.44	Width 0.64–0.91
Mean	...	0.37	0.84
Standard deviation	...	0.026	0.05
Coefficient of variation	...	7.03	6.00

Ratio between Length : Width 1 : 2.03–2.51 (average 2.31)

Correlation Table giving Length and Greatest Width of Head in Second Stage Nymph.

Length / Width	0.47	0.54	0.56	0.57	0.58	0.60	0.62	0.64	0.65	0.67	0.69	0.70	0.71	Totals
0.64	1	...	...	...	...	...	...	...	...	...	...	...	...	1
0.65	...	...	1	...	...	...	...	...	...	...	...	...	...	1
0.75	...	...	...	...	...	...	...	...	1	...	...	...	...	1
0.76	...	...	...	...	...	1	...	...	...	...	...	...	...	1
0.77	...	1	...	...	1	...	1	...	...	...	...	...	...	3
0.82	...	...	...	1	...	1	3	...	...	1	1	1	...	8
0.85	...	...	...	...	...	...	1	...	...	...	...	...	...	1
0.91	...	...	...	...	...	...	2	1	3	2	1	...	1	10
0.96	...	...	...	...	...	...	...	...	1	...	...	...	...	1
Totals	1	1	1	1	1	2	7	1	5	3	2	1	1	27

Measurements (MM.)		Length 0.47–0.71	Width 0.64–0.96
Mean	...	0.65	0.84
Standard deviation	...	0.044	0.05
Coefficient of variation	...	6.70	6.00

Ratio between Length : Width 1 : 1.28–1.35 (average 1.31)

Correlation Table giving Length and Greatest Width of Prothorax in Second Stage Nymph.

Length / Width	0.20	0.21	0.22	0.23	0.24	0.25	0.26	0.27	0.29	Totals
0.40	...	...	1	...	...	...	...	...	...	1
0.45	1	...	...	...	...	...	...	...	...	1
0.49	...	...	...	...	...	1	...	...	...	1
0.50	...	...	...	...	2	2	2	...	...	6
0.53	...	...	...	...	...	...	1	...	...	1
0.55	...	...	...	...	2	2	...	1	...	5
0.56	...	...	...	1	...	...	2	...	...	3
0.58	...	1	...	...	2	2	...	3	1	9
Totals	1	1	1	1	6	7	5	4	1	27

		Length	Width
Measurements (MM.)	...	0.20–0.29	0.40–0.58
Mean	...	0.25	0.54
Standard deviation	...	0.013	0.027
Coefficient of variation	...	5.2	5.0

Ratio between Length : Width 1 : 1.8–2.25 (average 2.16)

Correlation Table giving Length and Greatest Width of Pterothorax in Second Stage Nymph.

Length / Width	0.25	0.26	0.27	0.28	0.29	0.30	0.31	0.33	0.34	0.35	0.36	0.38	0.40	0.41	0.42	Totals
0.58	...	...	...	...	..	...	1	...	...	...	...	...	...	...	...	1
0.60	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1
0.71	...	1	1	...	...	1	...	...	1	...	...	...	..	...	...	4
0.72	...	...	...	...	...	...	...	1	1	...	...	...	...	...	...	2
0.73	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	1
0.75	...	...	...	...	...	1	...	...	...	...	...	...	...	...	1	2
0.76	...	...	...	...	1	...	2	1	...	...	...	...	...	1	...	5
0.82	...	..	...	...	...	...	...	...	...	2	...	4	2	...	...	8
0.84	...	...	...	...	...	...	...	...	...	...	1	...	1	...	1	3
Totals	1	1	1	1	1	2	3	2	2	2	1	4	3	1	2	27

		Length	Width
Measurements (MM.)	...	0.25 – 0.42	0.58 – 0.84
Mean	...	0.34	0.76
Standard deviation	...	0.048	0.044
Coefficient of variation	...	14.1	5.8

Ratio between Length : Width 1 : 1.8 - 2.4 (average 2.23)

Correlation Table giving Length and Greatest Width of Abdomen in Second Stage Nymph.

Length / Width	0.618	0.746	0.89	0.94	0.98	1.04	1.05	1.09	1.15	1.18	1.21	1.27	1.33	1.35	1.38	Totals
0.78	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1
0.99	...	...	...	1	...	...	...	...	...	..	...	...	...	...	...	1
1.00	...	...	...	...	1	...	...	...	...	...	...	...	...	..	...	1
1.04	...	1	...	...	1	...	...	...	...	.	...	...	...	...	...	2
1.09	...	...	1	...	...	...	. .	...	...	...	...	...	...	...	...	1
1.10	...	...	...	1	...	1	1	...	...	...	...	...	...	...	...	3
1.15	...	...	...	...	1	...	1	...	...	...	...	...	...	...	...	2
1.16	...	...	...	...	1	2	...	...	1	...	...	...	...	...	.	4
1.18	...	...	...	...	...	...	...	1	2	...	...	...	...	...	...	3
1.21	...	...	...	...	...	...	...	..	1	...	...	...	...	...	...	1
1.31	...	...	...	...	...	...	...	...	...	1	1	1	...	...	...	3
1.41	...	..	...	...	...	...	...	...	...	1	...	...	...	...	...	1
1.51	...	...	...	...	...	...	...	...	...	...	...	...	2	1	1	4
Totals	1	1	1	2	4	3	2	1	4	2	1	1	2	1	1	27

		Length	Width
Measurements (MM.)	...	0.618 – 1.38	0.78 – 1.51
Mean	...	1.12	1 21
Standard deviation	...	0.106	0.11
Coefficient of variation	...	9.5	9.9

Ratio between Length : Width 1 : 1.05 – 1.13 (average 1.08)

THE THIRD STAGE NYMPH is golden yellow in colour. The cephalic carinae and the tergal plates well marked, quadrate marginal portion and triangular anterior portion, when the two parts are seen as whole, they prefigure the markings seen in the adult. The segments are now well separated marginally, but not so clearly in the middle. The abdominal chaetotaxy is profuse when compared with the second stage nymph and still scanty when compared with the adults. The last abdominal segments bilobed, not yet showing any sexual modifications. The antennae are modified in the nymphs which are future males (text-figs. 11-12).

CHAETOTAXY

	Male			*Female*		
Pterothorax	Tergal 1+1	Sternal 1+1	Pleural 2+2+2+2	Tergal 1+1	Sternal 1+1	Pleural 2+2+2+2
Abdomen I	1+5+5+1		1+1	2+2		..
II	2+5+5+2		1+1	2+2		1+1
III	2+5+5+2		1+1	3−2+2−3		1+1
IV	2+5+5+2		1+1	2+2−3		1+1
V	2+4+4+2		2+2	2+2		2+2
VI	2+2+2+2		2+2	1+1		2+2
VII	1+1+1+1		2+2	1+1		2+2
VIII	...		1+1	1+1		3+3
IX	1+1+1+1		1+1	1+1+1+1		2+2
	5+5 on the ventrum.			4+4 on the ventrum		

Correlation Table giving Length and Greatest Width of Preantennal Region in Third Stage Nymph.

Length	0.33	0.35	0.36	0.38	0.44	Totals
Width						
0.93	1	...	...	...	...	1
1.00	...	1	...	1	...	2
1.02	...	1	1	...	...	2
1.09	1	2	...	...	..	3
1.15	...	...	...	1	1	2
1.18	1	...	...	...	...	1
Totals	3	4	1	2	1	11

Measurements	Length 0.33−0.44	Width 0.93−1.18
Mean ...	0.36	1.06
Standard deviation	0.08	0.035
Coefficient of variation	2.22	3.41

Ratio between Length : Width 1 : 2.6 −3.6 (average 2.9)

Correlation Table giving Length and Greatest Width of Hind Head in Third Stage Nymph.

Length / Width	0.35	0.44	0.47	0.49	0.53	0.55	0.56	0.59	Totals
0.91	1	...	...	...	...	...	...	...	1
1.00	...	...	1	...	...	...	...	...	1
1.11	...	1	1	...	1	...	1	...	4
1.16	...	...	...	...	...	1	...	...	1
1.18	...	...	...	1	...	...	...	1	2
1.19	...	...	...	1	...	...	...	...	1
1.21	...	...	...	...	...	...	1	...	1
Totals	1	1	2	2	1	1	2	1	11

	Length	Width
Measurements (MM.) ...	0.35–0.59	0.91–1.21
Mean ...	0.51	1.12
Standard deviation ...	0.037	0.058
Coefficient of variation ...	7.25	5.18

Ratio between Length : Width 1 : 1.9–3.3 (average 2.2)

Correlation Table showing Length and Width of Head in Third Stage Nymph.

Length / Width	0.67	0.80	0.82	0.85	0.87	0.89	0.92	0.93	0.94	Totals
0.91	1	...	...	...	...	...	...	...	...	1
1.00	...	...	1	...	...	...	...	...	...	1
1.11	...	1	...	1	...	...	2	...	...	4
1.16	...	...	...	...	1	...	...	...	...	1
1.18	...	...	...	...	...	...	...	1	1	2
1.19	...	...	..	1	...	...	...	...	...	1
1.24	...	...	...	...	...	1	...	...	...	1
Totals	1	1	1	2	1	1	2	1	1	11

	Length	Width
Measurements (MM.) ...	0.67–0.94	0.91–1.24
Mean ...	0.85	1.12
Standard deviation ...	0.039	0.058
Coefficient of variation ...	4.59	5.18

Ratio between Length : Width 1 : 1.2–1.4 (average 1.3)

Correlation Table giving Length and Greatest Width of Prothorax in Third Stage Nymph.

Length / Width	0.25	0.27	0.29	0.31	0.33	0.35	Totals
0.55	1	...	...	...	...	...	1
0.67	...	...	1	2	...	...	3
0.71	1	...	1	1	2	...	5
0.73	...	...	...	...	...	1	1
0.76	...	1	...	...	...	...	1
Totals	2	1	2	3	2	1	11

Measurements (MM.)	Length 0.25–0.35	Width 0.55–0.76
Mean	0.29	0.69
Standard deviation	0.017	0.02
Coefficient of variation	5.8	2.9

Ratio between Length : Width 1 : 2.1–2.7 (average 2.3)

Correlation Table giving Length and Greatest Width of Pterothorax in Third Stage Nymph.

Length / Width	0.42	0.45	0.47	0.49	0.51	0.53	Totals
0.84	...	1	...	...	...	...	1
0.96	...	1	...	...	...	...	1
1.00	...	...	...	2	...	1	3
1.04	1	...	...	...	...	...	1
1.07	...	1	1	2	1	...	5
Totals	1	3	1	4	1	1	11

Measurements (MM.)	Length 0.42–0.53	Width 0.84–1.07
Mean	0.47	1.02
Standard deviation	0.015	0.052
Coefficient of variation	3.2	5.1

Ratio between Length : Width 1 : 1.4–2.5 (average 2.2)

Correlation Table giving Length and Greatest Width of Abdomen in Third Stage Nymph.

Length	1.20	1.27	1.31	1.35	1.40	1.47	1.51	1.69	1.76	1.91	1.98	Totals
Width												
1.25	...	...	...	1	...	...	...	...	...	...	...	1
1.45	...	...	1	...	...	...	...	...	...	...	...	1
1.49	1	...	...	...	...	...	...	...	...	...	...	1
1.51	...	1	...	...	...	...	...	...	...	...	...	1
1.55	...	...	...	...	1	1	1	...	...	...	...	3
1.82	...	...	...	...	...	...	...	1	...	...	...	1
2.00	...	...	...	...	...	...	...	...	1	...	...	1
2.09	...	...	...	...	...	...	...		...	1	1	2
Totals	1	1	1	1	1	1	1	1	1	1	1	11

		Length	Width
Measurements (MM.)	...	1.20 - 1.98	1.25 - 2.09
Mean	...	1.51	1.47
Standard deviation	...	0.121	0.22
Coefficient of variation	...	8.5	15.64

Ratio between Length : Width. 1 : 092 - 1.16 (average 0.96)

From the figures given above it is not possible to show the difference that existed between the male and female second stage nymphs. In the following tables a comparative figure for the two sexes are given for ready reference.

Correlation Table giving Length and Greatest Width of Preantennal Region of Male and Female Third Stage Nymphs Respectively.

MALE

Length	0.29	0.33	0.35	0.37	0.38	Totals
Width						
0.93	1	...	...	...	...	1
1.15	...	2	1	...	...	3
1.17	...	...	2	...	...	2
1.65	...	...	...	2	2	4
Totals	1	2	3	2	2	10

	Length	Width
Measurements	0.29 - 0.38	0.93 - 1.65
Mean	0.39	1.31
Standard deviation	0.22	0.10
Coefficient of variation	7.1	7.6

Ratio between Length : Width 1 : 3.2 - 4.5 (average 4.2)

FEMALE

Length	0.35	0.37	0.38	0.42	0.44	Totals
Width						
1.08	...	...	1	...	1	2
1.15	1	...	...	...	1	2
1.17	...	1	...	...	1	2
1.25	...	...	...	1	1	2
Totals	1	1	1	1	4	8

	Length	Width
Measurements	0.35 - 0.44	1.08 - 1.25
Mean	0.41	1.16
Standard deviation	0.013	0.037
Coefficient of variation	2.5	3.2

Ratio between Length : Width 1 : 2.4 - 2.9 (average 2.8)

Correlation Table giving Length and Greatest Width of Hind Head of Male and Female Third Stage Nymphs Respectively.

MALE

Length	0.51	0.58	Totals
Width			
1.08	5	1	6
1.13	1	3	4
Totals	6	4	10

	Length	Width
Measurements	0.51–0.58	1.08–1.13
Mean	0.54	1.10
Standard deviation	0.005	0.005
Coefficient of variation	0.9	0.45
Ratio between Length : Width	1 : 1.8–2.2 (average 2.3)	

FEMALE

Length	0.43	0.50	0.53	Totals
Width				
1.08	1	2	1	4
1.18	1	2	1	4
Totals	2	4	2	8

	Length	Width
Measurements	0.43–0.53	1.08–1.18
Mean	0.49	1.13
Standard deviation	0.028	0.005
Coefficient of variation	5.7	0.4
Ratio between Length : Width	1 : 2.04–2.7 (average 2.3)	

Correlation Table giving Length and Greatest Width of Head of Male and Female Third Stage Nymphs Respectively.

MALE

Length	0.83	0.87	0.88	0.93	Totals
Width					
1.08	2	3	1	...	6
1.13	...	...	2	2	4
Totals	2	3	3	2	10

	Length	Width
Mesurements	0.83–0.93	1.08–1.13
Mean	0.88	1.10
Standard deviation	0.022	0.022
Coefficient of variation	2.25	2.00
Ratio between Length : Width	1 : 1.24–1.34 (average 1.25)	

FEMALE

Length	0.82	0.85	0.87	0.95	Totals
Width					
1.08	2	1	1	.	4
1.16	...	2	1	1	4
Totals	2	3	2	1	8

	Length	Width
Measurements	0.82–0.95	1.08–1.16
Mean	0.86	1.13
Standard deviation	0.26	——
Coefficient of variation	3.02	——
Ratio between Length : Width	1 : 1.12–1.33 (average 1.31)	

Correlation Table of Length and Greatest Width of Prothorax in Male and Female Third Stage Nymphs Respectively.

MALE

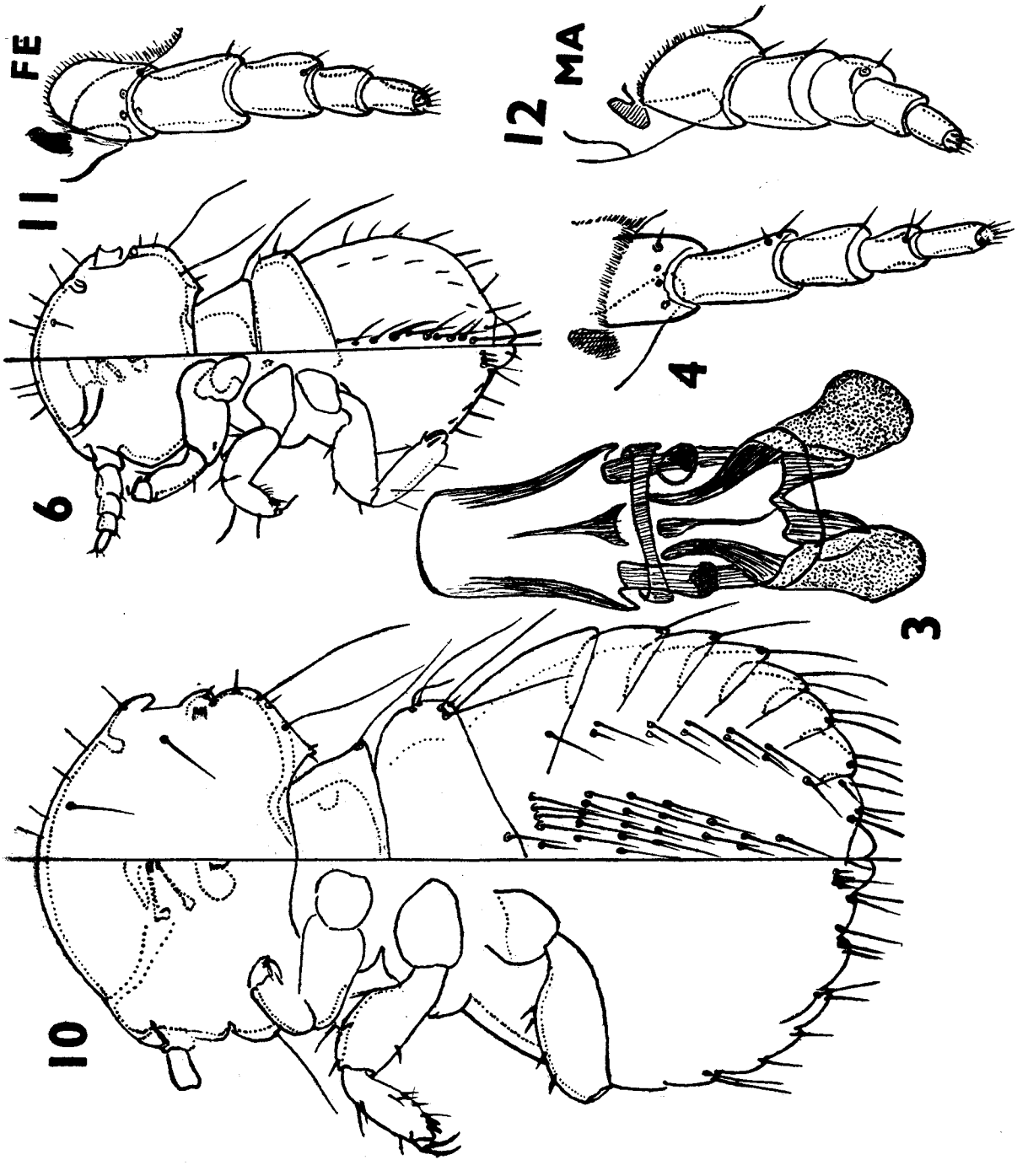
Length	0.33	0.37	Totals
Width			
0.71	8	2	10

	Length	Width
Measurements	0.33–0.37	0.71
Mean	0.34	——
Standard deviation	0.1	——
Coefficient of variation	3.0	——
Ratio between Length : Width	1 : 1.9–2.2 (average 0.203)	

FEMALE

Length	0.33	0.37	0.38	Totals
Width				
0.65	3	1	...	4
0.70	...	2	...	2
0.75	...	...	2	2
Totals	3	3	2	8

	Length	Width
Measurements	0.33–0.38	0.65–0.75
Mean	0.37	0.68
Standard deviation	0.01	0.018
Coefficient of variation	2.5	2.9
Ratio between Length : Width	1 : 1.75–1.97 (average 1.8)	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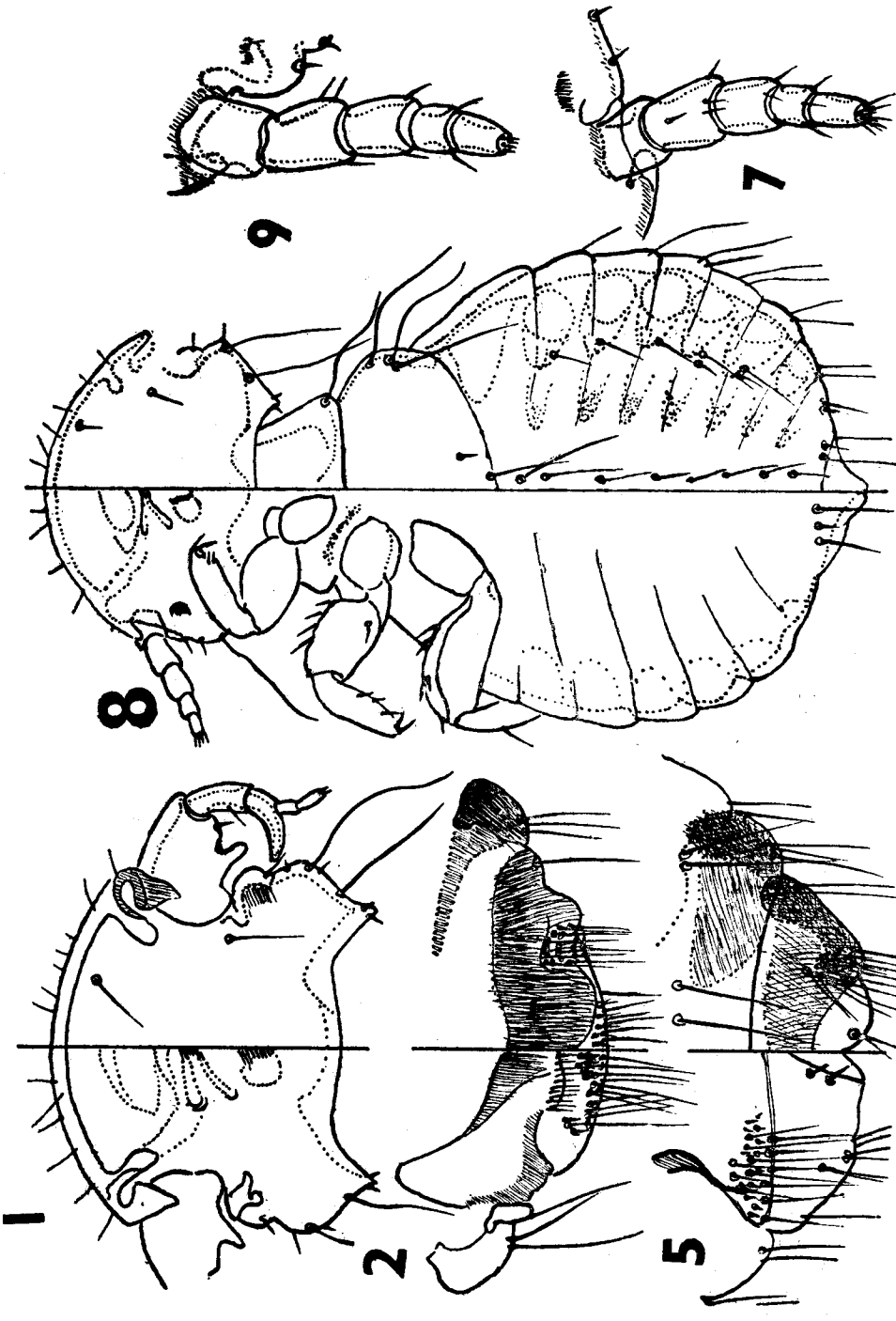

Text figs. 1—12 *Goniodes pavonis* (Linnaeus). 1.—dorsal and ventral view of the head of male. 2.—dorsal and ventral view of the last abdominal segments of male. 3.—male genital armature. 4.—female antenna. 5.—dorsal and ventral views of the last abdominal segments of female. 6.—dorsal and ventral views of I stage nymph. 7.—antenna of I stage nymph. 8.—dorsal and ventral views of II stage nymph. 9.—antenna of II stage nymph. 10.—dorsal and ventral views of III stage nymph. 11.—antenna of III stage female nymph. 12.—antenna of III stage male nymph.

Correlation Table giving Length and Greatest Width of Pterothorax in Male and Female Third Stage Nymphs.

MALE

Length / Width	0.45	0.47	0.51	Totals
0.98	2	3	2	7
1.07	...	1	2	3
Totals	2	4	4	10

Measurements	Length 0.45–0.51	Width 0.98–1.07
Mean ...	0.48	1.01
Standard deviation	0.007	0.016
Coefficient of variation	1.4	1.6

Ratio between Length : Width 1 : 1.92–2.27 (average 2.1)

FEMALE

Length / Width	0.47	0.51	0.52	0.55	Totals
0.98	1	2	1	2	6
1.07	1	1	...	...	2
Totals	2	3	1	2	8

Measurements	Length 0.47–0.55	Width 0.98–1.07
Mean ...	0.51	1.00
Standard deviation	0.018	0.021
Coefficient of variation	3.92	2.1

Ratio between Length : Width 1 : 1.78–2.28 (average 1.96)

Correlation Table giving Length and Greatest Width of Abdomen in Male and Female Third Stage Nymphs.

MALE

Length / Width	1.47	1.63	1.70	1.92	Totals
1.78	2	3	1	1	7
2.12	...	...	1	2	3
Total	2	3	2	3	10

Measurements	Length 1.47–1.92	Width 1.78–2.12
Mean ...	1.69	1.88
Standard deviation	0.12	0.064
Coefficient of variation	7.1	3.5

Ratio between Length : Width 1 : 092–1.21 (average 1.11)

FEMALE

Length / Width	1.53	1.66	1.77	Totals
1.78	...	2	2	4
2.83	2	1	1	4
Totals	2	3	3	8

Measurements	Length 1.53–1.77	Width 1.78–2.83
Mean	1.67	2.30
Standard deviation	0.022	0.25
Coefficient of variation	1.31	1.085

Ratio between Length : Width 1 : 1.01–1.85 (average 1.37)

At this point I wish to point out that in this instalment I have given the measurements of males, females and three stages of nymphs collected from five adult pea-fowls (3 males and 2 females). All these birds were shot from the same place, at the same time and no other bird species was shot along with them. This is small collection and therefore I have not been able to analyse this data properly and draw some important conclusions. Any how this data presented suggests that the size of lice varies considerably and special precautions therefore, be taken to base species on few specimens and meagre measurements. As a matter of fact the measurements alone are most defective means to recognise a species.

GROWTH OF NYMPHAL INSTARS OF *GONIODES PAVONIS* LINNAEUS AND DYAR'S PRINCIPLE.

According to Dyar (1890) the successive larval instars in Lepidoptera follow a regular geometrical progression. Since then this principle was applied to various other orders of insects. It was found helpful in some and of no utility in others (Atiqurrahman 1954). The result of applying the principle to the head width in Mallophaga was presented by me in a recent publication (Atiqurrahman 1956). The data in hand is calculated on these lines and additional information is supplied herewith.

Growth of Nymphal Instars of GONIODES PAVONIS (Linnaeus) and Dyars' Principle.

I stage (observed)	II stage (calculated)	III stage (calculated)
0.60×1.44	$=0.864 \times 1.44$	$=1.244$
0.61×1.44	$=0.878 \times 1.44$	$=1.265$
0.63×1.44	$=0.907 \times 1.44$	$=1.306$
0.64×1.44	$=0.922 \times 1.44$	$=1.327$
0.65×1.44	$=0.936 \times 1.44$	$=1.348$
0.66×1.44	$=0.951 \times 1.44$	$=1.368$
0.67×1.44	$=0.965 \times 1.44$	$=1.389$
0.75×1.44	$=1.081 \times 1.44$	$=1.555$
0.82×1.44	$=1.181 \times 1.44$	$=1.701$

	II stage (observed)	III stage (calculated)
...	0.64×1.44	$=0.922$
...	0.65×1.44	$=0.936$
...	0.75×1.44	$=1.081$
...	0.76×1.44	$=1.094$
...	0.77×1.44	$=1.109$
...	0.82×1.44	$=1.181$
...	0.85×1.44	$=1.224$
...	0.91×1.44	$=1.311$
...	0.95×1.44	$=1.383$

The observed head width in the III stage nymphs varies from $0.911 - 1.24$ mm.

It was pointed out in an earlier publication that Przibram and Mergusar principle may also be applied to mallophagan insects. This principle states that the linear dimensions in some insects increase at each ecdysis by a constant equal to $3/b = 1.26$. It will not be out of place to point out that the primary object of nymphal stages of insects is to feed and continue growing during a stadium. The rapidity with which the growth takes place and the great increase in size that is reached during each instar is evident from the figures given above. It is therefore most important in these studies that the newly emerged nymphs are compared with the newly moulted nymphs in the following stage, and the day old ones with their own age group of the next stage. The wide range of measurements will then be better understood. This principle was applied to the data given above and the results are tabulated below. For conclusions a reference may be made to Atiqurrahman 1956.

The Growth of Nymphal Instars of GONIODES PAVONIS (Linnaeus) and Przibram Mergusar's Principle as Modified by Bodenheimer.

III stage (observed)	II stage (calculated)	I stage (calculated)
0.911÷1.26	=0.723÷1.26	=0.573
1.00 ÷1.26	=0.794÷1.26	=0.631
1.11 ÷1.26	=0.881÷1.26	=0.699
1.16 ÷1.26	=0.921÷1.26	=0.731
1.18 ÷1.26	=0.937÷1.26	=0.743
1.19 ÷1.26	=0.944÷1.26	=0.751
1.24 ÷1.26	=0.984÷1.26	=0.781

	II stage (observed)	I stage (calculated)
...	0.64÷1.26	=0.508
...	0.65÷1.26	=0.515
...	0.75÷1.26	=0.595
...	0.76÷1.26	=0.603
...	0.77÷1.26	=0.611
...	0.82÷1.26	=0.651
...	0.85÷1.26	=0.674
...	0.91÷1.26	=0.722
...	0.96÷1.26	=0.762

The observed head widths in I stage nymph vary from 0.60−0.82 mm.

The Growth of Nymphal Instars of GONIODES PAVONIS (Linnaeus) and Przibram Mergusar's Principle as Modified by Bodenheimer. (As Applied to Body Lengths).

III stage (observed)	II stage (calculated)		I stage (calculated)	
3.46÷1.26	=2.78÷1.26	=2.21÷1.26	=1.75	
3.53÷1.26	=2.81÷1.26	=2.23÷1.26	=1.77	
3.64÷1.26	=2.93÷1.26	=2.33÷1.26	=1.85	
3.71÷1.26	=2.97÷1.26	=2.36÷1.26	=1.87	
3.91÷1.26	=3.08÷1.26	=2.44÷1.26	=1.93	
4.01÷1.26	=3.24÷1.26	=2.57÷1.26	=2.04	
4.18÷1.26	=3.32÷1.26	=2.63÷1.26	=2.08	
4.28÷1.26	=3.39÷1.26	=2.68÷1.26	=2.13	
4.43÷1.26	=3.51÷1.26	=2.78÷1.26	=2.21	
MALES :—				
4.11÷1.26	=3.26÷1.26	=2.59÷1.26	=2.06	
4.12÷1.26	=3.27÷1.26	=2.60÷1.26	=2.07	
4.15÷1.26	=3.29÷1.26	=2.61÷1.26	=2.08	
4.28÷1.26	=3.39÷1.26	=2.68÷1.26	=2.13	
FEMALES :—				
4.18÷1.26	=4.01÷1.26	=3.32÷1.26	=2.63÷1.26	=2.08
4.12÷1.26	=3.35÷1.26	=2.66÷1.26	=2.11	
4.19÷1.26	=3.39÷1.26	=2.68÷1.26	=2.13	
4.25÷1.26	=3.44÷1.26	=2.73÷1.26	=2.16	

The observed length of the I and II stage nymphs vary from 1.35−1.81 and 2.032−3.367 respectively.

POST SCRIPT—CHANGE OF NAME

A NEW NAME PROPOSED FOR *BRUELIA LONGIFRONS* ANSARI, 1956

Mr. Carriker Jr. suggested a new name *Bruelia longifrons* for specimens he collected from *Parus atricapillus longicaudatus* Harris. This description is published in *the Floride Entomologist* (39 (2) : June 1956, 69).

During the same period, I revised the *Bruelia* species occurring on true thrushes and gave the same name (*Bruelia longifrons*) to a new species collected from *Hylocichla ustulata*. The description was submitted on July 20, 1955 (inserted on page 143 : *Biologia*, 2 (1), June 1956) for publication in the *Biologia*, Lahore. The paper was however published in the June issue of the journal. In the meantime, however, I read this paper at the VIII Annual Session of the Pakistan Association for the Advancement of Science held at Dacca (East Pakistan) during February, 1956. An abstract, in the form of a key to species discussed in the paper, was published in the Proceedings well in advance to the session.

To what specimens this name is available, is now the question. It is to be decided in the light of article 25 E and 27 of the Rules of Zoological Nomencalture. (1) Is the name published in the Proceedings of the VIII Pakistan Annual Science Conference is valid ? (2) Can the date on which a paper is submitted for publication be considered while deciding a case of priority ? I discussed these questions with my coleagues but with no satisfactory answer.

It is an ambiguous case. Probably the name appearing in the Proceedings will not be acceptable under rules in force. The date of submitting the paper for publication also does not give it any status. The *Biologia*, Lahore was in our hand on the 1st of June. It is very difficult to say when *Florida Entomologist* for June was actually issued. Under these conditions I provisionally propose *Bruelia zeropunctata* for *Bruelia longifrons* Ansari from *Hylocichla ustulata* (*Biologia*, Lahore. 2 (1) : 121) and *Bruelia zoropunctata antiqua* for *Bruelia longifrons antiqua* Ansari from *Hylocichla guttata* (l.c., 122).