INTERNATIONAL JOURNAL OF AGRICULTURE & BIOLOGY
1560–8530/2004/06–6–1050–1052
http://www.ijab.org

Analysis of Taxonomic Characters of the Pakistani Species of the Genus *Grassomyia* Lewis (1987) (Diptera, Psychodidae, Phlebotominae)

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ABSTRACT

During an extensive taxonomic study conducted by the author in the whole of the Balochistan Province in 1996-2001, two species of the genus *Grassomyia* Lewis (1987) were collected. Detailed analysis of 23 female and 24 male diagnostic characters are given in the present paper to facilitate their identification.

Key Words: Sandfly; Genus *Grassomyia;* Diagnostic characters

INTRODUCTION

Lewis (1967) classical work was based on the sandflies of Punjab, N.W.F.P. and Sindh Provinces, but Balochistan Province, the biggest one of the country, was left un-surveyed. In view of the insufficient work of Lewis (1967), the present author surveyed the whole of the Balochistan Province in 1996-2001 to study the fauna of the sandflies (Kakarsulemankhel, 2001). Comparison of diagnostic parameters of the two species of the genus *Grassomyia* Lewis (1987) viz., *Grassomyia indica* Theodor (1931) and *G. dreyfussi turkestanica* Theodor and Mesghali (1964) are presented here.

MATERIALS AND METHODS

Sandflies were collected from in-doors as well as from out doors using suction tubes, sticky paper and light traps. Flies were processed, preserved, dissected and mounted according to the conventional methods especially those adopted by Johnson *et al.* (1963), Lewis (1973), Killick-Kendrick (1983) and Killick-Kendrick *et al.* (1994). For species identification, keys furnished by Lewis (1967, 1978, 1982) and Artemiev (1978) were consulted. Specimens are housed with the Author's Collection of Sandflies, Department of Zoology, University of Balochistan, Quetta.

RESULTS AND DISCUSSION

Twenty-three parameters of the female and 24 characters of male specimens were studied, compared and presented in Table IA and IB.

In female specimens of *Grassomyia indica,* taxonomic characters like head length / breadth, eye length / breadth, eye length / head length, wing length / breadth, labrum / head length, labrum sensilla depth, position of ascoid on A5, position of papillae on A3 and A4, number of cibarial teeth, anterior process of pigment patch, spermathecal capsule and genital furca were observed to be larger as compared with that of *G. dreyfussi turkestanica.* Further, egg-shaped spermathecae of *G. indica* were found while spermathecae of *G. d. turkestanica* were not of egg shaped. Femur 1, of *G. indica* was observed with no spines and no sockets whereas spines and sockets were found on femur 1 of *G. d. turkestanica.* Similarly, distance between eyes, alar index, palps length, proboscis length, labrum length, A3 length, A3 / labrum,A3 / A4+A5, A3 / wing length, A3 / proboscis, ascoid / A4, ascoid / A5, position of ascoid on A4, cibarium breadth, pigment patch, hind width / fore width of pharynx and height of armature / pharynx length of *G. d. turkestanica* were observed to be larger as compared with that of *G. indica.*

In the male of *G. indica* features like wing length / breadth, alar index, palps length, ascoid / A4, ascoid / A5, ascoid position on A4 and A5, number of cibarial teeth, anterior process of pigment patch, pharynx, hind width / fore width of pharynx, coxite length / breadth, coxite / labrum, coxite / A3 and aedeagus were found to be relatively larger as compared with that of *S. t. pakistanica.* Similarly, labrum length, labrum / wing length, A3, A3 / wing length, style length / breadth, ends of genital filament and filament / pump of *G. d. turkestanica* were observed greater than that of *G. indica.* However, pigment patch of *G. d. turkestanica* was observed without an anterior process.

CONCLUSION

In conclusion, it is suggested that in additions to the conventional features, extra characters like distance between eyes, wing length / breadth, alar index, labrum length, length comparison of A3 with**:** labrum, A4+ A5, proboscis, wing length, and cibarial breadth, size of ends of genital

Table IA. Comparative analysis of taxonomic parameters of the Pakistani species of the genus *Grassomyia*

Key Parameters Female	***Grassomyia indica***	***Grassomyia dreyfussi turkesta turkestanica***
1. Head length / breadth	1.0- 1.058	1.022- 1.086
2. Eye length / breadth	1.66-1.71	1.571-1.615
distance between eyes	0.128- 0.144	0.152- 0.168
3. Eye length / head length	0. 5- 0.53	0.44- 0.45
4. Wing length / breadth	3.77- 4.12	3.60- 3.33
5. Alar index	0.958- 0.971	1.0- 1.07
6. Palps length	0.48- 0.51	0.52- 0.56
7. Proboscis length	0.15- 0.17	0.17- 0.18
8. Labrum length	0.12- 0.13	0.12-0.14
/ wing length	0.093- 0.095	0.090- 0.097
/ head length	0.361- 0.375	0.326- 0.35
sensilla depth	0.04	0.033
9. Hypopharynx	apical margin pointed, lateral margin smooth,	apical and lateral margins weakly undulating,
dental depth	–	0.04
10. Maxilla	–	with sharp and thin apical part (0. .009 long), 6 lateral and 23 ventral teeth,
dental depth	–	0.028
11. Mandible	narrow, 5 re-curved teeth per 0. 004,	0.005 broad, with 4 small re-curved denticles per 0.004.
dental depth	–	0.032
12. A3 length	0.12-0.14	0.14- 0.17
/ labrum	1.0- 1.07	1.166- 1.214
/ A4 + A5	0.827-0.853	0.921-0.934
/ wing length	0.093- 0.102	0.118
/ proboscis	0.80- 0.823	0.823- 0.944
13. Ascoid 4 / A4	0.25- 0.285	0.44- 0.473
14. Ascoid 5 / A5	0.285- 0.32	0.456- 0.526
15. One ascoid and its on		
position on A4	0.267	0.39
A5	0.285-0.32	0.24
16. Single papilla and its		
position on A3	0.852	0.81
A4	0.732	0.633
17. Cibarium	0.034- 0.036 broad, 40- 48 small uniform teeth on a slightly concave row, a line of black dot like denticles at the hind bases of teeth,	0.07- 0.08 broad, 40-44 uniform (0.008 long) teeth in a concave row and 32- 34 minute rounded denticles at the hind bases of teeth,
18. Pigment patch	very thick (0.062 long, 0.024 broad), with a long inward triangular extension in the form of anterior process,	very dark and very thick (0.054- 0. 060 long, 0.05 broad), with a short anterior process,
19. Pharynx	0.13- 0.14 long, anterior-central armature strong and yellow pigmented whereas the basal armature relatively faint and weak, basal part of pharynx constricted,	very wide, flask shaped, 0. 14- 0. 16 long, anterior edge of armature forms a sharp convex line whereas armature of lateral sides not touch the side walls of the pharynx, anterior central part consists of large erect spine whereas hind and basal part composed of shorter and weak spines,
length / breadth		
hind width / fore width	2.153- 2.166	two times, basal part of pharynx lesser constricted,
armature height / length	2.16- 2.72	3.2-3.5
	0.3- 0.307	0.285-0.312
20. Spermatheca	almost egg- shaped, anterior part of capsule smooth whereas distal hind part with transverse striations,	not egg shaped, anterior smooth part, distal part with minute chitinous scales,
capsule length	0.04- 0.044	0.028- 0.03
fore width	0.024	0.024
hind width	0.032	0.034
basal width	0.012	0.024
21. Genital furca length	0.08	0.064
22. Genital atrium width	0.048	0.040
23. Femur 1	without spine, without sockets	in some specimens it was found lost and their sockets look like those of large hairs, some specimens found with spines on femur 1 and also with socket of spines, 5 femoral black spines observed arranged laterally and 7 sockets were also found,

filaments and presence and absence of spines on femur 1 should also be taken into account while identifying the species of the genus *Grassomyia* as these parameters facilitate the correct identification among the species.

Acknowledgements. The author wishes to thank Professors Drs. Killick-Kendrick, R.; David, J. Bradley; R. W. Ashford; R.P. Lane and Dr. David Evans for their encouragement and valuable guidance on sandflies. My sincerest thanks are also due to respected Joanna Kapusta

Table IB. Male

Key Parameters Male	*Grassomyia indica*	*Grassomyia dreyfussi turkesta turkestanica*
1. Head length / breadth	1.10-1.12	–
2. Eye length / breadth	1.06-1.31	–
3. Distance between eyes	0.186-0.19	–
4. Wing length / breadth	4. 428- 5. 0	4.33
5. Alar index	0.757- 0.857	0.531
6. Palps length	0.48- 0.53	0.48
7. Proboscis length	0.14	–
8. Labrum length	0.08- 0.09	0.11
/ head length	0.222-0.239	–
/ wing length	0.066- 0.072	0.105
9. Hypopharynx	Median apical part with 5-7 closely arranged shorter teeth whereas laterals sharply pointed and longer not arranged closely,	with pointed apex
dental depth	–	0.02
10. A3 length	0.11-0.13	0.16
/ wing length	0.91-0.104	0.153
/ head length	0.305-0.345	–
/ labrum length	1.375-1.444	1.45
/ proboscis length	0.785-0.928	–
/ A4+ 5	0.733-0.802	–
11. Ascoid 4 / A4	0.35-0.357	0.222
12. Ascoid 5 / A5	0.325-0.328	0.222
13. Single ascoid and its position		
on A4	0.293	0.227
A5	0.296	0.245
14. Single papilla and its position		
on A3	0.785	–
on A4	0.60	0.61
on A5	–	0.57
15. Cibarium	0. 05 broad, 20- 24 small teeth arranged in an almost straight line,	0. 044 broad, 20 small teeth on a straight line,
16. Pigment patch	small, median (0. 018 long), with a long anterior process	small without anterior process
17. Pharynx	0.12- 0.125 long, armature very faint and weak, armature occupies mostly the basal part,	0.11 long, weak armature in the form of irregular rows, and occupy posterior part behind the pharyngeal bulb,
length / breadth	2.6- 3.0	three times
hind width / fore width	2.0-2.5	1.18
height of armature / length	0.192-2.0	0.19
18. Coxite length / breadth	3.16-3.46	3.21
coxite / style	2.11-2.25	2.25
coxite / labrum	2.11-2.25	1.63
coxite / A3	1.46-1.63	1.125
19. Style	with 2 apical, 2 sub apical spines	2 apical, 2 sub apical spines,
length / breadth	3.214	3.63
20. Ventral seta at	0.76	0.9
21. Paramere	with a ventral tubercle, with a blunt end,	with narrow and beaked end,
22. Aedeagus	long (0.08-0.09) relatively thinner than of *G. d. turkestanica*	short (0.07 long), with a broad knife like apex
23. Genital filament	with less dilated ends,	with more dilated,
/ pump	2.88-3.2	3.4
24. Surstyle / coxite	0.88-0.89	0.88

(BMNH), Linda Huddleston (BMNH), Dr. J.-P. Dedet (France), Dr. Farrokh Modabber (WHO) and Prof. Dr. V. N. Neronov (Russia) for providing the literature on sandflies.

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(Received 01 March 2004; Accepted 26 July 2004)