

# Analysis of External and Anatomical Characters of the Pakistani Species of the Subgenus *Sintonius* Nitzulescu (1931) (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 *Sergentomyia*, subgenus *Sintonius* Nitzulescu (1931) were collected. Detailed analysis of 23 female and 24 male diagnostic characters is given in the present paper to facilitate their identification.

**Key Words:** Sandfly; Subgenus *Sintonius*; 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 subgenus *Sintonius* viz., *Sergentomyia clydei* Sinton (1928) and *S. tiberiadis pakistanica* Artemiev and Safayanova (1974) 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-two parameters of the female and 24 characters of male specimens were studied, compared and presented in the given Table IA and IB.

In female specimens of *S. clydei* taxonomic characters like alar index, palps length, proboscis length, labrum, A3 / A4+5, A3/ proboscis, ascoid position on A3, pharynx hind width/ fore-width, hind width of spermathecal capsule and

genital atrium breadth were observed to be comparatively larger as compared with of *S. tiberiadis pakistanica*. Further, lateral margins of hypopharynx were found with deep undulations appearing broader teeth like structures in *S. clydei* while weak undulations were found in the *S. t. pakistanica*. Significant variations in number of lateral and ventral maxillary teeth in these two species were observed. Similarly, wing length / breadth, A3 / labrum, ascoid 4/ A4, ascoid 5 / A5, ascoid position on A5, pharynx length / breadth, spermathecal capsule, ducts length and genital furca of *S. t. pakistanica* were observed to be larger as compared with that of *S. clydei*.

In male of *S. clydei*, features like alar index, proboscis, labrum, A3, A3 / A4+5, anterior process of pigment patch, pharynx hind width / fore width, coxite length / breadth, coxite / A3, aedeagus, genital filament / pump and surstyle / coxite were found to be relatively larger as compared with that of *S. t. pakistanica*.

Further, greater number (16-22) of cibarial teeth was noted in *S. clydei* while fewer numbers of teeth (13-15) were counted in *S. t. pakistanica*.

Similarly, wing length / breadth, dental depth of hypopharynx, A3 / wing length, ascoid 3 / A3, ascoid 4 / A4, ascoid 5 / A5, pharynx length / breadth, height of pharyngeal armature and coxite / labrum of *S. t. pakistanica* were observed greater than that of *S. clydei*. However, a short anterior process of pigment patch of *S. t. pakistanica* was found.

## CONCLUSION

In conclusion, it is suggested that in additions to the conventional features, extra characters like mouth-parts (hypopharynx, maxilla), morphology of pharynx, size of spermathecal capsule and length of spermathecal ducts, coxite length / breadth, coxite / A3, size of aedeagus, surstyle/

**Table IA. Comparative analysis of taxonomic parameters (in mm) of the Pakistani species of the sub genus *Sintonius* Nitzulescu (1931)**

Key Characters Female	<i>S. clydei</i>	<i>S. tiberiadis pakistanica</i>
1. Head length / breadth	1.156- 1.166	–
2. Eye length / breadth	1.466-1.6	–
distance between eyes	0.14-0.16	–
3. Wing length / breadth	3.8-4.11	–
4. Alar index	0.66-0.71	0.583-0.6
5. Palps length	0.664	0.5-0.51
6. Proboscis length	0.21-0.23	0.18-0.19
7. Labrum length	0.19-0.21	0.16-0.17
/ wing length	0.133	0.12-0.13
/ head length	0.55	–
sensilla depth	0.03	0.028
8. Hypopharynx	apical margin with deep undulations, lateral margins with weak undulations,	with broad teeth like structures, apical margin smooth
dental depth	0.032	–
9. Maxilla	with 3 lateral teeth and 30 ventrals	6 lateral and 27 ventral teeth,
dental depth	0.088	0.098
10. Mandible	0.007 broad, with 22 teeth	5 re-curved teeth per 0.004
dental depth	0.028	–
11. A3 length	0.13- 0. 15	0.112- 0. 116
/ labrum	0.3	0.682- 0. 7
/ A4 + A5	0.903	0.84- 0. 868
/ wing length	0.087- 0.098	0.084- 0.093
/ proboscis	0.636	0. 610- 0.622
12. Ascoid 3 / A3	0.285	0. 30- 0. 31
13. Ascoid 4 / A4	0. 532	0. 546-0. 588
14. Ascoid 5 / A5	0. 538	0. 553- 0. 571
15. 2 Ascoids and their positions on		
A 3	0.80	0.68
A 4	0.347	0.35
A 5	0. 352	0.38
16. Position of papilla on A 3	–	A3 has 3 prominent papillae 0.55, 0.48, 0.55, 0.82
A 4	–	A single papilla near tip of ascoid 0.62
17. Cibarium	0. 048- 0. 056 broad, with 11- 15 needle like teeth standing on a straight line, 12-14 minute punctiform denticles in a zigzag line present above the teeth	0.048-0.055 broad, with 12-16 teeth wide and pointing upward, 10-15 denticles in 1-2 zigzag row present above the teeth
18. Pigment patch	well marked triangular with broad bifid anterior projection	triangular, with long anterior process
19. Pharynx	armature occupies most of the basal part in the form of needle like ridges with punctiform denticles whereas anterior part with unarmed transverse ridges,	narrowing gradually behind the bulge with a basal width 0. 024, armature in the form of weak transverse ridges
hind width / fore width	2.78	1.25-1.27
armature height / length	0.145	–
20. Spermatheca	8-10 segments, apical segment with a short neck (0. 004 long) with hair like ductules (0. 005 long),	7-9 segments, narrowing towards apex, ducts narrow
capsule length	0.02-0.024	0.028
fore width	0.008- 0.01	0.009
hind width	0. 014- 0.016	0. 012
21. Ducts length	0. 009- 0.013	0. 016
22. Genital furca length	0. 06- 0.065	0. 088
23. Genital atrium width	0. 05- 0.064	0. 04

coxite and filament / pump should also be taken into account while identifying the species of the subgenus *Sintonius* as these parameters facilitate the correct identification among the species.

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**Table IB. Male**

Key Characters Male	<i>S. clydei</i>	<i>S. tiberiadis pakistanica</i>
1. Head length / breadth	1.119-1.28	–
2. Eye length / breadth	1.86-2.0	–
3. Distance between eyes	0.15-0.17	–
4. Wing length / breadth	3.8-4.0	4.375-4.411
5. Alar index	0.625-0.733	0.456
6. Palps length	0.51-0.54	0.53
7. Proboscis length	0.18-0.21	0.16-0.18
8. Labrum length	0.16-0.17	0.12-0.14
/ head length	0.455	–
/ wing length	0.12	0.114
9. Hypopharynx	0.018 broad, apex broad,	with 8-9 sharply pointed teeth,
dental depth	0.024	0.028
10. A3 length	0.15-.17	0.12-0.15
/ wing length	0.116	0.107-0.125
/ labrum length	0.969	0.984
/ A4 + A5	0.941	0.787
11. Ascoid 3 / A3	0.168	0.215-0.23
12. Ascoid 4 / A4	0.365	0.363-0.368
13. Ascoid 5 / A5	0.352	0.333-0.368
14. Single ascoid and its position on A3	–	0.646
A4	–	0.333
A5	–	0.343
15. Single papilla and its position on A3	0.847	0.85
A4	0.67	0.736
16. Cibarium	0.04- 0.055 broad, with 16- 22 small teeth arranged in groups of 2-3 on a line slightly convex, above these teeth an irregular row of punctiform denticles,	0.044- 0.048 broad, 13- 15 long and pointed a teeth standing on an almost straight line, above these teeth are about 15 minute punctiform denticles arranged in a zigzag line,
17. Pigment patch	Less developed than of female, with an anterior long process,	triangular, with short anterior process,
18. Pharynx	armature weak and small, occupies most of the hind part behind the pharyngeal bulge,	armature in the form of weak transverse ridges in the basal part of the pharynx,
length / breadth	3.0	3.5-5.0
hind width / fore width	2.08	1.66
height of armature / length	0.09	0.147
19. Coxite length / breadth	3.14- 4.03	3.46
coxite / style	2.2- 2.33	2.28- 2.30
coxite / labrum	1.29-1.31	1.33- 1.42
coxite / A3	1.29- 1.4	1.33
20. Style	with 2 apical and 2 sub apical spines	with 2 apical and 2 sub apical spines,
length / breadth	3.95	2.80-3.0
21. Ventral seta at	0.666-0.777	0.71
22. Paramere	with a ventral tubercle, gradually narrowing towards anterior and finally bends laterally like a bird's head,	with a ventral tubercle, gradually narrowing and ending with a blunt end,
23. Aedeagus	0.10- 0.11 long, with pointed ends,	0.075- 0.085 long, with pointed ends,
24. Genital filament / pump	3.77-4.154	3.33-4.9
24. Surstyle / coxite	0.953	0.70-0.75

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