

Genus Oryzaephilus Ganglbauer

Silvanus (Oryzaephilus) Ganglbauer, 1899, Die Käfer Von Mitteleuropa 3 : 584.

Oryzaephilus Ganglbauer : Reitter, 1911, Fauna Germanica 3 : 45; Grouvelle, 1912, Annls Soc. ent. Fr. 81 : 318.

Type-species : Oryzaephilus surinamensis (L.)

The representatives of this genus can be recognised by its elongated and somewhat flat body, ranging from 2.50 to 3.50 mm in length, elongated prothorax with three longitudinal carinae on pronotum and with six lateral teeth. Ganglbauer (1899) erected the subgenus Oryzaephilus under the genus Silvanus Latreille for the species S. surinamensis (L.) and S. mercator Fauvel. Reitter (1911) gave generic status to Ganglbauer's subgenus Oryzaephilus. Hetschko (1930) in Junk's "Coleopterorum Catalogus" listed eight species under this genus, of which only O. gossypii (Chittenden) is recorded from India. In the present study four species are dealt with, of which two are new and the larva of O. mercator is described (see p. 284).

Definition :

General appearance (Fig. 1) elongated, moderately depressed, pronotum with three distinct longitudinal carinae and six lateral teeth, usually reddish brown to blackish brown.

Head (Fig. 3) elongated, front margin of clypeus almost straight, eyes small to large and coarsely faceted, temple flattened beneath eye and shelf-like, transverse impressed line on vertex behind eyes absent, tentorium as seen in figure. Antenna moderately long and slender, antennal insertions hidden under projection of frons, 11-jointed, scape broadly elongated, pedicel and joint 3 usually about as long as scape and slightly narrower, joints 4-8 shorter and subequal, club loose and 3-jointed. Mandible (Fig. 10) elongated with 3 apical teeth, mola well-developed, a trace of dorsal mandibular cavity present near base. Maxilla (Fig. 11) with lacinia narrow, elongated and without apical spines; galea short and broad and its apex densely hairy; palpi with segments 2 and 3 almost equal, apical segment longest and fusiform. Labium (Fig. 12) with mentum somewhat triangular and transverse, palpi with apical segment longest and fusiform. Labrum (Fig. 13) transverse and its apical margin rounded

Prothorax (Fig. 4) elongated, lateral margin with six distinct teeth, pronotum with a discal area demarcated by a median and lateral longitudinal carinae and lateral longitudinal grooves on either sides of median carina. Front coxae almost contiguous, coxal cavities almost round, cavities broadly closed behind externally and internally, prosternal process broad at apex and its apical margin straight, sterno-pleural suture extending to anterior tooth.

Meso-metathorax (Fig. 6) : Mesocoxae almost contiguous, cavities broadly opened outwardly, lateral margins of mesosternal process simple, sternal fitting between mesocoxae almost in a straight line. Metasternum slightly transverse, median impressed line extends anteriorly near middle, hind coxae widely separated. Metendosternite simple and represented by two appophyses.

Wing and Elytra : Wing (Fig. 9) with single anal vein and radial cell, without anal cell and subcubital fleck. Elytra somewhat parallel-sided, side margins usually slightly wavy, each elytron (Fig. 7) with 9 rows of striae punctures, without scutellary striole, interstices pubescent, epipleura narrow and complete upto apex.

Legs (Fig. 5) moderately long and slender, trochanters short and simple, femora swollen towards middle, tibiae not broadened at apex, tibiae devoid of any distinguishable apical spur; tarsal formula 5-5-5 in both sexes, tarsi simple, tarsal segment 1 elongated, segments 2 and 3 equal and slightly shorter than segment 1, segment 4 shortest, claws simple. In male hind trochanter with a spinous projection and hind femur with a distinct spine on posterior side at middle.

Abdomen (Fig. 8) elongated, ventrite 1 longer than ventrites 2-5, intercoxal process broad and its apical margin almost straight, femoral lines closed, ventrites 2-5 subequal. Aedeagus (Fig. 14) with median lobe broad, median sturt elongated and

its apex spatulate; parameres well-developed, slender and elongated, fringed with a few long setae and many short setae. Ovipositor (Fig. 15) with well-developed paraprocts, valvifers, coxites and styli attached on outer margin of apex of coxites.

Habitat : Stored food products, dried seeds and also attracted at light.

Distribution : All Zoogeographical regions.

KEY TO THE SPECIES OF ORYZAEPHILUS FROM INDIA

1. Length of temple of head about as long as 2 to 2.5 eye facets, length of eye about 3 to 4 times the length of temple ..... 2  
Length of temple of head about as long as 3.5 to 4 eye facets, length of eye usually less than twice the length of temple. .... 3
2. Antennal joints 6 and 7 about as long as broad, prothorax elongated (1.10 to 1.14 : 1.00), lateral margins of frons and longitudinal carinae on pronotum normally elevated. .... mercator (Fauvel)  
Antennal joints 6 and 7 distinctly elongated, prothorax more elongated (1.21 : 1.00), lateral margins of frons and longitudinal carinae on pronotum strongly and more markedly elevated. .... elevatus sp.nov.

3. Antennal joints 6 to 8 about as long as broad, aedeagus with parameres fringed with long apical and outer marginal setae (Fig. 19). . . . . surinamensis (L.)  
Antennal joints 6 to 8 elongated, aedeagus with parameres fringed with a few long and forked setae only at apex (Fig. 20). . . . . genalis sp.nov.

32. Oryzaephilus surinamensis (Linnaeus)

Dermestes surinamensis Linnaeus, 1767, Systema Naturae ed.

12 : 565 (Type-loc. : Surinam, Dutch Guinea).

Tenebrio surinamensis (L.) : De Geer, 1775, Mémoires pour Servir a l'histoire des insectes 5 : 54.

Anobium frumentarium Fabricius, 1775, Systema Entomologiae 1 : 62.

Ips frumentaria Olivier, 1790, Entomologie, ou histoire naturelle des insectes 2 (18) : 10.

Colydium frumentarium (F.) : Fabricius, 1792, Entomologiae Systemeticae emendate et auctae 1(2) : 496.

Dermestes sexdentatus Fabricius, 1792, Entomologiae Systemeticae emendate et auctae 1(2) : 232.

Lyctus sexdentatus (F.) : Kugelann, 1794, Neustes Mag. Liebhaber Ent. 1 : 566.

Colydium sexdentatum Paykull, 1880, Fauna Suecica. Insecta 3 : 313.

Silvanus sexdentatus (F.) : Gyllenhal, 1813, Insecta Suecica 1(3) : 406.

Silvanus surinamensis (L.) : Stephens, 1830, Illustration of British Entomology. Mandibulata 3 : 104.

Silvanus (Oryzaephilus) surinamensis (L.) : Ganglbauer, 1899, Die Käfer Von Mitteleuropa 3 : 584.

Oryzaephilus surinamensis (L.) : Reitter, 1911, Fauna Germanica 3 : 46.

General appearance (Fig. 16) elongated, moderately flattened, reddish brown to blackish brown and covered with short, semierect, golden pubescence.

Head : Exposed part of head about as wide as long, eyes small to moderately large, length of eye about one-fourth of length of head, length of temple about as long as 3.5 to 4 eye facets and about as long as eye or slightly shorter than it, lateral margin of frons slightly elevated, puncturation on vertex coarse and dense and that of towards anterior margin of clypeus slightly finer, setae short and projected towards middle line. Antenna moderately long and slender, scape moderately large, pedicel and joint 3 slightly shorter and narrower than scape, joints 4-8 subequal and about as broad as long, joints 9 and 10 transverse and joint 11 about as long as broad or slightly transverse. Prothorax elongated,

convex, anterior margin outwardly curved with slight indentation at middle, lateral margin with anterior tooth more acute than other teeth, pronotal disc with lateral longitudinal carinae convergent towards extremities than in middle, longitudinal grooves on either sides of median carina rather well-marked, puncturation on pronotum coarse and dense and similar to that of vertex of head. Scutellum moderately large, transverse and pubescent. Elytra slightly more than two times as long as broad, lateral margins wavy and explanate, rows of punctures on elytra moderately large; interstices 3,5 and 7 slightly carinate; setae projected posteriorly. On ventral side puncturation of head and prothorax almost similar to that of dorsal side, of meso-metathorax and abdomen slightly finer. Aedeagus (Fig. 19) with parameres long and slender, each paramere fringed with numerous short setae and a few long setae on outer margin and apex.

Measurements : Total length 2.75-3.50 mm, width of head across eyes 0.55-0.68 mm, length of antenna 0.81-1.06 mm, width of prothorax across middle 0.61-0.75 mm, length of elytra 1.60-1.95 mm and width across middle 0.79-0.96 mm.

Materials examined : 70 ex. INDIA : WEST BENGAL, Calcutta, 2 ex., 19.ix.09, C.A.P., dried walnut; 8 ex., June 1888, W.M. Duncan, Ship biscuits; 1 ex., 5.ii.1892, E.C. Cotes, date fruit;

36 ex., 7.iv.1971, T. Sengupta, Rice; 7 ex., 6.vii.1972, T. Sengupta, Rice; 4 ex., 30.v.1953, T.G. Vazirani; 5 ex., 24.viii.1977, Mazumdar, Shorea robusta seed brought from Bankura; BIHAR, Chaibasa, 2 ex., 11.xi. 1970, T. Sengupta, Rice; Ranchi, 1 ex., W.H. Irvine; UTTAR PRADESH, Dehra Dun, 1 ex., 10.vi.1971, A. Sing; Dehra Dun, New Forest, 2 ex., 27.ii.1928, N.C. Chatterjee; TAMIL NADU, Madras, 1 ex., Sorghum Seed.

Distribution : Cosmopolitan. In India this species is recorded from West Bengal, Bihar, Uttar Pradesh and Tamil Nadu.

33. Oryzaephilus mercator (Fauvel)

Silvanus mercator Fauvel, 1889, Rev. Ent. Caen. 8 : 132, nota; Reitter, 1890, Wien. ent. Ztg. 9 : 255. (Type-loc. : France, Africa, New Caledonia).

Oryzaephilus mercator (Fauvel) : Reitter, 1911, Fauna Germanica 3 : 46; Slow, 1958, Bull. ent. Res. 49 : 27

Oryzaephilus surinamensis var. mercator (Fauvel) :

Grouvelle, 1912, Annls Soc. ent. Fr. 81 : 318, 319.

Silvanus gossypii Chittenden, 1897, U.S. Dept. Agric. Div. Ent. : 13.

This species is closely related to O. surinamensis but can be easily separated by using ratio of eye and temple lengths. Moreover, its aedeagus with each paramere fringed with numerous small setae and a few long setae only at apex.

General appearance (Fig. 1) elongated, moderately depressed, reddish brown to blackish brown and covered with short, semierect, golden pubescence.

Head : Exposed part of head wider than long, eyes large and length of eye about one-third of length of head, length of temple about as long as 2 to 2.5 eye facets or about one-third as long as eye, lateral margin of frons slightly elevated, puncturation on vertex coarse and dense and that of towards anterior margin of clypeus slightly finer, setae short and projected towards middle line. Antenna moderately long and slender, scape moderately large, pedicel and joint 3 about as long as scape and slightly narrower, joints 4-7 about as wide as long and shorter than joint 3, joint 8 slightly transverse, joints 9 and 10 distinctly transverse and joint 11 about as wide as long or slightly transverse. Prothorax elongated, convex, anterior margin outwardly curved and sometimes with slight indentation at middle, anterior tooth more acute than other lateral teeth which are more or less pointed, pronotal disc with lateral longitudinal carinae slightly convergent at extremities, longitudinal grooves on either sides of median carina well-marked, puncturation on pronotum coarse and dense and similar to that of vertex of head. Scutellum moderately large, transverse and pubescent. Elytra more than two times as long as broad, lateral margins wavy and explanate, rows

of punctures moderately large; interstices 3,5 and 7 slightly carinate; setae projected posteriorly. On ventral side puncturation of head and prothorax almost similar to that of dorsal side, and of meso-metathorax and abdomen slightly finer. Aedeagus (Fig. 14) with parameres elongated, slightly broader across posterior half, each paramere fringed with numerous small setae and a few long setae only at apex.

Measurements : Total length 3.00-3.50 mm, width of head across eyes 0.41-0.54 mm, length of antenna 0.82-1.01 mm, width of prothorax across middle 0.68-0.80 mm, length of elytra 1.70-2.50 mm and width across middle 0.84-1.02 mm.

Materials examined : 162 ex. INDIA : WEST BENGAL, Calcutta 2 ex., 16.xi.1971, T. Sengupta, Wheat; 1 ex., 6.xii.1974, T. Sengupta, Corn flake; 49 ex., 10.iv.1974, T. Sengupta, Cashew nut; BIHAR, Chaibasa, 1 ex., 30.x.1964, T. Sengupta, Wheat; 2 ex., 11.xi.1970, T. Sengupta, Rice; RAJASTHAN, Ajmer, 2 ex., 1969, S.M. Datta, Ground nut; MAHARASTRA, Bombay, 5 ex., 1974; and 100 ex., from culture on Cashew nut maintained by T.K. Pal.

Distribution : Cosmopolitan. This species is particularly widespread in Africa, Asia, North and South America, Australia and in some European countries. In India this species is recorded from West Bengal, Bihar, Rajasthan, Maharashtra.

Remark : Grouvelle (1912) mentioned that surinamensis and mercator are two extremes of the same species. Later

several authors including Slow (1958) established that these are two distinct species and the male genitalia are different, and ratio between eye and temple lengths significantly different. Slow also noted that cross breeding of these two species produced no offspring. Study of Pal and Sengupta (unpublished) based on meristic characters agrees with the view of Slow (1958).

34. Oryzaephilus elevatus sp.nov.

This species is near O. mercator in having similar type of general appearance and temple of head, but can be separated by its antennal joints 5-7 being distinctly elongated and joints 9 and 10 less strongly transverse, prothorax narrower and more elongated (1.21 : 1.00) than O. mercator (1.14 : 1.00), head with lateral margins of frons and carinae on pronotum more strongly elevated; elytral interstices 2,4 and 6 slightly carinate.

General appearance (Fig. 17) elongated, moderately depressed, blackish brown and covered with short, semierect, golden pubescence.

Head : Exposed part of head about as long as broad, eyes large and length of eye slightly longer than one-third length of head, length of temple about as long as 2.5 eye facets or one-fourth length of eye, lateral margin of frons strongly elevated, puncturation on vertex coarse and dense and that of towards anterior margin of clypeus slightly finer, setae

short and projected towards middle line. Antenna moderately long and slender, scape moderately large, pedicel slightly shorter and narrower than scape, joint 3 about as long as pedicel and slightly narrower; joints 4-7 elongated, subequal and shorter than joint 3; joint 8 slightly transverse and slightly shorter than joint 7, joint 10 slightly more transverse than joints 9 and 11. Prothorax elongated and rather parallel-sided, convex, anterior margin outwardly curved; lateral margin of prothorax with anterior tooth largest and pointed at apex, other teeth subequal and less pointed; longitudinal carinae on pronotal disc strongly elevated and longitudinal grooves on either sides of median carina more well-marked, carinae convergent towards extremities, puncturation on pronotum coarse and dense and similar to that of vertex of head. Scutellum moderately large and transverse. Elytra more than two times as long as broad, lateral margins wavy and not explanate, rows of punctures moderately large; interstices 2,4 and 6 raised and extending almost upto apex; apex of elytra forked, setae projected posteriorly. On ventral side puncturation finer than on dorsal side.

Measurements of holotype : Total length 2.89 mm, width of head across eyes 0.55 mm, length of antenna 0.95 mm, width of prothorax across middle 0.61 mm, length of elytra 1.95 mm and width across middle 0.85 mm.

Holotype ♀, INDIA : TAMIL NADU, Tope, 1524, foot of Palni Hills, 22-23, x. 22, S. Kemp, at light (in Zoological Survey of India, Calcutta).

Distribution : INDIA : Tamil Nadu.

35. Oryzaephilus genalis sp.nov.

This species is closely related to O. surinamensis (L.) but can be separated by its antennal joints 6 to 8 being elongated, head with lateral sides of frons slightly more elevated, aedeagus (Fig. 20) with its median lobe slightly longer, paramere slender and with a few long setae only near apex and which are forked.

General appearance (Fig. 18) elongated, moderately depressed, blackish brown and covered with short, semierect, golden pubescence.

Head : Exposed part of head about as long as broad, eyes moderately large and length of eye about as long as one-third of length of head, length of temple about as long as 4 eye facets or slightly longer than half of length of eye, lateral margin of frons strongly elevated, two shallow depressions on frons present above antennal insertions, puncturation on vertex coarse and dense and that of towards anterior margin of clypeus slightly finer, setae short and projected towards middle line. Antenna moderately long and slender, scape moderately large,

pedicel about as long as scape and slightly narrower, joint 3 slightly shorter and narrower than pedicel; joints 4-7 almost equal, elongated and slightly shorter than joint 3; joint 8 elongated and slightly shorter than joint 7, joints 9 and 10 slightly transverse and joint 11 about as long as broad.

Prothorax elongated, convex, anterior margin outwardly curved and almost straight near middle; anterior tooth larger than other lateral teeth and rather pointed at apex, teeth 2-5 less pointed, posterior tooth more obtuse; longitudinal carinae on pronotal disc normally elevated and longitudinal grooves well-marked as in surinamensis and mercator, lateral carinae convergent more towards front; puncturation on pronotum coarse and dense and similar to that of vertex of head. Scutellum moderately large and transverse. Elytra more than two times as long as broad, lateral margins wavy and not explanate, rows of punctures moderately large; interstices 2,4 and 6 slightly carinate and prominent upto anterior two-third; elytral apex slightly forked, setae projected posteriorly. On ventral side puncturation finer than on dorsal side. Aedeagus (Fig.20) with median lobe broadly elongated, each paramere with a few long apical setae which are forked at apex.

Measurements of holotype : Total length 2.55 mm, width of head across eyes 0.47 mm, length of antenna 0.98 mm, width of prothorax across middle 0.55 mm, length of elytra 1.67 mm and width across middle 0.74 mm.