Notes on the genus Richardsia L. Papp  
(Diptera, Sphaeroceridae)  

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Abstract - The copromyzine genus Richardsia L. PAPP, 1973 (with its type-species mongolica (L. PAPP, 1973)) is revised; the way of the character analysis applied (NORRBOM & KIM 1985a) allows a quick comparison to any genus in the tribe Copromyzini. The characters of the male as well as of the female terminalia for analysing phylogenetic relationships are discussed. With 8 original figures.

Richardsia was described as a monotypic subgenus of Copromyza FALLÉN (PAPP 1973) from Mongolia and listed in the new Catalogue of Palaearctic Diptera (PAPP 1984) without any additional data. Indeed, that species was not collected after its description.

In the last five years the majority of the genera in the tribe Copromyzini has been revised. NORRBOM & KIM published excellent revisions on Crumomyia MACQUART and Alloborborus DUDA (1985a), on Metaborborus VANSCHUYTBROECK (1985b), on Copromyza s.str. (1985c) and on Gymnometopina HEDICKE (1987). NORRBOM & MARSHALL (1988) revised Lotophila LIOY, PAPP (1988) described a new genus Norrbomia for a majority of the former "Borborillus" with several new species. (The species of Achaeothorax are under revision and will be published in the near future by PAPP & NORRBOM; A. L. NORRBOM [pers. comm.] has commenced the revision of Dudaia HEDICKE).

The genus Richardsia was actually mentioned and partly discussed by NORRBOM & KIM (1985a) only: there a key was also given for the Holarctic genera and the elevation of the rank of Richardsia to the generic level was formally performed. Its type (and only known) species mongolica is known only from Mongolia (it was not found in North America [A. L. NORRBOM, pers. comm.], i.e. it is not a Holarctic species). Its life-habits show the plesiomorphic state in Copromyzini (coprophagous on horse dung). In all probability its larvae belong to the primary coprophagous larvae (like those of all species of Norrbomia, Borborillus, etc.).

The character analysis below follows NORRBOM & KIM'S (1985a: 65 characters with two to six character states) as for numbering and character states, since that sequence of characters was used in several papers and so it will be possible to compare Richardsia to any other genus. After that list, those characters are given, which do not fit into NORRBOM & KIM'S list.

Type-species: Copromyza (Richardsia) mongolica L. PAPP, 1973: 374-6 (Figs 8, 16, 40, 46, 49).
Material studied: holotype male and all the paratypes (preserved in the HNHM).

Head

1/ postocellar setae in two rows;
2/ 2 pairs of fronto-orbital setae;
3/ frons completely dark;
4/ frons pruinose on frontal triangle, on orbits and on the two narrow interfrontal lines;
5/ anterior edge of frons bare;
6/ genal seta developed but not as strongly as in Crumomyia;
7/ gena pruinose on postgena and on a narrow moderately wider peristomal stripe;
8/ face mostly bare;
9/ eyes normal;
   - ocellar seta lateral to line from median to posterior ocellus;

Thorax

10/ humeral calli pruinose;
11/ only 1 humeral macroseta;
12/ scutum completely pruinose; and
13/ density even;
14/ only 1 pair of dorsocentral macrosetae;
15/ prescutellar pair short but distinct;
16/ acrostichals in 4 (most anteriorly 6) rows;
18/ scutellum pruinose;
19/ only 2 pairs of marginal scutellar setae;
20/ propisternum pruinose;
21/ anepisternum: bare area of moderate size, ca. to the middle of anepisternum (see Fig. 49 of Papp 1973);
22/ katepisternum setose but no long macroseta;
23-24/ katepisternal setae rather numerous, also on ventral half;
25/ anepimeron pruinose;
26/ meron nearly completely pruinose;
27/ meron without median vertical bare area;

Wings

28/ wings not reduced;
29/ wings unicolorous;
   - costal vein on the second costal section extremely thick (Fig. 46 of PAPP 1973), basally with a moderately
     long bristle, subbasally with a pair of bristles: lateral one shorter (exclinate) medial one extremely long
     (inclinate), longer than dc bristle, similarly to the one in the species of Achaetothorax;

Legs

30/ tibiae and femora all dark grey;
31/ pruinosity: bare areas small;
32/ male femora and tibiae without long fine setae;
33/ only 1 anterodorsal macroseta on mid tibia;
34/ hind tibia with very long anteroventral seta;
35/ male fore basitarsus with a rather long apical spur ventrally;
36/ male hind basitarsal spur absent;
   - dorsal preapical on hind tibia very long, longer than basitarsus, nearly as long as basitarsus and 2nd tar-
     somere combined;

Abdomen

37/ abdominal terga pruinose;
38/ male abdomen normal (in size and width);
39/ female sternites less than 1/5 as wide as T3;
40/ female preabdominal sterna moderately sclerotized;
41/ syntergite (T1+2) nearly flat medially;

Female terminalia

42/ T6 sclerotization rather strong, 2/3 as long as T5, S6 very small, ca. 1/4 width of T6;
43/ S7 and T7 sclerotization rather strong, also S7 wide, both with long marginal setae; (see more below);
44/ 2 spermathecae in the 6th segment;
45/ no spermathecal apodeme;
46-47/ spermathecae globular, without external collar, neck moderately long and weakly sclerotized;
48/ spermathecal sculpturing line-like;

Male terminalia

49/ sternites 6 and 7 of an intricate form (Fig. 1);
50/ size of genital arch normal (Fig. 8 of PAPP 1973);
51/ epandrium normal with 8-10 very long macrosetae (Fig. 4);
52/ surstyli (Fig. 3) broad, with a short blunt posterior lobe, with several moderately long setae on lateral (outer) surface and with numerous short setae (thornlets) on medial (inner) surface;
53/ aedeagal apodeme robust though not long (Fig. 5);
54/ epiphallus small, reduced but distinct (Figs 5, 7);
55-56/ preepiphallus absent;
57-62/ distiphallus (Figs 5-6) very broad with a striking dorsal (? dorsolateral) pair of thin processes;
63/ arm of paramere without a cylindrical lobe (Fig. 8);
64/ paramere (Fig. 8) with a mesal lobe (or rather with a large anteromedial "hypandrial" lobe, see Fig. 2).

For more details on body characters see the original description. Other features of the terminalia:

Male: no sclerotized cerci, at most a very narrow lath fused to epandrium; latter with a small cleft present ventrally and rather posteriorly (below surstyli); hypandrium in 3 parts (hypandrial apodeme and two lateral arms) with rather caudally placed parameres, connection to parameres very strong (Fig. 2); no postphallic sclerite, i.e. no direct sclerotized connection between basiphallus and epandrium; no ejaculatory apodeme of the usual form but transformed into a sclerotized "sperm pump" (Figs 5 and 7) joining to and merged with basiphallus; basiphallus short and stout; parameres of a rather characteristic shape and with large anteromedial "hypandrial" lobes; apical (dorso-apical) fleshy parts of distiphallus touching female terminalia in copulation, only dorsal (dorso-lateral) thin processes penetrate into the female postabdomen.

Female: though postabdomen telescoping, however, S7 and T7 rather large and cover the more caudal parts in rest as well as when ovipositing (there are no flexible and stretching integumentum between the sclerites of the 7th segment and the more caudal sclerites; T8 an intricate structure (roughly H-shaped with numerous long and medium-sized setae) with a pair of cranially directed subdorsal processes, medially (sagittally) weakly sclerotized but not divided, dorsally covers (shields) cerci; cerci with 7 pairs of long wavy bent setae; epiproct forms a very narrow half of a ring only bearing a single medial pair of setae; S8 tripartite (with short hairs only): a pair of convex lateral parts and one long narrow medial part; S9 bipartite with several medium long setae, S9 cranial parts "interrupt" S8, i.e. inserted between lateral and medial part caudally; S8 and S9 form a semiglobular structure beneath T8 (and T7).

In my opinion, Richardsia deserves a generic rank, indeed. However, it is not easy to decide on its position in the phylogenetic system of Copromyzini. As it was shown above, male genitalia are with a number of plesiomorphic features: epandrium with lateral cleft (though small), a well-developed hypandrial apodeme present, no postphallic sclerite, small but distinct epiphallus present, remnants (? if any) of cerci fused to epandrium. Several autapomorphies have been found: e.g. 2 rows of postoculars, much thickened costal vein, reduction of male cerci, enlarged ejaculatory apodeme transformed into a special "sperm pump" and fused basiphallus, the whole female terminalia are unique. However, there are several features in the above list which are shared apomorphies with Norrbomia and Achaetothorax (as for the genitalia, its short and stout basiphallus). The polarity of some characters used in the taxonomy of Copromyzini is still questionable and as it was mentioned in the introduction, not all genera have been revised hitherto. The way of the presentation of its characters allows an easy comparison to any copromyzine genus but no cladistic analysis is given here. The aim
of this short paper was only to serve as a contribution to the future paper on the phyletic relationships of the genera in Copromyzini.

References


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Figs 1-4. *Richardsia mongolica* L. PAPP, male: 1 = abdomen, ventral view, 2 = hypandrial apodeme and right hypandrial arm, dorsal view, 3 = surstylus in broadest extension, inner view, 4 = epandrium and left surstylus caudally. - Scales: Fig. 1 = 1.0 mm, Fig. 3 = 0.1 mm, Figs 2 and 4 = 0.2 mm. Abbreviation: g = insertion of postgonite (paramere)
Figs 5-8. *Richardsia mongolica* L. PAPP, male: 5 = aedeagal complex laterally, 6 = ventrally, 7 = basiphallus and ejaculatory apodeme ("sperm pump") in lateral view, 8 = paramere (postgonite) laterally. - Scales: Figs 5-6 = 0.2 mm, Figs 7-8 = 0.1 mm. Abbreviation: a = insertion of aedeagal apodeme