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## Notes on *Coenomyia* LATREILLE

(Diptera: Coenomyiidae)

With 10 textfigures

### Introduction

*Coenomyia* is a peculiar, Tabanid-like genus of the Holarctic Region, the systematic position of which has never satisfactorily resolved. It is one of a number of genera of primitive Brachycera which do not fit readily into any of the major families — Rhagionidae, Tabanidae or Stratiomyidae — probably because these genera are relicts of the ancestral group from which the Brachycera radiated. STEYSKAL (1953: 239) used the family Coenomyiidae as a device for disposing of such genera, and it is convenient to follow his lead, as long as it is realised that the association of these genera is mainly negative: i.e. that they are placed together because they do not fit anywhere else.

Present knowledge of the genus *Coenomyia* is confined almost entirely to the type species, *C. ferruginea* (SCOPOLI, 1763), of the Palaearctic Region, which has been redescribed a number of times under different names. The Nearctic *C. pallida* SAY and *C. cinereibarbis* BIGOT are also regarded as synonyms (STONE et al 1965: 296), so this species becomes Holarctic. As long ago as 1880, BELING described the metamorphosis of *C. ferruginea*, which has remained not so much unknown as enigmatic.

ENDERLEIN briefly described two other species of *Coenomyia*, *bituberculata* (1921) from Tibet, and *comans* (1927) from Japan, but these two species have subsequently remained obscure. Recently Dr. GÜNTER MORGE sent to me for examination a male *Coenomyia* from Nepal, which proved to be the unknown male of *C. bituberculata* ENDERLEIN, and the determination of this specimen revealed in the British Museum collection specimens of both sexes of all three species of *Coenomyia*. The present paper is the outcome of this opportunity to compare these three species for the first time.

### *Coenomyia* LATREILLE

*Coenomyia* LATREILLE, Précis des caractères génériques des Insectes, disposés dans un ordre naturel, 159; 1796. Hist. nat. Crust. Ins., 3, 439; 1802.

Originally no species was included, but the description was repeated in 1802 with the mention of a single species, *Sicus ferruginea* FABRICIUS = *Musca ferruginea* SCOPOLI, 1763, which therefore became the type species by monotypy.

### Generic characters

Plump, heavily-built flies, which have the appearance of a primitive genus, even before they are examined in detail (fig. 1). The head is noticeably narrower than the thorax, which in turn is narrower than the abdomen. Males holoptic, or nearly so; females with eyes separated at vertex by little more than breadth of ocellar tubercle but diverging strongly ventrally (fig. 10). Antennae placed in middle of eye-margins. Centre of face recessed into a deep oral cavity, which extends upwards to antennae; well-developed parafacials covered with long hair, but reduced in apparent width by being inclined inwards. Buccae deep, projecting well below level of eyes.

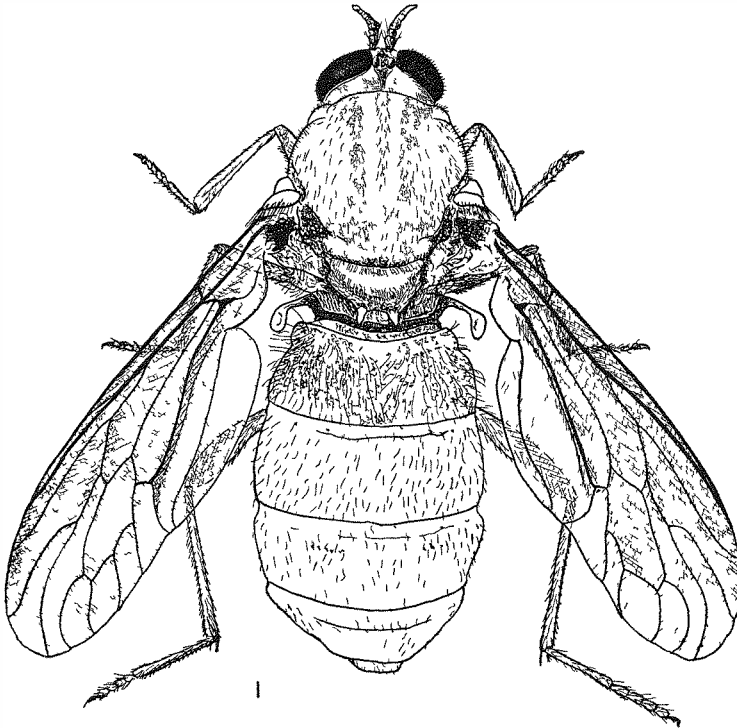
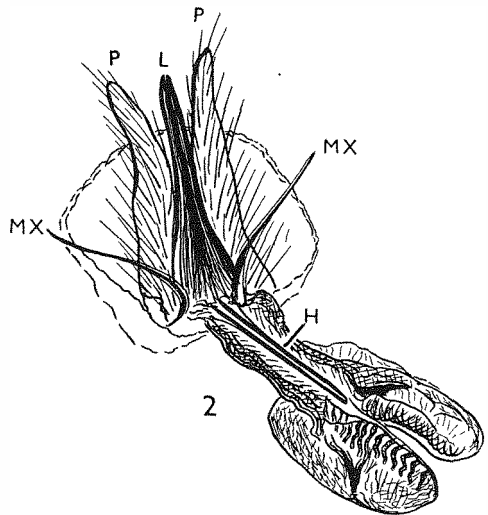


Fig. 1. *Coenomyia ferruginea* (SCOPOLI) ♀

Antennae about as long as height of frons: first segment 2–3 times as long as second, both simple; third segment continuous with a carrot-shaped flagellum, totalling seven annulations and one incomplete division. Proboscis short, Tabanid-like, with short labium and long labella. Labrum well-developed, channelled, with bifid tip. Mandibles absent; maxillae present as slender, soft styles, not adapted for piercing; hypopharynx well-developed, lying in groove of labium (fig. 2). Palpi nearly as long as proboscis, cylindrical, acutely pointed at tip.

Fig. 2. *Coenomyia ferruginea* (SCOPOLI)  
 ♀: Proboscis dissected. (L = labium;  
 P = palp; Mx = maxilla; H = hypo-  
 pharynx lying in groove of labium, with  
 its fleshy labella)



Thorax voluminous, deep and broad, so that it makes the head appear to be relatively small. Mesonotum rounded, with few projections: humeral lobes small, inconspicuous, but with a sharply defined notopleural fold; postalar calli moderately developed, all without any strong bristles. Scutellum semicircular, inflated, without bristles, but with a marginal pair of tubercles of different development in the the three species; scutellum separated from mesonotum by a deep groove, just anterior to which is a pair of mammiform papillae (fig. 1). Pleural sclerites large and solid, without special features, with hairs, but with no strong bristles, not even in front of halteres. Metanotum unusually prominent as a narrow rim uniting the two halteres (fig. 7).

Abdomen reduced to four large visible tergites, the others being telescoped beneath these (shown extended in figs. 3, 4). It is the small number of visible tergites that gives *Coenomyia* its characteristically plump aspect. Abdomen clothed with fine, adpressed hairs, but without any strong bristles.

Legs without remarkable features. All tibiae with spurs 1:2:2 respectively.

Wings with a primitive venation, all cells which reach wing margin are open, or occasionally the anal cell is just closed (not the fourth posterior cell, see SÉGUY, 1955: 289). Basal cells relatively long, so that base of discal cell comes almost at mid-point of wing. Discal cell large, different in shape in the three species (figs. 1, 5, 6). Posterior cells short and stumpy. Halteres (fig. 7) large, with big knob.

The three species may be separated as follows:

### Key to the species of *Coenomyia*

- 1 Scutellum with only small, inconspicuous tubercles on hind margin. Wing venation as in fig. 5. Himalayas . . . . . *bituberculata* ENDERLEIN
- Scutellum with well-developed, conical tubercles on hind margin . . . . . 2

- 2 Eyes with long hairs, as long as second antennal segment; in ♂ eyes separated by more than breadth of median ocellus. Prescutellar tubercles (on mesonotum) well developed. Venation as in fig. 6. Japan . . . . . *comans* ENDERLEIN
- Eyes with short hairs en brosse. Eyes of ♂ touching each other for a long distance. Venation as in fig. 1. Holarctic . . . . . *ferruginea* SCOPOLI

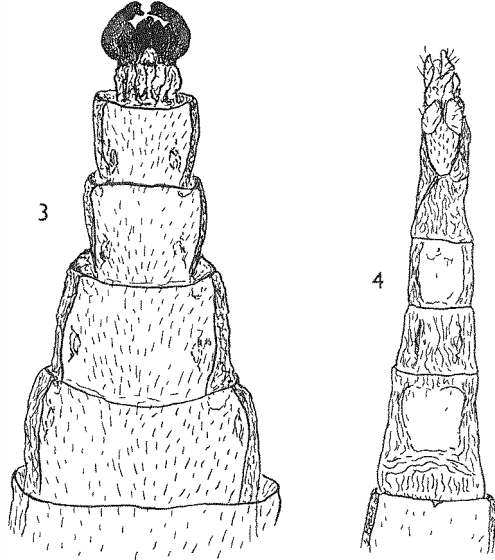


Fig. 3. *Coenomyia ferruginea* (SCOPOLI) ♂: Apex of abdomen, artificially extended  
 Fig. 4. *Coenomyia ferruginea* (SCOPOLI) ♀: Apex of abdomen, artificially extended

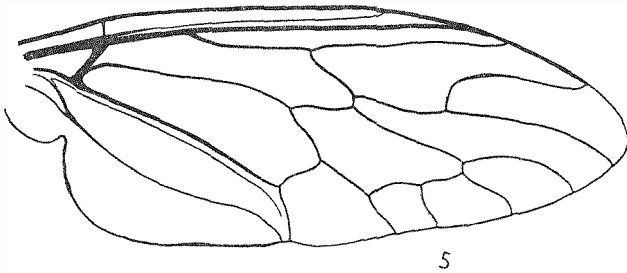


Fig. 5. *Coenomyia bituberculata* ENDERLEIN: Wing

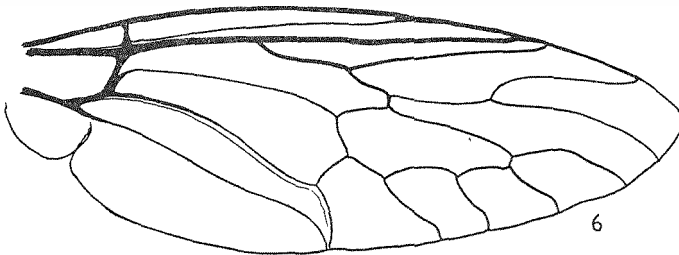


Fig. 6. *Coenomyia comans* ENDERLEIN: Wing

In all three species there is a sharp difference between the two sexes: the females being orange, sparsely haired, with large abdomen, broad and flattened; the males blacker, with long, pale hairs.

*Coenomyia ferruginea* (SCOPOLI)

- Musca ferruginea* SCOPOLI, Ent. Carn., p. 340: 1763.  
*Tabanus bidentata* FABRICIUS, Spec. Ins. 2, 259: 1781.  
*Tabanus bispinosa* FABRICIUS, Spec. Ins. 2, 259: 1781.  
*Musca olens* HERBST, Genn. Natur. 8, 108: 1787.  
*Stratiomys macroleon* PANZER, Fauna Germ. 9, 20: 1793.  
*Stratiomys unguiculata* PANZER, Fauna Germ. 9, 22: 1793.  
*Stratiomys errans* FABRICIUS, Ent. Syst. 4, 263: 1794.  
*Stratiomys crucis* FABRICIUS, Ent. Syst. 4, 264: 1794.  
*Sicus bicolor* FABRICIUS, Ent. Syst. Suppl., p. 535: 1798.  
*Stratiomys grandis* SCHRANK, Fauna Boica 3, 92: 1803.  
*Stratiomys major* SCHRANK, Fauna Boica 3, 93: 1803.  
*Stratiomys palatina* SCHRANK, Fauna Boica 3, 93: 1803.  
*Sicus aurea* MEIGEN, Klass. 1, 122: 1804.  
*Sicus unicolor* MEIGEN, Klass. 1, 122: 1804.  
*Coenomyia pallida* SAY, 1824, Long's Exped. App., p. 369: 1824.  
*Coenomyia cinereibarbis* BIGOT, 1879, Ann. Soc. ent. France (5) 9, 194: 1879.  
*Coenomyia basalis* MATSUMURA }  
*Coenomyia apicalis* MATSUMURA } see SHIRAKI, p. 488: 1932.  
*Coenomyia grandis* MATSUMURA }

The multiplicity of synonyms of *C. ferruginea* is caused less by individual variation than by the strong sexual dimorphism, coupled with uncertainty about the true generic position. Note how many authors in the list above have described the male and the female as different species in the same work. SÉGUY (1955) devotes a short paper to polymorphism within this species, and postulates the existence of a number of local races in different parts of the Holarctic Region. The only names that he mentions, however, are *pallida* SAY for the American race; *japonica* SÉGUY for a Japanese race with long hairs on the eyes, which is clearly *comans* ENDERLEIN (see below); and *errans* FABRICIUS, distinguished on rather slight chromatic differences, and given no particular locality.

♀

Orange or yellow-brown in colour, only base of abdomen noticeably blackish. Head. Eyes covered with erect, light brown hairs, about as long as height of an ocellus, and distributed evenly but rather sparsely (fig. 9). Frons and face diverging steadily from vertex, which is only just broad enough to accommodate ocellar tubercle, to four times this breadth at level of proboscis. Frons dull yellow-brown, with tomentum, but no hairs, vertically wrinkled. Face mostly consists of a large cavity, extending up to bases of antennae, and leaving only narrow parafacial strips, clothed with long, yellow hairs; in centre of oral cavity is an apparent clypeus. Narrow parafacials expand abruptly into broad buccae. Occiput somewhat inflated ventrally, but receding and becoming flat dorsally, clothed with long yellow hairs, but with no strong individual bristles. Antennae

entirely orange, with orange hairs; first segment twice as long as second; flagellum distinctly annulated, with seven segments. Palpi narrow, cylindrical, pointed; orange, with long orange hairs. Proboscis fleshy, orange, with orange and black hairs.

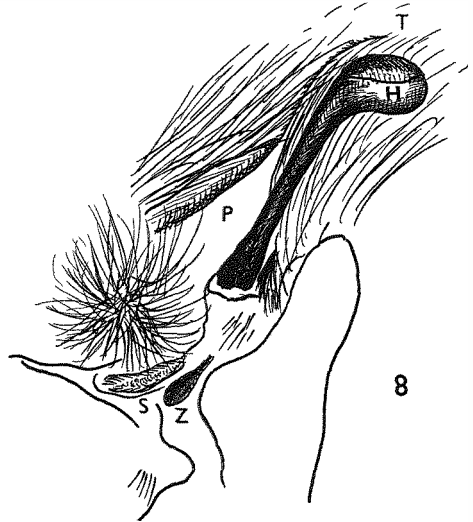
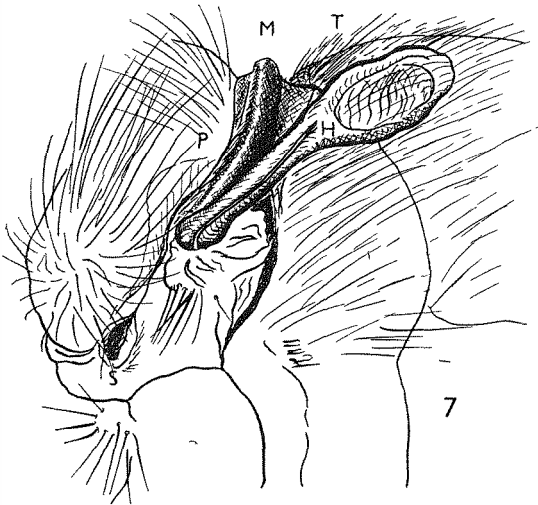


Fig. 7. *Coenomyia ferruginea* (SCOPOLI) ♀: Metathorax and haltere. (S = metathoracic spiracle; P = postscutellum of mesothorax; M = metanotum; H = haltere; T = first abdominal tergite)

Fig. 8. *Tabanus biguttatus* WIEDEMANN ♀: Metathorax and haltere, for comparison with fig. 7 (lettering as in fig. 7; Z = scale-like object peculiar to the family Tabanidae)

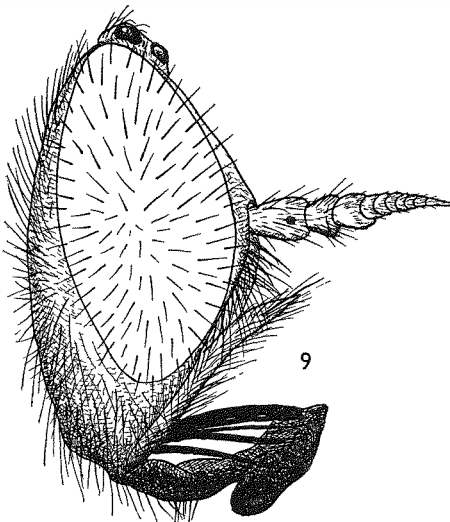


Fig. 9. *Coenomyia ferruginea* (SCOPOLI) ♀: Head in profile

Thorax orange. Mesonotum entirely tomented, with indefinite indications of darker and lighter stripes; in particular a pair of admedian pale stripes formed by whitish dusting (fig. 1). Humeral lobes pale, deflated, linked to an unusually acute notopleural ridge. Postalar calli well-developed, but not strongly demarkated. Scutellum strongly inflated, like a cushion, bare, shining yellow-brown, and with a pair of strong tubercles, like horns; immediately anterior to scutellum, on mesonotum, a pair of small, divergent processes. Mesonotum clothed with short, recumbent, yellow hairs; scutellum with rather more erect hairs, mixed black and red. Pleura orange with white tomentum and orange hairs, which are longer and denser on propleuron and on 'metapleuron' (i.e. lateral area of postscutellum, immediately before halteres). True metanotum black, conspicuous (fig. 7).

Abdomen dorsally and ventrally usually orange, except for first tergite, which is black or blackish; without distinct pattern, and entirely clothed with recumbent orange hairs. In a strong light traces can be seen of the yellow pattern described below as present in the male. Four tergites completely visible, rest partly or wholly concealed.

Legs orange with orange hairs. No strong bristles, but all tibiae have apical spurs 1:2:2.

Wings lightly stained yellow, rather more densely so anteriorly. Veins orange venation as in fig. 1. Halteres with white knobs.

Length of body 15 mm.; of wing 13 mm.

♂

Smaller and slighter than female. Holoptic, eyes meeting for almost entire distance from ocelli to antennae, leaving only a small supra-antennal triangle. Eye-facets uniform, with no noticeable increase in size either dorsally or anteriorly; facets hairy, hairs mixed black and orange, shorter and crisper than those of female. Rest of head structure similar to that of female, except that ground colour of sclerites is darker, brown rather than orange; palpi, in particular, dull blackish, with small red tip.

Thorax blackish brown in ground colour, with faint white stripes anteriorly, as in female; clothing hairs longer than in female, and much more conspicuous against dark ground. Scutellum bare, black-brown, wrinkled, with a pair of marginal tubercles much as in female. Pleura also black-brown in ground colour, with spiracles orange, and covered with whitish tomentum and pale yellowish hairs.

Abdomen black, first segment obscured by tomentum and short hairs, but rest bare and shining; second segment with quadrate orange spots laterally on hind margin; third segment with smaller spots, linked together by a narrow yellow hind margin; fourth segment with narrow posterior yellow band only. Venter shining black, with narrow yellow posterior margins. Tergites and sternites clothed with short, adpressed orange hairs.

Legs like those of female, except that all femora are black-brown.

Wings as in female.

Length of body 13 mm.; of wing 13 mm.

**DISTRIBUTION.** Holarctic. Although SÉGUY (1955: 291) says of *Coenomyia pallida* SAY: "C'est la forme américaine. Elle diffère par plusieurs points des schémas descriptifs données ci-dessus", I do not see any difference in the few North American specimens available to me, except that the first abdominal tergite is less obviously dark. On the other hand, the Japanese *Coenomyia* is specifically distinct from *ferruginea*, as was recognised by both ENDERLEIN (1928) and SÉGUY (1955).

***Coenomyia comans* ENDERLEIN**

*Coenomyia ferruginea* SCOPOLI. ENDERLEIN, 1921, Mitt. zool. Mus. Berlin 10: 213 (in part).

*Coenomyia comans* ENDERLEIN, 1928, Sitz. Ges. naturf. Freunde Berlin 1927: 48.

*Coenomyia japonica* SÉGUY, 1955, Boll. Lab. Ent. Agr. Portici 14: 290.

Distinguished from *ferruginea* in both sexes by the much longer and more conspicuous hairs of the eyes, and in the male by the fact that the eyes do not quite meet.

♀

Head. Hairs of eyes as long as second antennal segment. Frons a little broader at vertex, and less sharply divergent, than in *ferruginea* (fig. 10) with a prominent median papilla just above antennae; antennae set in large sockets. Parafacial hairs also correspondingly long, as long as first antennal segment. Palpi less acutely pointed than in *ferruginea*.

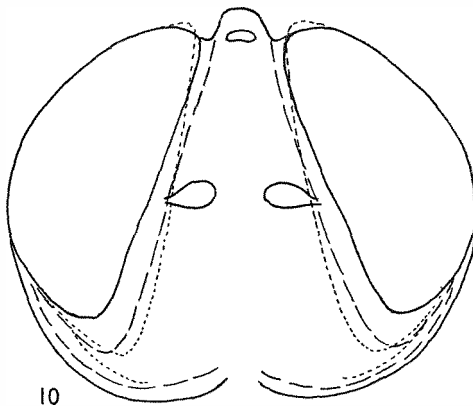


Fig. 10. *Coenomyia* ♀: Outline of head of three species superimposed.

——— *bituberculata* ENDERLEIN

--- *ferruginea* (SCOPOLI)

..... *comans* ENDERLEIN

Thorax quite similar to that of *ferruginea*, except that prescutellar tubercles are bigger and semiglobular. Metanotum brownish, inconspicuous.

Antennae, legs and wings as in *ferruginea* (cf. figs. 1, 6).

Length of body 22 mm.; of wing 18 mm., i.e. distinctly bigger than *ferruginea*, but the number of specimens available is too small to say whether this difference is significant.



♂

Described here for the first time: Eyes not touching, but distinctly separated by a distance rather greater than breadth of anterior ocellus; male thus has a distinct frons, narrow and elongate, sunken, covered with grey tomentum and fairly long yellow hairs. Hairs of eyes also long and conspicuous, as long as first antennal segment, orange; eye-facets all of equal size. Face diverging steadily to a breadth at proboscis about twice that at antennae. Parafacials broader than those of *ferruginea*, oral cavity less pronounced, all obscured by long orange hairs. Buccae broad, buccae and occiput clothed with very long, silky orange hairs about as long as proboscis. Antennae with third segment more elongate than in *ferruginea*, with traces of nine segments; mainly orange, but with blackish areas and some black bristles as well as orange ones. Proboscis fleshy, orange and partly black, with orange hairs. Palpi elongate, very narrow, cylindrical, blunt; black, with tiny red tip and long, orange hairs.

Thorax. Dull black with some whitish patches (observed on the only male available to me), especially on humeri and postalar calli. Scutellum inflated, mostly shining black, with two short but well-developed horn-like processes, which are black with bone-white tips. Pleura black with grey tomentum. Entire thorax, dorsum and pleura, covered with long, curved, orange or tawny yellow hairs.

Abdomen. Shining. First tergite and a central area of second and third segments blackish, and a little duller; lateral thirds of second and third tergites, and entire apex of abdomen, more shining mahogany-brown; venter similar, without dark patches, and rather less shining; both dorsum and venter clothed with short orange hairs.

Legs. Brown, obscurely darker in part, especially hind legs. Hairs orange, rather long on femora.

Wings. As in fig. 6. Veins yellow. Membrane stained yellow, moderately deeply on costal margin, paler elsewhere.

Length of body 17 mm.; of wing 16 mm.

DISTRIBUTION. JAPAN: Yokohama: Niko Mts., Sapporo (ENDERLEIN); Mt. Takao, near Hachiogi, Hakodate (SÉGUY); Yesso (in B.M.).

#### *Coenomyia bituberculata* ENDERLEIN

*Coenomyia bituberculata* ENDERLEIN, 1921, Mitt. zool. Mus. Berlin 10: 213.

In spite of its name, this species is distinguished from the other two by having much smaller processes on the scutellum.

♀

Head. Eyes with long hairs, as in *comans*, especially prominent ventrally. Frons relatively broad, distinctly broader than ocellar tubercle, and expanding to three times that breadth at level of proboscis (fig. 10). Frons inflated, less deeply furrowed than in other species, dull orange, with long orange hairs. Face

not so deeply recessed, so that parafacials are relatively broad, and densely covered with bright orange hairs; these hairs extend into a strong tuft between each antennal socket and adjacent eye, more conspicuously so than in other species. Buccae relatively deeper, and occiput much more inflated, with a distinct groove along posterior margin of eye; buccae and occiput with grey tomentum and long orange hairs. Antennae orange, first and second segments large, thick, with dense orange hairs; flagellum very small, little longer than first segment; annuli compressed. Proboscis fleshy, orange, with orange hairs: palpi cylindrical, moderately acute at tip, with orange hairs.

Thorax. Mesonotum clear orange, without pattern, only humeri whitish; scutellum inflated, but tomented, not shining, and with marginal processes reduced to tiny, widely separated papillae; prescutellar processes distinct, but not prominent. Metanotum black. Dorsum with moderately long, orange hairs. Pleura orange with orange hairs.

Abdomen orange with orange hairs, and no pattern either dorsally or ventrally. Legs also orange with orange hairs, and without distinct pattern.

Wings (fig. 5), although subject to variation, show a distinct difference in shape from other two species: an exaggerated breadth across base and crowding of veins towards apex, with reduction in size of posterior cells. Orange veins, membrane slightly stained yellow, darker towards costa. Halteres yellow.

Length of body 18 mm.; of wing 17 mm.

♂

Eyes almost touching, midway between holoptic state of male *ferruginea* and dichoptic state of male *comans*. Supraantennal triangle grey with a distinct median prominence. Parafacials relatively broad, face moderately recessed, both blackish with grey tomentum and a mixture of black and pale yellow hairs, long and shaggy. Buccae and lower occiput inflated, with grey tomentum, short black hairs, and long, shaggy yellow hairs; upper occiput concave, with long, silky yellow hairs. (Antennae broken in only available specimen.) Proboscis fleshy, black with black hairs. Palpi cylindrical pointed, black, with hairs predominantly black, some yellow.

Thorax dull, with thick tomentum, broadly brown anteriorly, with faint indications of stripes; laterally and posteriorly grey; humeri whitish; hairs dense, erect, moderately long, yellowish grey. Scutellum entirely dull ashy grey, with almost no traces of marginal pillae; prescutellar processes distinct but small. Scutellum densely covered with yellowish grey hairs. Pleura ashy grey with abundant, long, yellowish grey hairs.

Abdomen dorsally shining black, with narrow, bone-yellow hind margins; hairs mostly black, yellow laterally and posteriorly. Venter more brownish, tomented, and with hairs predominantly pale.

Legs black, knees very narrowly red. Femora with shaggy, yellowish grey hairs, especially basally; legs otherwise clothed with very short hairs, which may

be black, but are bright orange on anterior and posterior faces of tibiae and tarsi, giving these a reddish appearance.

Wings as in fig. 5. More black than in other species, and distinctly clouded on major veins and crossveins. Veins black. Halteres yellow.

Length of body 15 mm.; of wing 13 mm.

**DISTRIBUTION.** The high HIMALAYA. ENDERLEIN described the species from SIKKIM (Bingham). 4 ♀ in the British Museum are from TIBET, Chumbi, 10,000 ft (HINGSTON). One male, the origin of the present study, sent to me by Dr. G. MORGE, is from NEPAL, Rd. between Khumjung and Namche Bazaar, Dudhkosi, 7 June, leg. JANETSCHKE (in Zoological Institute, University Innsbruck).

#### Summary

The genus *Coenomyia* is discussed, and a key is given to the three known species. Both sexes of each species are described and figured, the males of *C. comans* ENDERLEIN and *C. bituberculata* ENDERLEIN being described for the first time.

#### Zusammenfassung

Es wird die Gattung *Coenomyia* besprochen und eine Bestimmungstabelle für die drei bekannten Arten gegeben. Deskribiert werden beide Geschlechter jeder Art (die Männchen von *C. comans* ENDERLEIN und *C. bituberculata* ENDERLEIN waren bisher noch nicht beschrieben).

#### Резюме

Обсуждается род *Coenomyia* и даётся определительная таблица для знакомых трёх видов. Описываются оба рода каждого вида, самцы *C. comans* ENDERLEIN и *C. bituberculata* ENDERLEIN до сих пор были неописанны.

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