ACTA ENTOMOLOGICA MUSEI NATIONALIS PRAGAE

VOL. 41 1983

CONTRIBUTION TO THE TAXONOMY OF THE GENUS LOGIMA EAT. (DIPTERA, PSYCHODIDAE).

JAN JEŽEK

Department of Entomology, National Museum (Nat. Hist.), Praha

The position which the genus *Logima* Eaton, 1904 occupies in tribus Psychodini End. of the family Psychodidae has been discussed by Ježek (1983a). The further classification of the insects now placed in the genus *Logima* Eaton, 1904 in this sense is beset with difficulties of two kinds: nomenclatorial and morphological. On the purely nomenclatorial side the name *Logima* Eaton, 1904 is now firmly established as the generic name for example for cosmopolitan species „*Psychoda severini* Tonnoir, 1922" and new synonymy will lead to much confusion but it is necessary owing to the cladistic scheme of the whole tribus Psychodini End. (Ježek, 1983b). From the morphological and taxonomic stand-point a revisional work of all world species of this genus is badly needed. For the sake of getting to know all the species of this family from Bohemia and Moravia, I had found myself in an awkward position. A total absence of previous students of the type-material of even very common species of the genus is surprising in light of the importance of some species.

Genus **Logima** Eaton, 1904

Logima Eaton, 1904: 58; Ježek, 1983a (full synonymy): in press.

Type-species: *Psychoda erminea* Eaton, 1893 (by original desig.)

Differential diagnosis: Genera *Logima* Eaton, 1904, *Tinearia* Schellenberg, 1803, *Ypsydocha* Ježek, 1983a, *Psychoda* Latreille, 1796 and *Copropsychoda* Vaillant, 1971 have antennae with 15 or 14 segments and there are mostly huge differences in the size of the last three antennal segments. On the other hand genera *Psychodula* Ježek, 1983a, *Chodopsycha* Ježek, 1983a, *Psychomora* Ježek, 1983a, *Psycha* Ježek, 1983a and Psychodocha Ježek, 1983a antennae are 16 segmented and there are mostly small differences in the size of the last three reduced antennal segments, however a swelling setae is not considered as a segment. Antennae both of genus *Logima* Eaton, 1904 and *Copropsychoda* Vaillant, 1971 14 segmented, remainders of one or more spines penultimate pseudoantennal segment. On the other hand genera *Ypsychdocha* Ježek, 1983a, *Psychoda* Latreille, 1796 and *Tinearia* Schellenberg, 1803 with 15 segmented antennae and spines or their remainders on penulti-

mate antennal segment mostly missing. Antennal segment 12 with a narrowed part in genus *Logima* Eaton, 1904, more or less swollen part between fused segments 13 and 14 developed, both radial and medial forks of the wing veins uninterrupted. In genus *Copropsychoda* Vaillant, 1971 antennal segment 12 without a neck part, more or less swollen part between fused segments 13 and 14 missing, both radial and medial forks of the wing veins interrupted.

Distribution: 21 species in the world — Australian area (5), New Zealand area (1), Polynesian area (2), Indo-malayan area (7), Holarctic area (6).

List of included species and discussion quoted by Ježek (1983a).

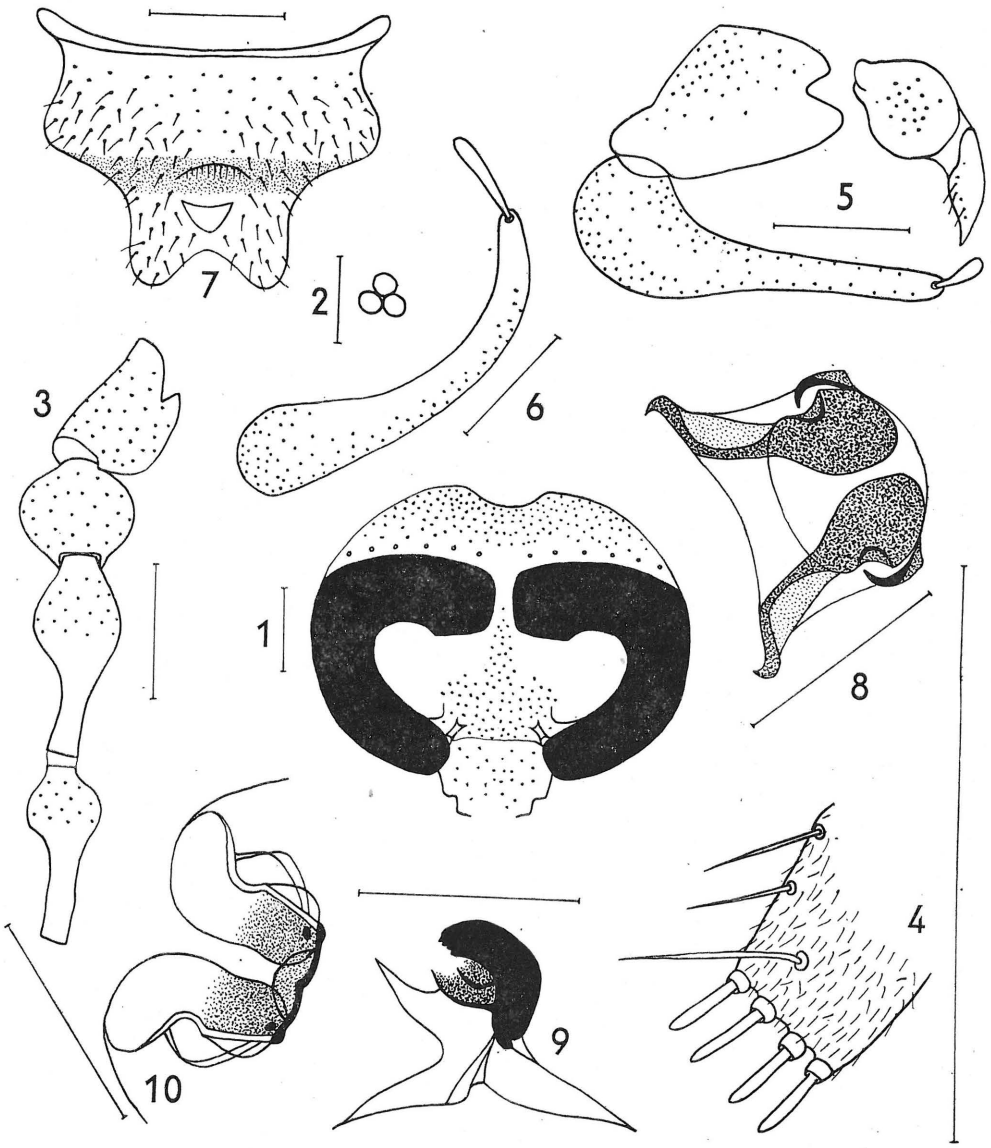
Logima albipennis (Zetterstedt, 1850)

(Figs. 1—20)

Psychoda albipennis Zetterstedt, 1850 (nec *albipennis* auct.): 3708.
Logima albipennis: Ježek, 1983a: in press.
Psychoda severini Tonnoir, 1922: 78; Dyar, 1926: 104; Leruth, 1939: 90; Tonnoir, 1940: 53; Grensted, 1947: 2; Sarà, 1951c: 5; d: 49; 1952: 12; Quate, 1955: 216; Sarà, 1955: 2; Tokunaga et Komyo, 1955: 206; Jung, 1956: 202; Tokunaga, 1958: 368; Sarà, 1959: 9; Quate, 1960: 27; Nielsen, 1961: 150; Sarà, 1961: 7; Quate, 1962a: 958; b: 187; Sarà, 1962: 71; Vaillant, 1963: 87; Giljarov, 1964: 658; Nielsen, 1964: 155; Quate, 1964: 288; Vaillant, 1964: 62; Botosaneanu et Vaillant, 1965: 78; Nielsen, 1965a: 152; b: 104; Sarà, 1965: 130; Szabó, 1965a: 86; Vaillant, 1966: 226; Krek, 1967: 315; Tanasijčuk, 1969: 132; Vaillant, 1971: 42; Ježek, 1972: 29; Duckhouse, 1973: 12; Salamanna, 1974a: 55; b: 65; 1975a: 203; b: 71; c: 86. **Syn. n.**
Psychoda severini severini; Tonnoir, 1940: 53; Sarà, 1951c: 5; Satchell, 1956: 118; Sarà, 1959: 10; 1962: 70; Botosaneanu et Vaillant, 1965: 78; Sarà, 1965: 130; Vaillant et Botosaneanu, 1966: 92; Sarà et Salamanna, 1967: 68; Zuska et Laštovka, 1969: 205; Salamanna, 1975a: 204.
Psychoda (Psychoda) severini; Tonnoir, 1940: 63; Kloet et Hincks, 1945: 333; Nielsen, 1961: 143; Szabó, 1965a: 80; b: 619; Rozkošný, 1971: 141.
Psychoda severini parthenogenetica Tonnoir, 1940: 53; Freeman, 1950: 96; Sarà, 1951c: 5; Jung, 1956: 188;Sarà, 1959: 10; Szabó, 1960: 213; Vaillant, 1963: 87; 1964: 63; Botosaneanu et Vaillant, 1965: 78;Sarà, 1965: 130; Vaillant et Botosaneanu, 1966: 92; Bellier, 1967: 58; Sarà et Salamanna, 1967: 68; 1968: 154; Zuska et Laštovka, 1969: 208; Rozkošný, 1971: 140; Wagner, 1973: 520; Salamanna, 1974b: 65; 1975a: 204. **Syn. n.**
Psychoda (Psychoda) severini parthenogenetica; Tonnoir, 1940: 63; Kloet et Hincks, 1945: 333; Jung, 1956: 188; Szabó, 1965b: 619.
Psychoda (Psychoda) severini parthenogenetika; Halgoš, 1973: 74.
Psychoda parthenogenetica; Duckhouse, 1971: 317; 1973: 12; Wagner, 1977: 27; 1978a: 285; b: 70; 1979a: 56; b: 448; Caspers et Wagner, 1980: 81.

Diagnosis. Small species; swollen part between fused antennal segments 13 and 14 inconspicuous, length of the wing 2.0—3.0 mm, the wing without brownish tufts of hairs, coxopodites strengthened in the middle, harpagones rather short, pointed apically from lateral view, ventral phallomere S-shaped, large, as figured. Subgenital plate of the female aproximately oblong, crosswise situated, with a pair of conspicuously developed distal rounded lobes. The mentioned lobes with a crosswise pigmented stripe at base, the width of sensory organ at base larger than its length. Genital chamber of female of characteristic shape.

Male. Index of the facet diameter to the width of frons 1.4; index

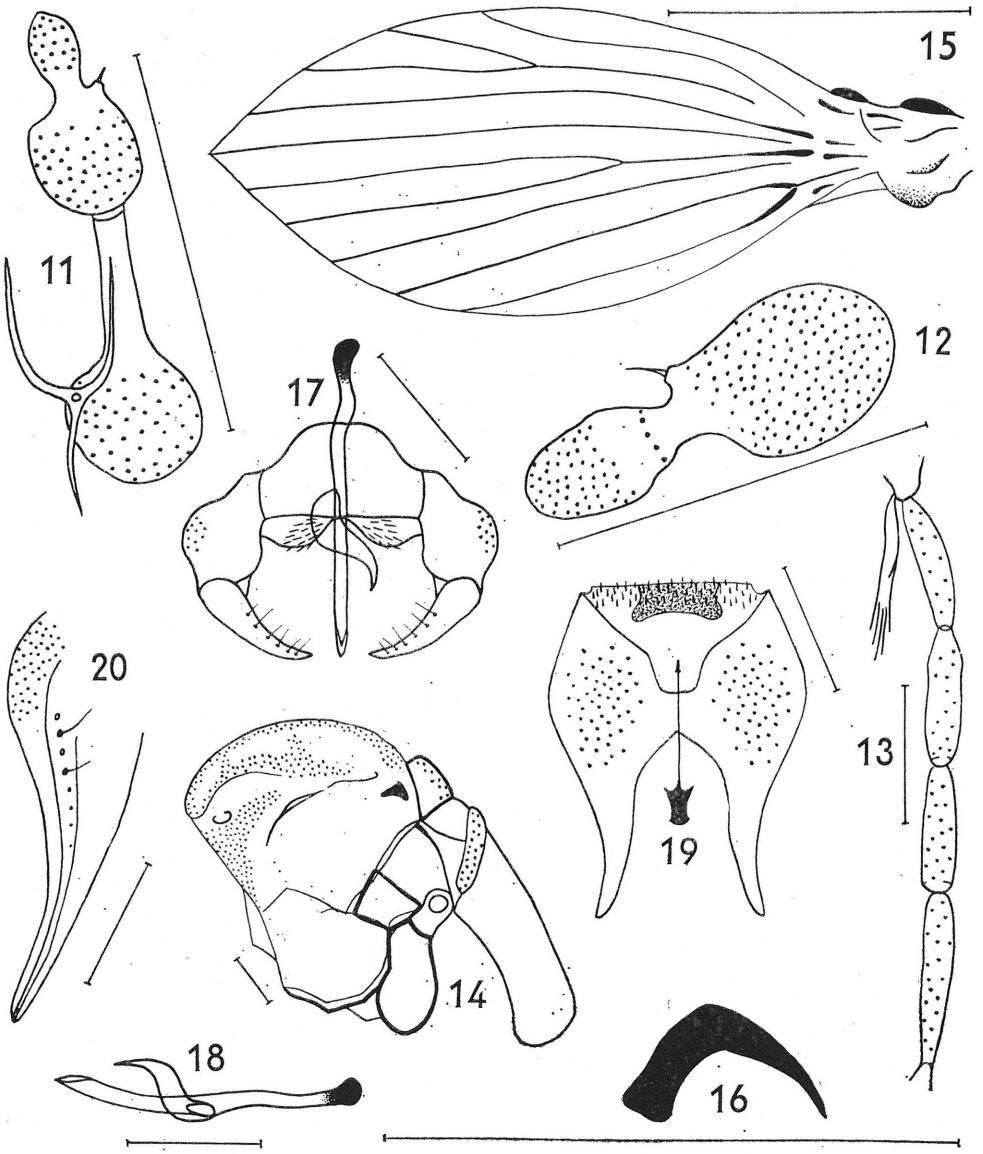


Figs. 1—10: *Logima albipennis (Zett.)* ♂♀; 1: head; 2: facets; 3: basal antennal segments; 4: terminal lobe of labium; 5: hypopygium laterally; 6: cercus dorsally; 7: female subgenital plate; 8: structures of female genital chamber anteriorly; 9: the same laterally; 10: the same ventrally. Scales 0.1 mm.

of the distance of the tangential points of the eyes ends to the width of frons 8.8 and to the facet diameter 6.3. Both frons and 14 segmented antennae haired. The length of the first antennal segment a little more than its width, pedicellus almost globular, the flagellar segments flask--shaped. The swollen part between tused segments 13 and 14 inconspicuous. Sensory filaments rather large, with three branches. Terminal lobes of labium with 4 digital projections. Ratios of the length of the segments of maxillary palpus 37:38:34:46. Maximal length of cibarium to the length of epipharynx 7:8. Pleural suture with a curve at the lower end. The wing lancet-shaped, without brownish tufts, costal nodes distinct. Sc long, interrupted in the middle. R_1 arched to Sc, the origin of R_{2+3} unattached, R_2 and R_3 steeply diverging from R_{2+3}, which is bent to Sc. R_4 conspicuously arched to the radial fork, as well as R_5 with the mouth in apex of the wing. M_{1+2} without a strengthening at base, almost straight, M_1 and M_2 straight, diverging steeply from M_{1+2}, M_3 inconspicuously bent to the medial fork, the origin of M_3 unattached, Cu and M_4 jointed basally. The veins r-r, r-m and m-m unascertainable. Medial wing angle 90°. Index of the wing AB:AC:AD=8.8:10.8:8.0, BC:CD:BD=3.5:5.6:6.5. Index of the base M_{1+2}, a to the maximal breadth of the wing 2.0. Length of the halteres to their greates breadth 4.8:1. Ratios of the length of femur, tibia and first tarsal segment P_1=11:12:6, P_2=12:15:6.5, P_3=14:8:7. Basal apodeme of genitalia straight proximally, inconspicuously S-shaped distad, strengthened at the end. Phallobasis with three phallomeres around gonoporus. Ventral phallomera S-shaped, large, apex of which deviated from the pair of thin dorsal phallomeres which are partly concrescenced. Coxopodites rather short, sizable swelling in the middle, harpagones pointed apically, almost of the same length as coxopodites. Index of the maximal breadth of coxopodites to their minimal width 2.2. Epandrium of characteristic shape. Aperture with a cut anteriorly. Hypandrium narrow. Cerci very arched from ventral view, with one retinaculum on the top. The base of cercus rounded.

Female. Subgenital plate approximately oblong, crosswise situated, with a pair of conspicuously developed distal rounded lobes. The mentioned lobes at base with a crosswise pigmented stripe, the width of sensory organ at base wider than its length. Structure of genital chamber complicated with pair of posterior and pair of dorsal projections, unpaired ventral part with characteristic structures inside.

Material: 1 ♂, about 7000 ♀♀. Bohemia: Bělá nad Radhuzou, Bělčice (Strakonice distr.), Blatná (Strakonice distr.), Bohutín (Příbram distr.), Bukvice (České Budějovice distr.), Čáslav (Kutná Hora distr.), Čelákovice, České Budějovice, Český Brod, Český Krumlov, Deštné (Rychnov nad Kněžnou distr.), Dobrovice, Doksy (Kladno distr.), Doubí (Tábor distr.), Družec, Františkovy Lázně, Hojsova Stráž, Horní Černútky (Kn.), Horní Lipka, Hořice v Podkrkonoší (Kn.), Hvožďany (Příbram distr.), Charvatce (Mladá Boleslav distr.), Chodová Planá, Jabkenice, Kaplice (Český Krumlov distr.), Kolín, Kosořice, Kostomlaty nad Labem, Kynšperk nad Ohří, Lázně Kynžvart, Lhota u Příbramě, Lhotka (České Budějovice distr.), Lipnice nad Sázavou, Lnáře, Louny, Malý Rapotín, Mě-



Figs. 11—20: *Logima albipennis* (Zett.) ♂♀; 11: apical antennal segments; 12: variability of apical antennal segment; 13: maxilla and palpus maxillaris; 14: thorax laterally; 15: wing; 16 claw of P_1 laterally; 17: copulatory organ, coxopodites and harpagones dorsally; 18: copulatory organ laterally; 19: epandrium dorsally; 20: female cercus laterally. Scales 0.1 mm., fig. 15 1 mm.

děnec, Mělník — distr. town, Měrunice, Nové Město (Karlovy Vary distr.), Nymburk, Onšov (Pelhřimov distr.), Pec pod Sněžkou, Peřimov (D.), Pořešín, Praha-Kunratice, Roudná (Tábor distr.), Sedloňov, Soběslav, Srby (Kladno distr.), Špindlerův Mlýn, Tachov — distr. town, Teplá (Karlovy Vary distr.), Velemín, Vilémovice (Havlíčkův Brod distr.), Vinařice (Mladá Boleslav distr.), Víska (Rychnov nad Kněžnou distr.), Vlastislav (Sl.), Výsluní, Zichovec (K.), Železná Ruda, Žďár (Český Krumlov distr.). Moravia: Bítovčice, Blansko — distr. town, Bojanovice (Znojmo distr.), Brodek u Prostějova, Břeclav, Bystřička, Čichov, Dolní Libochová, Dolní Lomná, Dolní Marklovice, Dolní Smrčné, Hodonín — — distr. town, Horákov, Horní Libochová, Hostím (Znojmo distr.), Hulín (Kroměříž distr.), Jablunkov, Jablůnka, Jedovnice, Jevišovice, Křižanov (Žďár nad Sázavou distr.), Luka nad Jihlavou, Lužice (Hodonín distr.), Napajedla, Nová Ves (Břeclav distr.), Nová Ves (Žďár nad Sázavou distr.), Ochoz u Brna, Okříšky, Olbramkostel, Ostrava-Hrušov, Ostrava-Poruba, Otaslavice, Plumlov, Pohořelice (Břeclav distr.), Pravčice, Prostějov — distr. town, Pržno (Vsetín distr.), Roštejn (castle) env. Jihlava, Salaš (Uherské Hradiště distr.), Spytihněv, Stonava, Střížov-Přímělkov, Tichá (Nový Jičín distr.), Tlumačov (Gottwaldov distr.), Třebíč, Uherské Hradiště, Velehrad, Záhlinice, Znojmo, Ženklava. Slovakia: Nižná Myšľa.

Comments on the material: Mostly collected by autor; D.-Dlabola lgt., K.-Kovář, Kn.-Kneifl and Sl.-Slouková. Figured male is labelled Lipnice nad Sázavou, 16. 8. 1973 and female Dobrovice, 5. 6. 1974. The name of the district town is only given where according to the alphabetic list of settlements of Czechoslovakia one or more homonyms of the locality exist.

Occurence in Czechoslovakia: IV—IX.

Bionomy: Larvae live in the mud of tracks of both cattle and horses, dung, waste pipes, drain devices, out-houses and on the trickling beds of sewage farms (Jung, 1956). Mouthparts of the larva was described by Goetghebuer (1925) and Sarà (1951d). Whole larva was described by Satchell (1974a, b) and Sarà (1951a, b). Polyvoltinous species, life-history 8—25 days. Vaillant (1971) registered 10 generations during 6 months in Algeria. Jung (1956) collected larvae in cow-dung, in leaf-mould, rotten apples, rottingsea-weed, poultry dirt and bird-nests. Bellier (1967) collected larvae of this species in slowly running flows, Vaillant (1971) in a reservoir with stagnant water. An occurrence of the larvae in the food-processing industries was recorded by Zuska et Laštovka (1969): Poultry farms, hatcheries, offal, viscera, blood, stored and waste feathers, carcasses, spoiled wax used for feather removal, eggs and egg shells, dung, excrement, wet poultry food, in mills on moist soya-bean meal, sun-flowers, rice and grain. Biology and development on the filters studied Crips et Lloyd (1954), Solbé et Tozer (1971) and Solbé, Ripley et Tomlinson (1974). Vaillant quoted that the adults are able to survive at least one month at 0—10 °C, larvae can develop in water 0.6 °C and adults hibernated in cellars. This species was registered in caves by Leruth (1939), Vaillant et Botosaneanu (1969) and

Sarà (1950, 1962). Vaillant (1971) recorded oviposition on the guano of bats in caves. Data about pollination of Arum maculatum L. by „Psychoda severini Tonnoir, 1922" were quoted by Tonnoir (1940) and Grensted (1947). Some races are probably parthenogenetic (Vaillant, 1971), however it has not been proved experimentally. Jung (1956) as well as Wagner (1977) collected this species at light, on *Urtica* and *Phragmites* as well as in bathrooms, Ježek (1972) in the beds of polystyrene gravel over which a trickle of water was maintained by moving distributors. Duckhouse (1966) recorded this species in the moist cavities of trees and in garden rubbish in dry areas of Australia. Habitats of this species recorded by the author of this paper: banks of rivers and river arms, moist meadows, streams, ditches, torrents, ponds, mill races, swamps, inundation forests, dry irrigation sewers, moist underpasses under railway lines, moist waste-heaps, pits with litter of crude potatoes, cesspools, windows of water closets, hen-houses. Localities with growths of *Populus, Salix, Alnus, Quercus, Sambucus, Fraxinus, Betula, Pinus, Picea, Corylus, Robinia, Fagus, Acer, Sorbus, Tilia, Ulmus, Carpinus, Abies* and *Aesculus.* Undergrowth with *Urtica, Impatiens, Lappa, Artemisia, Petasites, Senecio, Calamagrostis, Agropyrum, Filipendula, Mentha, Geum, Lythrum, Lysimachia, Iris, Asarum, Scirpus, Rubus, Musci, Comarum, Juncus, Phragmites, Geranium* and *Typha.*

Distribution: Cosmopolitan species. Austria, Belgium, Britain, Czechoslovakia, Denmark, France, Hungary, Italy, Romania, Sweden, West Germany, Yugoslavia. Azores, Canary Islands, North Corea, Japan, India, Afghanistan, Africa, South America, Australia, New Zealand, Juan Fernandez I., Macquarie I., Kerguelen I., Campbell I.

Data about type-material and type locality: There are syntypic material of *„Psychoda albipennis* Zetterstedt, 1850" with 4 specimens deposited in Sweden (Museum in Lund). Male with a small part of genitalia is unavailable for lectotype-designation, as well as specimen without posibility of determination of sex. Lectotype-designation: ♀, Skalstugan, fenestr., 608/1978. Slide with separated parts of body; head as one part, thorax with abdomen as second part, wings and genitalia separately, from which the last part was divided on the subgenital plate with complicated structures of genital chamber and cerci. Right antenna with only 3 basal segments, right maxillary palpus missing, thorax damaged. Paralectotype-designation: ♀, Skalstugan, 609/1978. Slide with the same separated parts of body as lectotypus. Right antenna only with two basal segments, left with 5 basal segments, right maxillary palpus missing, left maxillary palpus with only one basal segment. Two P_1 missing. Zeterstadt (1850) quoted the following data concerning type-locality: „Hab. in Scandinavia boreali; in Töien prope Christianiam Norwegiae d. 10 Maj. et iterum Julio a D. Siebke ♂ detectus, mecumque in tribus individuis communicatus; feminam in fenestra ad Skalstugan Jemtlandiae 16 Jul. 1840 in 2 exemplis ipse inveni." Type-specimens both of *„severini"* and *„parthenogenetica"* with type-locality „Europe" are unknown to me and the type-material is probably lost.

Discussion: The species is recorded by Szabó (1965b) and Halgoš

(1973) from Slovakia, by Vaillant (1966) and Rozkošný (1971) from Moravia. Dyar (1926) wrongly wrote that the name *Psychoda severini* Tonnoir, 1922 is a synonym of *Psychoda phalaenoides* (Linné, 1758). Tonnoir (1940) described both *Psychoda severini parthenogenetica* and bisexual *Psychoda severini severini* Tonnoir, 1922. They are sympatric forms and therefore good species sensu Duckhouse (1962). Sarà (1951c), Jung (1956) and Szabó (1956b) said that the mentioned forms are morphologically indistinguishable. I have found several specimens in Czechoslovakia where the ends of antennae of one specimen were different; one of one „subspecies" and one of the second one. It is not excluded, that some female specimens of *„Psychoda satchelli"* quoted by Quate (1955) from USA belong to *Logima albipennis* (Zettersetdt, 1850). Quate (1954) quoted that it is not excluded, that Hawaiian species *Psychoda inornata* Grimshaw — only female is known — is identical with *„Psychoda severini* Tonnoir, 1922" or with *„Psychoda satchelli* Quate, 1955". A knowledge of comparative morphology of the males of the species is badly needed. Good original figures of diagnostic elements of *„severini"* and *„parthenogenetica"* suggest, that it is *Logima albipennis* (Zetterstedt, 1850) in the sense of the lectotype- and paralectotype-designation in this paper.

Logima erminea (Eaton, 1893)

(Figs. 21—39)

Psychoda erminea Eaton, 1893: 130; 1898: 154; Kertész, 1902: 300; Becker, Bezzi, Bischof, Kertész et Stein, 1903: 164; Tonnoir, 1922: 64; Barendrecht, 1934: 80; Leruth, 1939: 90; Freeman, 1950: 91; Satchell, 1956: 119; Tokunaga, 1957: 55; Sarà, 1958: 2; Tokunaga, 1958: 360; Quate, 1959: 451; Nielsen, 1961: 147; 1964: 157; Vaillant, 1966: 225; Vaillant et Botosaneanu, 1966: 92; Tanasijčuk, 1969: 130; Salamanna, 1974b: 64.

Logima erminea; Eaton, 1904: 58; Tonnoir, 1922: 64; Ježek, 1983a: in press.

Longima erminea; Rapp, 1946: 174.

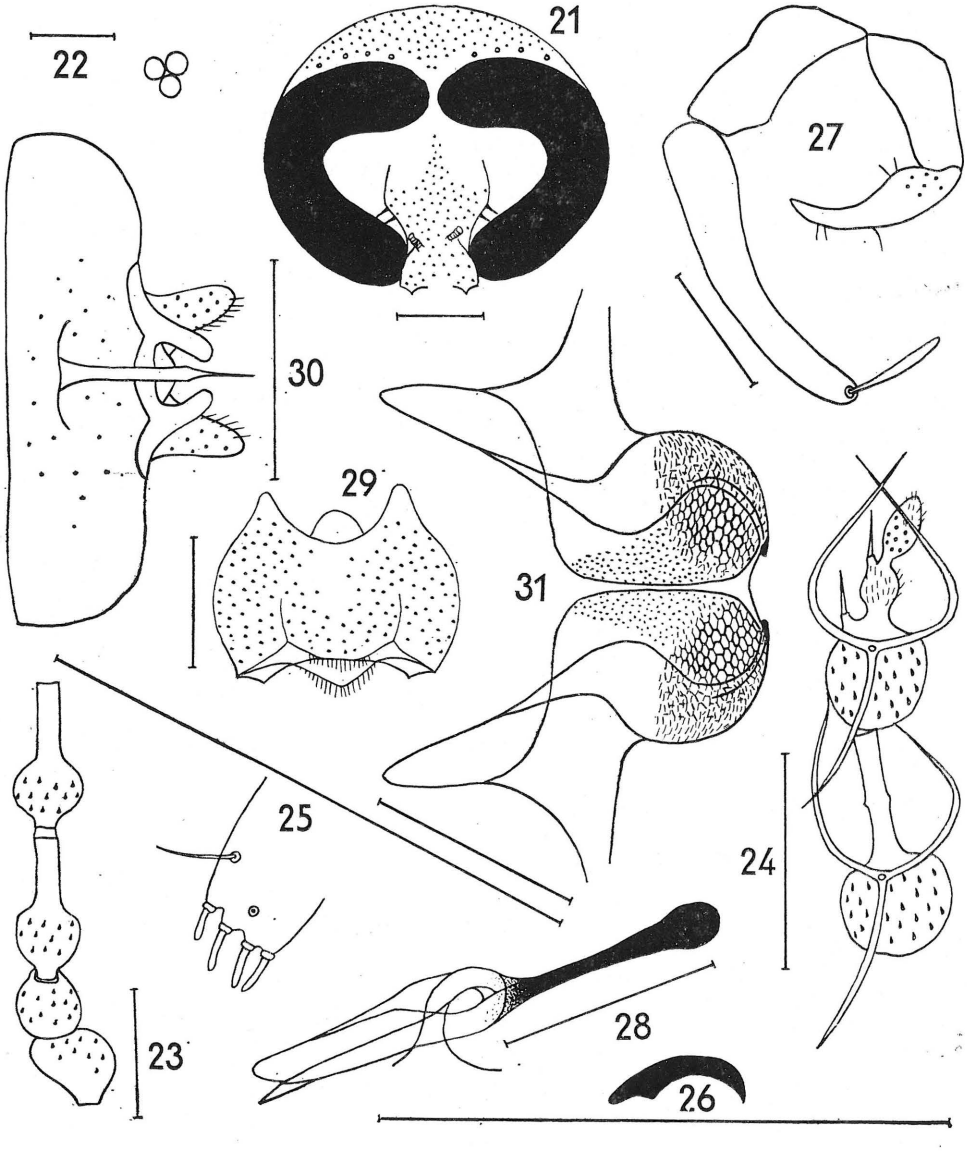
Psychoda eriminea Tokunaga et Komyo, 1955: 206 (lapsus).

Psychoda (Logima) erminea; Tonnoir, 1919: 14; 1922: 64; Sarà et Salamanna, 1967:62.

Psychoda (Psychoda) erminea; Kloet et Hincks, 1945: 333; Nielsen, 1961: 145; Rozkošný, 1971: 141.

Diagnosis. Small species, wing length 1.8 mm, the wings with 10 small black areas arranged in three irregular stripes and with black top. Harpagones only a little longer than coxopodites from lateral view. Harpagones broadened at base and pointed apically, dorsal phallomeres partially fused, ventral phallomere developed as isolated twist around funnel-shaped sclerite, subgenital plate with doubled distal lobes, the wide of mentioned plate twice as large as its length, pointed sensory organ developed and very long. Genital chamber of female with net-structures.

Male. Index of the facet-diameter to the width of frons 3.0, index of the distance of the tangential points of the eye-ends to the wide of frons 22.5 and to the facet-diameter 7.5. Frons with long hairs as wellas antennae. Scapus short, irregularly cylindrical, pedicellus rather globular, flagellum with flask-shaped segments. Swollen part between fused seg-



Figs. 21—31: *Logima erminea* (Eat.) ♂♀; 21: head; 22: facets; 23: basal antennal segments; 24: apical antennal segments; 25: terminal lobe of labium; 26: claw of P_1 laterally; 27: hypopygium laterally; 28: copulatory organ laterally; 29: epandrium dorsally; 30: female subgenital plate; 31: structures of female genital chamber anteriorly; Scales 0.1 mm.

ment 13 and 14 conspicuously developed, ovoid-shaped, with a spine subapically as well as at segment 13. Sensory filaments large, with three arms. Terminal lobes of labium with 4 digital protuberances. Ratios of the lengths of the segments of maxillary palps 29:28:31:47. Ratio of the maximal length of cibarium to the length of epipharynx 1:1. Pleural suture in the lower part inconspicuously curved. Wings lancet-shaped with black tufts of hairs. Basal costal node inconspicuous, in contrast to distal one. Sc rather long, interrupted half way. R_1 bent to Sc. R_{2+3} a little bent towards R_1, R_2 and R_3 diverges in the small angle from R_{2+3}. R_4 bent to the radial fork as well as R_5, with the mouth in the wing-apex. M_{1+2} without swollen base, rather straight, M_1 and M_2 diverged in the large angle from M_{1+2}, M_3 inconspicuously bent to the medial fork, M_3 and Cu without a common point on M_4. Veins r-r, r-m and m-m not visible. Medial wing-angle 110°. Index of wing: AB:AC:AD = 11.9:13.8 :11,9, BC:CD:BD = 3.7:5.7:7.8. Index of the base of M_{1+2}, A to the maximal breadth of the wing 2.1. Ratio of the length of halteres to the breadth 3.7:1. Ratios of the length of femur, tibia and the first tarsal segment: P_1 = 8:9:3; P_2 = 9:12:4; P_3 = 10:14:4. Paired tarsal claws only a little bent. Basal apodeme of male genitalia straight, with the end oval. Dorsal phallomers partially fused, ventral phallomere developed as an isolated twist around funnel-shaped sclerite. Coxopodites with a conspicuous protuberance outside, harpagones only a little longer than coxopodites from lateral view, broadened at base and pointed apically. Index of the length of coxopodites to the length of harpagones from dorsal view 1.3; index of the maximal breadth of coxopodite to its minimal breadth 1.2. Epandrium of characteristic shape. Aperture rather inconspicuous. Hypandrium narrow. Epiproct very short, conspicuously spinose, hypoproct triangular, rounded. The length of hypoproct a little shorter than the breadth of the same at base. Cerci inconspicuously S-shaped from ventral view with conspicuous protuberance at the cut flat base, with one retinaculum apically.

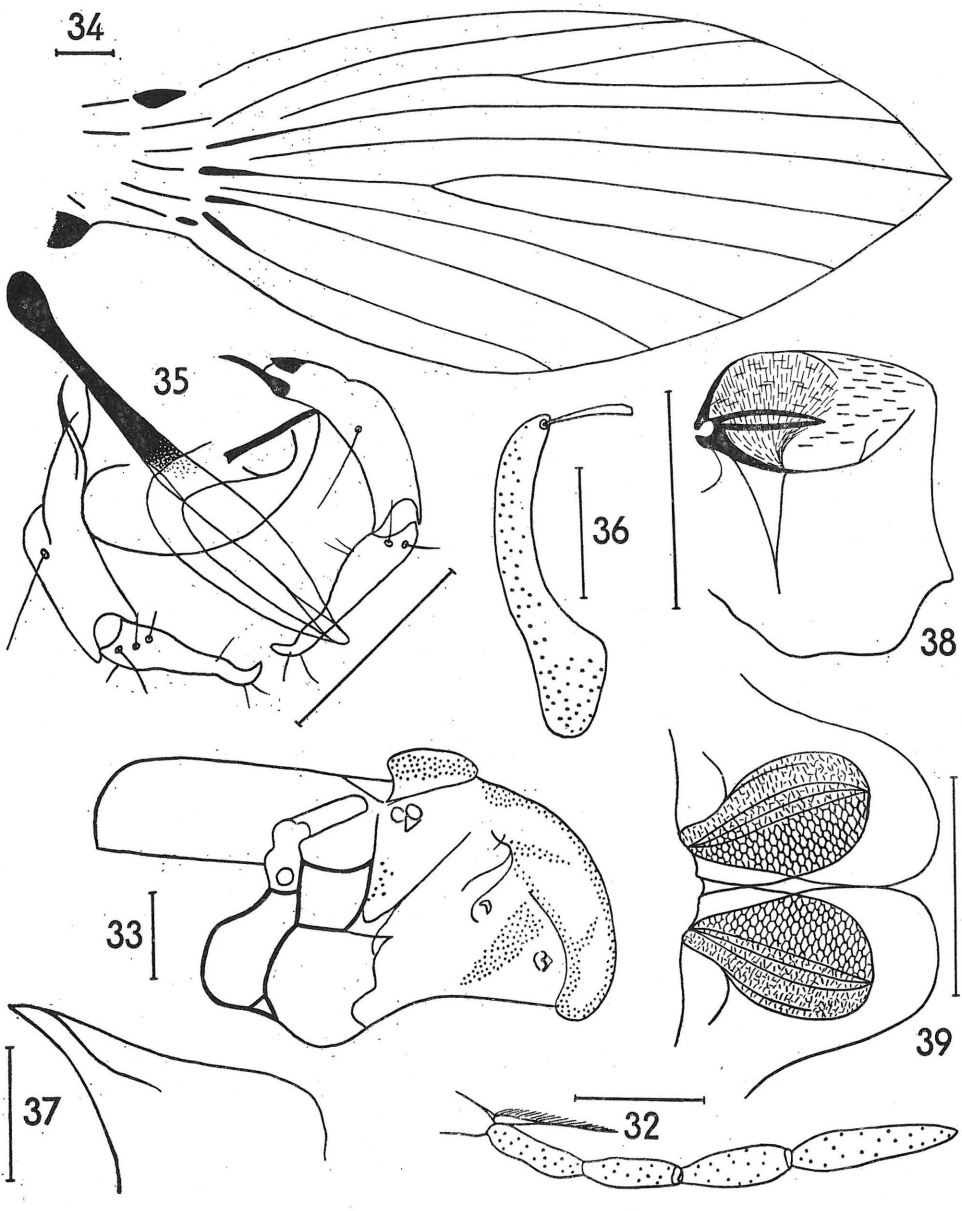
Female. Subgenital plate of characteristic shape with doubled distal lobes. The breadth twice larger than its length, sensory organ developed, very long and pointed. Complicated sclerotized forms in the area of genital chamber with mesh-like structures.

Material: 2 ♂♂, 6 ♀♀. Bohemia: Čelákovice, Kostomlaty nad Labem. Moravia: Brno-Černovice (? lgt.), Louky (Karviná distr.), Nová Ves (Břeclav distr.), Tlumačov (Gottwaldov distr.), Uherské Hradiště.

Comments on the material: Material collected mainly by author of this paper and deposited in the Deparment of Entomology of the National Museum in Prague. One female from Brno-Černovice on microscopice slide and determined by Vaillant is deposited in the Department of Entomology of the Moravian Museum in Brno. Figured specimen of male is labelled Louky (Karviná distr.), 18. 9. 1972 and female is labelled Čelákovice, 20. 7. 1971.

Occurence in Czechoslovakia: VII—IX.

Bionomy: Little known. Nielsen (1961) quoted that habitat of this species is on the periphery of ponds or water-reservoirs polluted by se-



Figs. 32—39: *Logima erminea* (Eat.) ♂♀; 32: maxilla and palpus maxillaris; 33: thorax laterally; 34: wing; 35: copulatory organ, coxopodites and harpagones dorsally; 36: cercus dorsally; 37: female cercus laterally; 38: structures of female genital chamber laterally; 39: the same ventrally. Scales 0.1 mm.

wage works. The species was recorded from caves by both Leruth (1939) and Vaillant et Botosaneanu (1966). The author of this paper collected material on the banks of streams and drainages potatoes, swamps, branches of rivers and periphery of ponds. Localities were shaded by *Alnus, Salix, Robinia, Sambucus, Pinus* and *Fraxinus*, in the undergrowth were mostly both *Geranium* and *Urtica.*

Distribution: Belgium, Britain, Czechoslovakia, Denmark, France, Italy, Nederland, Switzerland, Algiers, Formosa and Japan.

Data on both type-material and type-locality: Through the kindness of Dr. Cranston (British Museum, Nat. Hist.) I obtained a loan of syntypic series of *Psychoda erminea* Eaton, 1893. Eaton's „dry" slides were demounted and specimens mounted on slides with Canada Balsam. Lectotype-designation: ♂, Window at Westron, Holmall, 4. 12. 1891, Eaton Coll., B. M. 1929—590. Paralectotype-designation: ♀, Biar near Algier, 2. 3. 1893, Eaton Coll., B. M. 1929—590. Lectotype with detach wing, hypopygium divided in two parts. Thorax damaged; one wing missing. Very damaged paralectotype detached on the following parts: head, wing, thorax with abdomen and genitalia, from which detached subgenital plate. Present only left P_1 and right P_3. One wing missing. The other two of Eaton's „dry" slides have one wing. It isn't excluded that those wings are from lectotype and paralectotype because of the labelled data.

Discussion: The species was described originally in the genus *Psychoda* Latreille, 1796 and the views for using the mentioned name as generic or an aplication of subgeneric name *Logima* Eaton, 1904 for this species is discussed.

Logima zetterstedti sp. n.

(Figs. 40—58)

Psychoda albipennis auct. (nec Zetterstedt, 1850 partim); Schiner, 1864a: 17; b: 637; Wulp, 1877: 315; Eaton, 1893: 130; 1895: 491; 1898: 122; Kertész, 1902: 299; Becker, Bezzi, Bischof, Kertész et Stein, 1903: 164; Feuerborn, 1922: 23 = *P. trinodulosa* (Tonnoir, 1922) ?; Tonnoir, 1922: 81; Edwards, 1928: 75; Koch, 1929: 26; Abreu, 1930: 21; Hövener, 1930: 74; Barendrecht, 1934: 81; Satchell, 1949: 414; Freeman, 1950: 93; Sarà, 1952: 11; Quate, 1955: 216; Jung, 1956: 207; Satchell, 1956: 119; Tokunaga, 1958: 371; Sarà, 1959: 10: Szabó, 1960: 213; Nielsen, 1961: 150; Vaillant, 1963: 86; Nielsen, 1964: 155; Vaillant, 1964: 61; Nielsen, 1965a: 151; b: 105; Sarà, 1965: 132; Szabó, 1965a: 86; Sarà et Salamanna, 1967: 68; 1968: 153; Tanasijčuk, 1969: 131; Wagner, 1973: 520; Salamanna, 1975c: 82; Wagner, 1977: 26; 1978b: 70; 1979a: 54; Caspers et Wagner, 1980: 81.

Psychoda (Psychoda) albipennis auct. (nec Zetterstedt, 1850); Kloet et Hincks, 1945: 333; Nielsen, 1961: 144; Szabó, 1965b: 619; Sarà et Salamanna, 1967: 65; Rozkošný, 1971: 141.

Psychoda satchelli sensu Salamanna (nec Quate, 1955), 1975a: 207 (female).

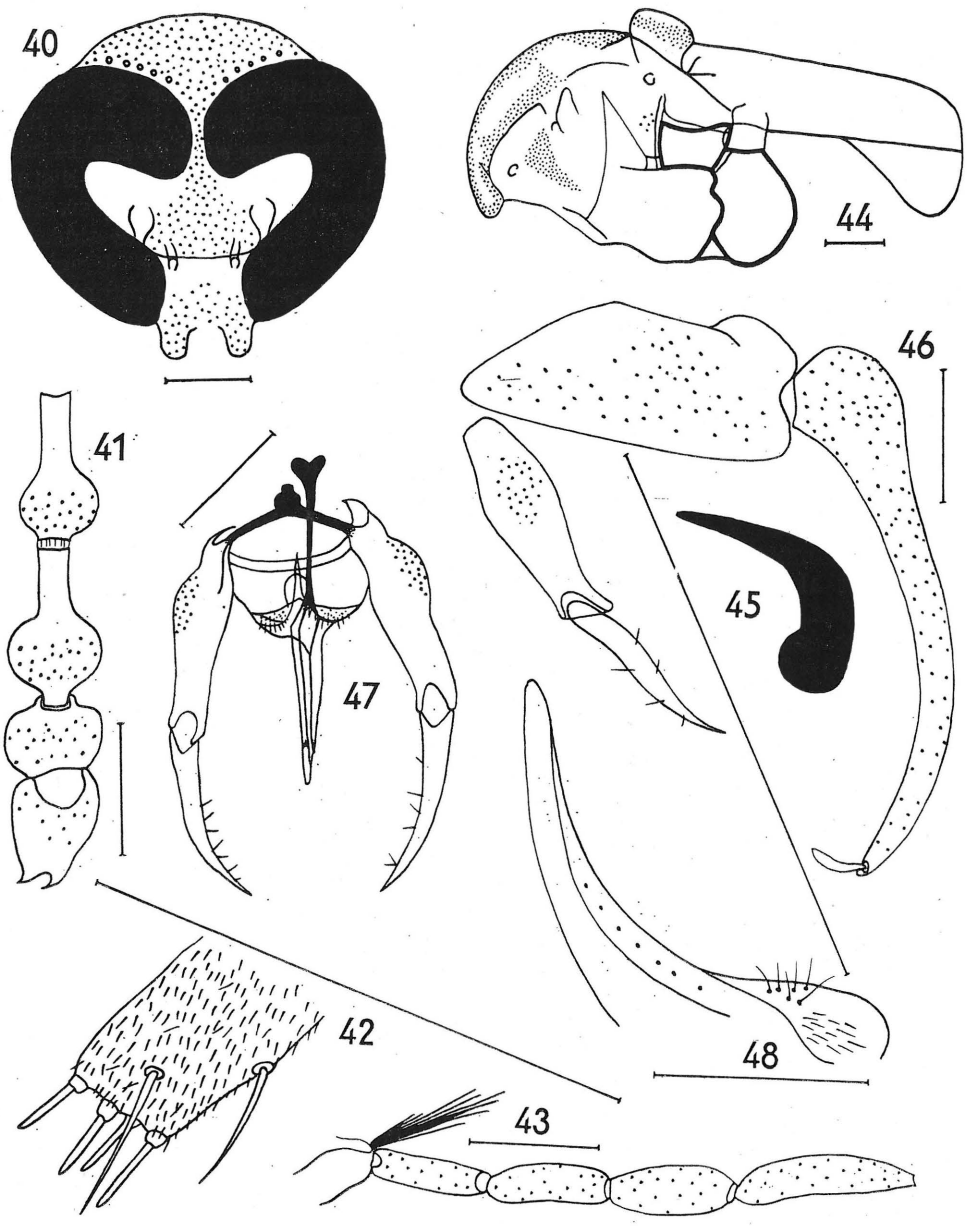
Diagnosis. Small species, the wing length 2.2 mm; the wings without maculation, the swollen part between segments 13 and 14 with an eccentric protuberance, without hairs and without subapical spine. Subapical spine missing at 13 segment. Basal apodeme of male genitalia bilobed proximally, dorsal phallomeres partially fused, ventral phallomere developed as isolated twist around funnel-shaped sclerite. Harpagones almost straight from lateral view, of same length as coxopodites, pointed

apically. Subgenital plate of female with single distal rounded lobes, the width of subgenital plate 1.3 times larger than its length; ratio of the breadth of the sensory organ to its length 1:1.

Male. Index of facet-diameter to the width of frons 3.0. Index of distance of the tangential points of the eye's ends to the facet-diameter 6.8, to the breadth of frons 20.5. Frons haired as well as the 14 segmented antennae. Scapus almost cylindrical, somewhat widened distad, pedicellus almost globular, the flagellar segments flask-shaped, swollen part between segments 13 and 14 conspicuously convex on one side, bare, without subapical spine as is segment 13. Sensory filaments of antennal segments rather large, with three branches. Terminal lobes of labium with 4 digital projections. Ratios of the lengths of the segments of maxillary palps 32:34:34:49. Ratio of maximal length of cibarium to the length of epipharynx 4:3. Pleural suture with many creases. Wings broad, lancet-shaped, without maculations, basal and distal costal nodes distinct. Sc rather long, interrupted in the middle. R_1 arched to Sc, basal field inconspicuously outlined. R_2 and R_3 divergent in the small angle from R_{2+3}, R_4 inconspicuously bent to the radial fork, R_5 almost straight, ends at the apex of the wing. M_{1+2} without a strengthening basally, almost straight, M_1 and M_2 diveregent in the small angle from M_{1+2}, M_3 almost straight, at its end bent a little to the wing apex, as well as M_2. M_3 and Cu without a common point on M_4. Veins r-r, r-m and m-m not easily ascertainable. Medial wing angle 98°. Index of wing: AB:AC:AD = 6.8:9.2:6.8; BC:CD:BD = 3.2:4.7:5.2. Index of the base of M_{1+2}, A to the maximal width of the wing 1,8. Ratio of the length of halteres to the breadth 2.5:1. Ratios of the length of femur, tibia and the first tarsal segment: $P_1 = 13:14:6$; $P_2 = 15:17:6$; $P_3 = 16:20:8$. Paired tarsal claws bent. Basal apodeme of the male genitalia straight, bilobed proximally. Dorsal phallomeres partially jointed, ventral phallomere as a funnel-shaped sclerite. Coxopodite with an external protuberance, harpagones of approximately the same length as coxopodites, pointed apically from lateral view. Index of length of coxopodites to length of harpagones from dorsal view 1.2. Index of maximal breadth of coxopodite to its minimal breadt 1.7. Epandrium of characteristic shape. Aperture missing, sclerotized remains of 10th tergite and sternite inside epandrium not visible. Hypandrium narrow. Epiproct inconspicuously developed, with many spines, hypoproct it not visible. Cerci with blunt broadened flattened base, S-arched from ventral view, with one retinaculum apically.

Female. Subgenital plate with only simple rounded distal lobes, the width of the subgenital plate 1.3 times larger than length, the width of sensory organ to its length 1:1. Complicated sclerotized structures in the area of genital chamber without „netting".

Material: 300 ♂♂ and 500 ♀♀. Bohemia: Bedřichov (Jablonec nad Nisou distr.), Bělčice (Strakonice distr.), Blatná (Strakonice distr.), Čáslav (Kutná Hora distr.), Doksy (Kladno distr.), Doubí (Tábor distr.), Horní Černůtky (Kn.), Horní Maršov, Horní Vltavice, Hořice v Podkrkonoší (Kn.), Chudíř, Kostomlaty nad Labem, Kynšperk nad Ohří, Lázně Kyn-



Figs. 40—48: *Logima zetterstedti* sp. n. ♂♀; 40: head; 41: basal antennal segments; 42: terminal lobe of labium; 43: maxilla and palpus maxillaris; 44: thorax laterally; 45: claw of P_1 laterally; 46: hypopygium laterally; 47: copulatory organ, coxopodites and harpagones dorsally; 48: female cercus laterally. Scales 0.1 mm.

žvart, Lhotka (České Budějovice distr.), Lipnice nad Sázavou, Lnáře, Mladá Vožice (D.), Nové Město (Karlovy Vary distr.), Onšov (Pelhřimov distr.), Plotiště nad Labem, Praha-Kunratice, Račice (Litoměřice distr.), Rejštejn, Sádek u Poličky, Skalice env. Třebívlice, Soběslav, Špindlerův Mlýn, Tachov-distr. town, Velemín, Vilémovice (Havlíčkův Brod distr.), Víska (Rychnov nad Kněžnou distr.), Vlastějovice, Záhrobí, Zichovec (K.), Žďár (Český Krumlov distr.). Moravia: Brodek u Prostějova, Bystřička, Dolní Lomná, Dolní Marklovice, Hodonín-distr. town, Horní Líštná, Hulín (Kroměříž distr.), Jablunkov, Jablůnka, Luka nad Jihlavou, Napajedla, Okříšky, Ostrava-Hrušov, Ostrava-Poruba, Otaslavice, Salaš (Uherské Hradiště distr.), Spytihněv, Stonava, Tlumačov (Gottwaldov distr.), Třebíč, Uherské Hradiště, Velehrad, Závada (Karviná distr.).

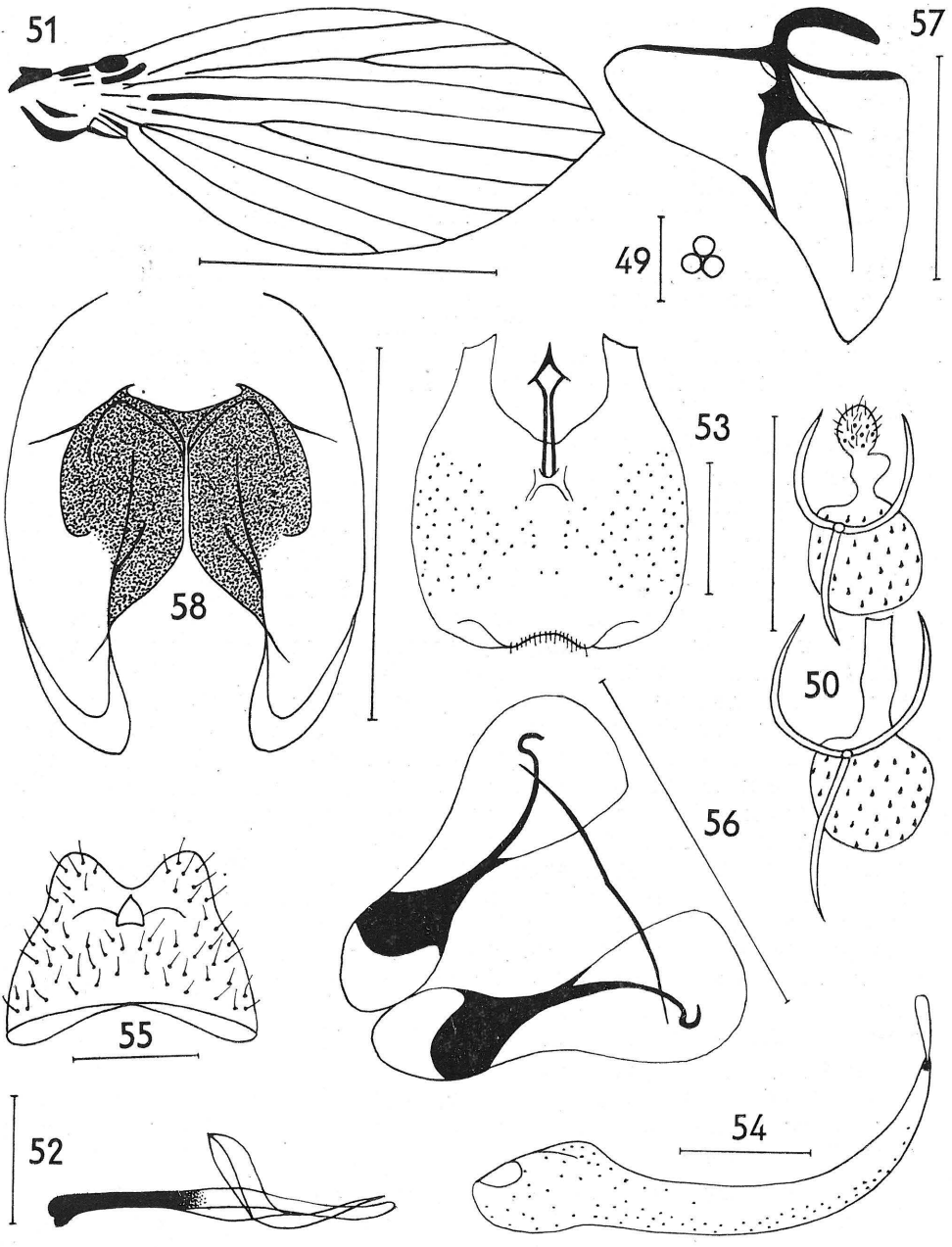
Comments on the material: Collected mainly by author, D.-Dlabola lgt., K.-Kovář and Kn.-Kneifl. Figured specimens of male and female are labelled Zichovec, 27. 8. 1971, Kovář lgt.

Occurence in ČSSR: IV—X.

Bionomy: The larva was described as *„albipennis"* by Keilin et Tate (1937) and Satchell (1947a, b). The larvae are saprobiont sensu Jung (1956) and may be collected in the soil of paddocks, in the drainage tubes and water mains. The natural history represents sensu Satchell (1947a, b) 19 days, sensu Jung (1956) 8—25 days. Vaillant (1961) collected larvae of this species in the dead fungus *Craterellus cornucopioides* (L. ex Fr.) Perr. of the family Cantharellaceae. The larvae are abundant on excrements of vertebrates sensu Wagner (1977) and on the banks of polluted water-reservoirs. Crips et Lloyd (1954) recorded species from manure and decaying vegetable material. Nielsen (1961) and Wagner (1977) collected this species in light-traps. The latter author wrote that adults are abundant in autumn near silo pits, where larvae live. The author of this paper collected adults on the banks of streams of both mountains and lowlands, dry drainages, polluted ponds, meadows, ditches, inundated forests, arms of rivers, swamps near sewage works, henroosts, moist dust heaps, rubbish from potatoes, dry cesspools, windows of WC. In nature the localities were shaded by *Salix, Alnus, Populus, Quercus, Betula, Corylus, Fraxinus, Robinia, Acer, Fagus, Sambucus, Pinus, Sorbus* and *Aesculus;* undergrowth with *Urtica, Phragmites, Lysimachia, Geum, Petasites, Impatiens, Calamagrostis, Lappa, Artemisia, Geranium* and *Rubus.*

Distribution: Austria, Belgium, Czechoslovakia, Denmark, Finland, France, Great Britain, Holland, Hungary, Italy, Norway, Spain, Sweden, Switzerland, West Germany. Azores, Canary Islands, Japan, Rjukju Islands, ? Fiji Islands.

Data on both type-material and type-locality: Holotype of male is labelled H. Líštná, 13. 10. 1972, Ježek lgt., Cat. no. 32918; allotype Praha-Kunratice, 3. 8. 1971, Ježek lgt., Cat. no. 32919; paratypes: 5 ♂♂, Zichovec, 27. 8. 1971, Kovář lgt., Cat. no. 32920—32924; 5 ♀♀, the same, Cat. no. 32925—32929. Type-material is deposited in the Department of Entomology of the National Museum (Nat. Hist.), Prague.



Figs. 49—58: *Logima zetterstedti* sp. n. ♂♀; 49: facets; 50: apical antennal segments; 51: wing; 52: copulatory organ laterally; 53: epandrium dorsally; 54: cercus dorsally; 55: female subgenital plate; 56: structures of female genital chamber anteriorly; 57: the same laterally; 58: the same ventrally. Scales 0.1 mm., fig. 51 1 mm.

Discussion: Tokunaga (1958) recorded the species „*P. albipennis* Zetterstedt, 1850" from Japan, however Quate (1961) suggested that it is „*P. savaiinensis* Edwards, 1928", which must be included sensu author of the present paper because of 4-branched sensory filaments and the forms of apical antennal segments in a new so far undescribed genus. Feuerborn (1922) figured apical antennal segments of „*P. albipennis* Zetterstedt, 1850", however it is probably *P. trinodulosa* (Tonnoir, 1922) from the genus *Psychomora* Ježek, 1983a. The species was recorded from Slovakia as „*albipennis*" by Szabó (1965 a, b). The anatomy was studied by Koch (1913), the organs for sexual attraction by Feuerborn (1922). Quate (1955) gave the differential diagnosis of male „*Psychoda satchelli* Quate, 1955" in comparison with „*Psychoda albipennis* auct." Dorsal pair of phallomeres of the last quoted species said to be without conspicuous hooked end in contrast to the former species. Knowledge of the variability of this character is badly needed; loaned paratype of male of „*satchelli*" on a slide deposited in Washington, D. C., U. S. A. (Smithsonian Institution) is dorsal pair of phallomeres with only inconspicuous hooked end in contrast to *Logima zetterstedti* sp. n. Sarà et Salamanna (1967) figured damaged male genitalia and determination is not clear. Salamanna (1975a) figured subgenital plate of female „P. satchelli Quate, 1955", however it is certainly *Logima zetterstedti* sp. n. The figures mentioned aren't in keeping with the original ones sensu Quate (1955).

Acknowledgements

My thanks are due to Dr. R. Danielson (Sweden, Lund, Entomological Museum), Dr. Peter S. Cranston (England, London, British Museum, Nat. Hist.) and to Dr. F. C. Thompson (U. S. A., Washington, Smithsonian Institution) for the generous loan of the types, comparative material, literature and much invaluable advice.

Summary

Threee species of the genus *Logima* Eaton, 1904 from Czechoslovakia are studied in this paper. Both differential diagnosis and distribution of the genus are presented. *Logima zetterstedti* sp. n. is described and diagnoses as well as redescriptions of *L. albipennis* (Zetterstedt, 1850) and *L. erminea* (Eaton, 1893) are given. New synonymy is suggested: *Psychoda severini* Tonnoir, 1922 and *Psychoda severini parthenogenetica* Tonnoir, 1940 = *Logima albipennis* (Zetterstedt, 1850) (nec *albipennis auct.).* Occurence in Czechoslovakia, bionomy, distribution, data concerning type-material and type-locality are studied and many taxonomic problems are discussed. Lectotype- and paralectotype-designations of *L. albipennis* (Zetterstedt, 1850) and *L. erminea* (Eaton, 1893) are established. Full synonymies of all included species are presented and all important diagnostic characters are figured.

References

Abreu E. S., 1930: Monografía de les Psychodides de las islas Canarias. *Mem. R. Acad.* Barcelona, **22** (3): 91—128.

Barendrecht G., 1934: Preliminary note on Dutch Psychodidae. *Ent. Ber.,* Amsterdam, **9** : 78—80.

Becker T., Bezzi M., Bischof J., Kertész K. et Stein P., 1903: Katalog der paläearktischen Dipteren. I. Budapest, 396 pp.

Bellier M. T., 1967: Les Diptères Psychodidae des eaux a cours lent et des étangs. *Trav. Lab. Hydrobiol. Piscic. Univ.* Grenoble, **57—58** (1965—1966) : 57—63.

Botosaneanu L. et Vaillant F., 1965: Les Diptères Psychodidae de Roumanie. *Trav. Lab. Hydrobiol. Piscic. Univ.* Grenoble, **56** (1964) : 77—80.

Caspers N. et Wagner R., 1980: Emergenz — Untersuchungen an einem Mittelgebirgsbach bei Bonn. II. Psychodiden — Emergenz 1976/1977. *Arch. Hydrobiol.,* Stuttgart, **88** (1) : 73—95.

Crisp G. et Lloyd L., 1954: The community of insects in a patch of woodland mud. *Trans. R. ent. Soc.* London, **105** : 269—313.

Duckhouse D. A., 1962: Some British Psychodidae (Diptera, Nematocera): descriptions of species and a discussion on the problem of species pairs. *Trans. R. ent. Soc.* London, **114** : 403—436.

Duckhouse D. A., 1966: Psychodidae (Diptera, Nematocera) of Southern Australia: subfamily Psychodinae. *Trans. R. ent. Soc.* London, **118** : 153—220.

Duckhouse D. A., 1971: Entomology of the Aucklands and other islands south of New Zealand: Diptera: Psychodidae. *Pacif. Insects Monogr.,* **27** : 317—325.

Duckhouse D. A., 1973: A catalogue of the Diptera of the Americas South of the United States. 6A Family Psychodidae. Subfamilies Bruchomyiinae, Trichomyiinae, Sycoracinae and Psychodinae. Sao Paulo, 29 pp.

Dyar H. G., 1926: Three Psychodids from the Glacier National Park (Diptera, Psychodidae). *Insecutor Insc. Menst.,* Washington, 14: 103—106.

Eaton A. E., 1893: A synopsis of British Psychodidae. *Ent. Mag.,* **29**: 5—8, 31—34, 120——130.

Eaton A. E., 1895: Supplementary notes on Dr. Fritz Müller's paper on a new form of larvae of Psychodidae (Diptera) from Brazil. *Trans. ent. Soc.* London, 1895: 489—493.

Eaton A. E., 1898: Supplement to „A synopsis of British Psychodidae". *Ent. Mag.,* **34** : : 117—125, 154—158.

Eaton A. E., 1904: New genera of European Psychodidae. *Ent. Mag.,* **15** : 55—59.

Edwards F. W., 1928: Nematocera. Insects of Samoa, London, Br. Mus. (Nat. Hist.), **6** (2) : 1—102.

Feuerborn H. J., 1922: Der sexuelle Reizapparat (Schmuck-, Dust-und Berührungsorgane) der Psychodiden nach biologischen und physiologischen Gesichtspunkten untersucht. Zugleich ein Beitrag zur Kenntnis der Physiologie der Sinnesorgane und der Organe des Geschlechts- und Bereitschaftsduftes. *Arch. Natg.* Berlin Abt. A, **88** (4) : 1—137.

Freeman P., 1950: British Psychodidae. Handb. Ident. Br. Ins., **9** (2) : 77—96.

Giljarov M. S., 1964: Opredělitěl obitajuščich v počve ličinok nasekomych. Izdatělstvo Nauka, Moskva, 919 pp.

Goetghebuer M., 1925: Contribution à l'étude des „prémandibules" chez les larves des Diptères nématocères. *Enc. Ent.* B. II, Dipt., **1** : 143—157.

Grensted L. W., 1947: Diptera in the spathes of Arum maculatum L. *Ent. Mont. Mag.,* **83** : 1—3.

Grimshaw P. H., 1901: Diptera. Fauna Hawaiiensis, 3 : 1—77.

Halgoš J., 1973: Príspevok k poznaniu rozšírenia druhov čeláde Psychodidae (Diptera Nematocera) na území západného Slovenska. (Contribution to the knowledge of

distribution of species of family Psychodidae [Diptera Nematocera] in the west Slovakia.) *Acta Fac. Rerum nat. Univ. Comen. Zool.*, Bratisl., **19** : 71—77 [In Slovak].

Hövener M., 1930: Der Darmtraktus von Psychoda alternata Say und seine Anhangsdrüsen. *Z. Morphol. Oekol. Tiere,* Berlin, **18** : 74—113.

Ježek J., 1972: Psychodidae čistících stanic odpadních vod v Čechách [Psychodidae of sewage works in Bohemia.) *Sbor. Jihočes. muz.* Č. Buděj., Přír. vědy, **12** [2] : 29 [In Czech].

Ježek J., 1983a: Six new genera of the tribus Psychodini End. [Diptera, Psychodidae]. *Acta faun ent. Mus. Nat. Pragae*, **17** : in press.

Ježek J., 1983b: Intergeneric relationships of selected tribes of the subfamily Psychodinae [Diptera, Psychodidae]. *Acta ent. Mus. Nat. Pragae,* **41**: 255—259.

Jung H. F., 1956: Beiträge zur Biologie, Morphologie und Systematik der europäischen Psychodiden [Diptera]. *Dtsch. ent. Z.,* Berlin [N. F.], **3** : 97—257.

Keilin D. et Tate P., 1937: A comparative account of the larvae of Trichomyia urbica Curtis, Psychoda albipennis Zett. and Phlebotomus argentipes Ann. et Brunn. *Parasitology,* **29** : 247—258.

Kertész C., 1902: Catalogus dipterorum hucusque descriptorum. I. Leipzig, 357 pp.

Kloet G. S. et Hincks W. D., 1945: A check-list of British Insects. Stockport, 483 pp.

Koch A., 1913: Anatomische Untersuchungen an Psychoda albipennis. Ein Beitrag zur Kenntnis der Psychodidae. Inaug.-Diss. Jena: Anton Kämpfe, 1913 [unpublished].

Koch M., 1929: Die postembryonale Entwicklung der weiblicheen Genitaldrüsen und ihrer Ausführungsgänge von Psychoda alternata Say. *Z. Morphol. Oekol. Tiere*, Berlin, **14** : 1—35.

Krek S., 1967: Psychodidae [Diptera] de la Bosnie centrale. *Bull. Sci., Conseil Acad. RSF Yougoslavie,* Section A — Zagreb, **12** [11—12] : 315—316.

Latreille P. A., 1796: Precis des characteres generiques des insectes, disposes dans un ordre naturel. Paris, Brive, 201 pp.

Leruth R., 1939: La biologie du domaine souterrain et la fauna cavernicole de la Belgique. *Mém. Mus. roy. H. N. Belg.,* **87** : 294—295.

Linné C., 1758: Systema naturae, sive regna tria naturae systematice proposita per classes, ordines, genera et species. I. Ed. 10. Holmiae, 824 pp. [London, 1956].

Nielsen B. O., 1961: Studies on the Danish Psychodidae [Diptera, Nematocera]. *Ent. Medd.,* Copenhagen, **31** : 127—152.

Nielsen B. O., 1964: Studies on the Danish Psychodidae [Diptera: Nematocera]. 2. *Preprint Natura jutl.*, **12** : 149—161.

Nielsen B. O., 1965a: Psychodidae from Norway and Sweden. *Opusc. ent.,* Lund, **30** : 141—152.

Nielsen B. O., 1965b: Psychodidae [Diptera] from the Azores and Madeira. *Boll. Mus. munic.* Funchal, **18** [1964] : 103—113.

Quate L. W., 1954: A revision of the Psychodidae of the Hawaiian Islands [Diptera]. *Proc. Haw. Ent. Soc.,* **15** : 335—356.

Quate L. W., 1955: A revision of the Psychodidae [Diptera] in America north of Mexico. *Univ. Calif. Publ. Ent.,* Berkeley, **10** : 103—273.

Quate L. W., 1959: Classification of the Psychodini [Psychodidae: Diptera]. *Ann. ent. Soc. Amer.,* Washington, **52** : 444—451.

Quate L. W., 1960: Guide to the insects of Connecticut. Part VI. The Diptera or true flies of Connecticut. Seventh fascicle: Psychodidae. *Bull. Connecticut geol. nat. Hist. Surv.*, Middletown, **92** : 1—54.

Quate L. W., 1961: Notes on Tokunaga's Japanese species of Psychoda. *Proc. Hawaii. ent. Soc.,* Honolulu, **17** [1960] : 437—438.

Quate L. W., 1962a: Insects of Macquarie Island. Diptera: Psychodidae. *Pacific Insects,* **4** [4] : 958.

Quate L. W., 1962b: Psychodidae (Diptera) at the Zoological survey of India. *Proc. Hawaii. Ent. Soc.*, **18** (1) : 155—188.

Quate L. W., 1964: Insects of Campbell Island. Diptera: Psychodidae. *Pacif. Ins. Monogr.*, Honolulu, **7** : 280—288.

Rapp W. F., 1946: Catalogue of the types of genera and subgenera of Psychodidae. *Bull. Brooklyn ent. Soc.* Lancaster, **40** (1945) : 172—177.

Rozkošný R., 1971: To the knowledge of Psychodidae (Diptera) in Czechoslovakia *Scripta Fac. Sci. Nat. UJEP Brunensis,* Biologia **2**, 1 : 133—144.

Salamanna G., 1974a: Vecchi e nuovi dati sui Psychodidae (Diptera) delle piccole isole italiane. *Boll. Mus. Ist. Biol. Univ.* Genova, **42** : 51—57.

Salamanna G., 1974b: Contributo alla conoscenza dei Psichodinae (Diptera) Italiani con descrizione di una nuova specie sarda, Panimerus bartolii. *Boll. Mus. Ist. Biol. Univ.* Genova, **42** : 59—70.

Salamanna G., 1975a: Psychodidae Psychodinae della Puglia e della Basilicata con descrizione di due nuove specie (Diptera Nematocera). *Entomologica,* **11** : 193—214.

Salamanna G., 1975b: Contributo alla conoscenza degli Psychodidae (Diptera) della Campania. *Boll. Mus. Ist. Biol. Univ.* Genova, **43** : 69—74.

Salamanna G., 1975c: Psychodinae della Calabria con descrizione di due specie nuove (Diptera Nematocera Psychodidae). *Boll. Mus. Ist. Biol. Univ.* Genova, **43** : 75—94.

Sarà M., 1950: Sulla spermatogenesi di Psychoda alternata Say e di Psychoda cinerea Banks (Dipt. Psychodidae). *Scientia Genet.,* Turin, **3** : 236—246.

Sarà M., 1951a: Su Psychoda severini severini Tonn. (Dipt. Psychodidae) nuova per l' Italia e sulla sua larva, rinvenute in ambiente cavernicole. *Annu. Ist. Mus. Zool. Univ.* Napoli, **2** (1950) (3) : 1—4.

Sarà M., 1951b: Sulla chetotassi e su alcune caratteristiche del tegumento nella larva di Psychoda severini Tonn. (Dipt. Psychodidae). *Annu. Ist. Mus. Zool. Univ.* Napoli, **2** (1950) (6) : 1—9.

Sarà M., 1951c: Psicodidi dell' Italia centro-meridionale e descrizione di una nuova specie di Telmatoscopus (Dipt. Nematocera). *Annu. Ist. Mus. Zool. Univ.* Napoli, **2** (1950) (7) : 1—8.

Sarà M., 1951d: Sulla capsula cefalica della larve dei Ditteri Psicodidi. *Boll. Zool.*, Torino, **18** : 49—56.

Sarà M., 1952: Psicodidi della Romagna, con descrizione e note critiche su tre nuove specie dei generi Tinearia, Peripsychoda e Pericoma (Diptera). *Annu. Ist. Zool. Univ.* Napoli, **4** (9) : 1—13.

Sarà M., 1955: Psicodidi della Calabria con descrizione di una nuova specie di Pericoma (Dipt.). *Ann. Ist. Mus. Zool. Univ.* Napoli, **6** (9) (1954) : 1—16.

Sarà M., 1958: Contributo alla conoscenza dei Psicodidi della Svizzera (Dipt.). *Annu. Ist. Zool. Univ.* Napoli, **9** (4) (1957) : 1—9.

Sarà M., 1959: Sinossi dei Psicodini italiani con descrizione di nuove specie del gen. Pericoma (Dipt.). *Annu. Ist. Zool. Univ.* Napoli, **10** (6) (1958) : 1—15.

Sarà M., 1961: Nuove osservazioni su Psicodini italiani (Dipt.). *Annu. Ist. Mus. Zool. Univ.* Napoli, **12** (5) (1960) : 1—8.

Sarà M., 1962: Rinvenimento di Psychoda minuta Banks, nuova per l' Italia, in una grotta della Sicilia e considerazioni sui Psicodidi cavernicoli (Dipt.). *Boll. Accad. Gioenia Sci. nat.* Catania, serie 4, **7** (2) : 68—73.

Sarà M., 1965: Osservazioni su Psicodini delle isole Canarie (Diptera, Psychodidae). *Boll. Soc. ent. ital.,* Genova, **95** : 129—132.

Sarà M. et Salamanna G., 1967: Nuovo contributo alla conoscenza dei psicodidi italiani (Diptera). *Memorie Soc. ent. ital.,* **46** : 27—72.

Sarà M. et Salamanna G., 1968: Psicodini del Piemonte (Diptera Nematocera). *Boll. Soc. Ent. Ital.*, Genova, **48** (9—10) : 149—156.

Satchell G. H., 1947a: The larvae of the British species of Psychoda (Diptera: Psychodidae). *Parasitology,* London, **38** : 51—69.

Satchell G. H., 1947b: The ecology of the British species of Psychoda (Diptera: Psychodidae). *Ann. appl. Biol.*, London, **34** : 611—621.

Satchell G. H., 1949: The early stages of the British species of Pericoma Walker (Diptera: Psychodidae). *Trans. Roy. ent. Soc.*, London, **100**: 411—447.

Satchell G. H., 1956: New and little known Algerian and Canary Islands Psychodidae. *Ann. Natal. Mus.*, Pietermaritzburg, **13** (1955) : 101—120.

Schellenberg J. R., 1803: Genres des Mouches Dipteres, representes en XLII Planches projettess et dessinees par Mr. J. R. Schellenberg et expliques par deux amateurs de l Entomologie. Zürich, Orell, 95 pp.

Schiner J. R., 1864a: Catalogus systematicus Dipterorum Europae. Vindobonae, 115 pp.

Schiner J. R., 1864b: Fauna Austriaca. Die Fliegen (Diptera) II. Wien, 658 pp.

Solbé J. F. de L. G., Ripley P. G. et Tomlinson T. G., 1974: The effects of temperature on the performance of experimental percolating filters with and without mixed-invertebrate populations. *Water. Res.*, **8** (8) : 557—573.

Solbé J. F. de L. G. et Tozer J. S., 1971: Aspects of the biology of Psychoda alternata (Say) and P. severini parthenogenetica Tonn. (Dipt.) in a percolating filter (Psychodidae). *J. Appl. Ecol.*, **8** : 835—844.

Szabó J., 1960: Les Psychodides (Diptera, Nematocera) des Bassins-Carpathiques I. *Acta Univ. Debrec.*, **6** : 205—216.

Szabó J., 1965a: Beiträge zur Kenntnis der Psychodiden-Fauna (Diptera, Nematocera) im östlichen Teil der Tschechoslowakei. *Acta Univ. Debrec.*, **3** (1964) : 69—92.

Szabó J., 1965b: Beiträge zur Verbreitung der Psychodiden (Diptera, Nematocera), in der Slowakei. *Acta Ent. Mus. Nat. Pragae*, **36** : 607—631.

Tanasijčuk V. N., 1969: Psychodidae in Bej-Bienko G. Ja.: Opredělitěl nasekomych evropejskoj časti SSSR. V (1). Dvukrylye, blochy. Leningrad, 804 pp.

Tokunaga M., 1957: Moth-flies from Formosa (Psychodidae, Diptera). *Sci. Rep. Saikyo Univ. Agric.*, Kyoto, **9** : 53—77.

Tokunaga M., 1958: Japanese Psychodidae, IV. Descriptions and revision of Psychoda species. *Philipp. J. Sci.*, Manila, **86** (1957) : 359—403.

Tokunaga M. et Komyo E., 1955: Japanese Psychodidae, III. New or little-known moth flies, with descriptions of ten new species. *Philipp. J. Sci.*, Manila, **84** : 205—228.

Tonnoir A. L., 1919: Contribution a l'étude des Psychodidae de Belgique. Note préliminaire. *Ann. Soc. ent. Belgique Bruxelles*, **59**: 136—140.

Tonnoir A. L., 1922: Synopsis des Espèces européenes du Genre Psychoda (Diptères). *Ann. Soc. ent. Belgique Bruxelles*, **62** : 49—88.

Tonnoir A. L., 1940: A synopsis of the British Psychodidae (Dipt.), with descriptions of new species. *Trans. Soc. Brit. Ent.*, Southampton, **7** : 21—64.

Vaillant F., 1961: Révision des Psychodidae Psychodinae de France (Diptera). *Ann. Soc. ent. France*, Paris, **130** : 131—157.

Vaillant F., 1963: Einige Psychodiden (Dipteren) aus Österreich. *Verh. zool.-bot. Ges.*, Wien, **101—102** (1962) : 86—93.

Vaillant F., 1964: Nouvelle contribution à l étude des Psychodidae (Diptera) de la France. *Trav. Lab. Hydrobiol. Piscic. Univ.* Grenoble, **56** : 61—76.

Vaillant F., 1966: Diptères Psychodidae de Moravie. *Acta Mus. Morav.*, **51** : 225—230.

Vaillant F., 1971: Psychodidae in Lindner E. (ed.): Die Fliegen der palaearktischen Region, Stuttgart, **287** : 1—48.

Vaillant F. et Botosaneanu L., 1966: Notes sur les Psychodides (Diptera) des grottes. *Lucr. Inst. de speol.* „Emil Racovita", Bucuresti, **5** : 91—98.

Wagner R., 1973: Psychodiden aus dem Breitenbach (Diptera, Psychodidae) 1970. *Arch. Hydrobiol.*, **72** (4) : 517—524.

Wagner R., 1977: Zur Kenntnis der Psychodidenfauna des Allgäus (Diptera: Nematocera). *Nachr. Bayer. Ent.*, 26 (2) : 23—28.

Wagner R., 1978a: Die Psychodidenausbeute zweier Sammelreisen des Ungarischen Na-

turwissenschaftlichen Museums in Budapest in die Volksrepublik Korea (Diptera: Psychodidae). *Fol. ent. Hungarica,* **31** (2) : 277—287.

Wagner R., 1978b: Psychodiden (Dipt.) als Gewässerindikatoren. *Mitt. dtsch. Ges. allg. angew. Ent.,* **1** : 67—71.

Wagner R., 1979a: Psychodidenstudium im Schlitzerland. Schlitzer Produktions-biologische Studien (26). Studies on Psychodids in Schlitzerland (Schlitz studies on productivity, no. 26). *Arch. Hydrobiol.,* Suppl. **57** : 38—88.

Wagner R., 1979b: Über einige Psychodiden-Arten aus Afghanistan (Diptera: Psychodidae). *Acta Zool. Acad. Scient. Hungaricae,* **25** : 441—448.

Wulp V. d. F. M., 1877: Diptera Neerlandica. De Tweevleugelige Insecten van Nederland. I. Gravenhage, 497 pp.

Zetterstedt J. W., 1850: Diptera Scandinaviae disposita et descripta (Psychodidae). Lundie, **9** : 3367—3710.

Zuska J. et Laštovka P., 1969: Species-composition of the dipterous fauna in various types of food-processing plants in Czechoslovakia. *Acta ent. bohemoslov.,* **66** : 201—221.

Anonymus, 1964a: Abecední seznam obcí a jejich částí s příslušnými dodávacími poštami v Československé socialistické republice. (Alphabetic list of villages and their parts in ČSSR, with respective post-offices.) Nakladatelství dopravy a spojů. 1181 pp., Praha (In Czech).

Anonymus, 1964b: Přehled obcí a jejich částí v Československé socialistické republice, jejichž názvy zanikly, byly změněny, nebo se staly místními částmi v době od 5. V. 1945 — 1. VII. 1964. (List of villages and their parts in ČSSR, of which names were abolished, changed or established as local parts of villages from 5. 5. 1945 to 1. 7. 1964.) Nakladatelství dopravy a spojů. 102 pp., Praha (In Czech).