Fr. D. Elias Santos Rodriguez y Don Elias Santos Pinto con muchos afectos

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On *Nemopalpus flavus* Macquart (Diptera: Psychodidae-Bruchomyiinae)

With 15 Text-figures

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(Communicated by H. OKA*)*

In 1838 M. Macquart erected a new genus for a male specimen of a remarkably primitive (plesiomorphic) species of nematocerous Diptera from the Canary Islands, which he named *Nemopalpus flavus*. As pointed out by Edwards (1921, p. 439) there are discrepancies in the figures given by Macquart in his two publications (1838a, b). However, *Nemopalpus flavus* is so different from all the other species of the genus, especially in structure of the male genitalia, that it is easily recognizable even from Macquart's rather incomplete description.

Eaton (1904, p. 55), who possibly possessed additional material, published a report on *Nemopalpus flavus*, but did not give a detailed description or illustrations. From his data concerning *Nemopalpus* it would appear that this genus has a long proboscis like the Phlebotominae but this is erroneous. Becker (1908, p. 71, Pl. 2, Fig. 28) gave the first good description of *N. flavus* based on a single male from La Palma Island, but made no slide preparation and did not describe the male genitalia.

During his long residence on the Canaries, Elias Santos Abreu secured one badly preserved specimen of *Nemopalpus flavus* and continued search revealed no additional material, so he was inclined to believe that the species was extinct (Alexander, 1928, p. 291). This statement was confirmed to me by the son and grandson of the late Santos Abreu, namely Sr. D. Elias Santos Rodriguez and Sr. D. Elias Santos Pinto, both entomologists, whom I visited during my stay on La Palma in 1958. Santos Abreu (1939, p. 123-126) also redescribed *N. flavus*, but it was based entirely on Becker's work.

Since the erection of *Nemopalpus*, 19 species of the genus and nine more species in two related genera (*Bruchomyia* and *Eutonnoiria*) have been described from different parts of the world (Fairchild, 1952). Yet, the genotype, *N. flavus*, is imperfectly known up to this time.

While collecting Psychodidae on the island in 1958, I paid special attention to

the collecting of *Nemopalpus*. With the aid of my father, I was able to collect specimens of this interesting species 120 years after its first discovery. Based on this new material I am able to complete the description of Becker's specimen and to add a description of the female.

The habitat of *Nemopalpus flavus* is in the ravine Barranco del Rio, in the mountains near Santa Cruz de la Palma. The ravine extends exactly east-west, so that for a long distance a shady north slope and a sunny south slope are developed. On the south slope at about 500 m are artificial terraces, up to a level of approximately 15 m from the stream bed, which produce small meadow-stripes, full of stones, on which some small medlar trees (*Mespilus* sp.) grow. The last terrace is approximately 100 m long and 6 m wide with larger trees (*Ficus* sp., *Citrus* sp., *Mespilus* sp.). Above this are steep and partly overhanging rocks of volcanic origin and containing a number of shallow cavities. In some places water trickles out of the rocks. Water of the "Rio" collects at about 1,000 m elevation an artificial system and passes on the sides of the valley in an aqueduct 5 to 20 m above the stream bed which contains no water in the lower part during most of the year.

From April 20 to May 4, 1958, some thirty specimens of *Nemopalpus flavus* were found in the cavities of the steep face above the highest terrace, but neither above nor below. The cavities harboring *Nemopalpus* were, apart from some wet soil on the ground, quite dry. The insects rested on the innermost, shaded overhanging rocks, often near the ground. They flew up when disturbed, sometimes only when touched by the net, but landed again in a similar place after a short flight (1/2 to 4 m). During daytime the adults showed a strong negative phototactic behavior. Captured specimens tried to escape even to the darkest side of the net. In particularly dark cavities near the ground, several times I observed that disturbed adults, turned back into the cavity upon reaching the entrance, indicating irritation by the light. It seemed that it would be easy to find the larval and pupal stages in a place where so many adults were found and appeared to stay permanently. Unfortunately this was a misconception. During approximately two weeks I made daily visits to the adult habitats and systematically examined all possible substrates which might contain the immature stages of *N. flavus*. I carried many kilos of diffenent substrates to my hotel where I spread them for drying on screens over water jars, a method I have used successfully to obtain larvae of the Psychodinae, Trichomyiinae and Phlebotominae. Although the adults of *N. flavus* were living in a comparatively dry place, the larvae probably need some moisture, so I concentrated on places which showed even slight moisture. The following substrates in the surroundings of the adult habitats were examined carefully:

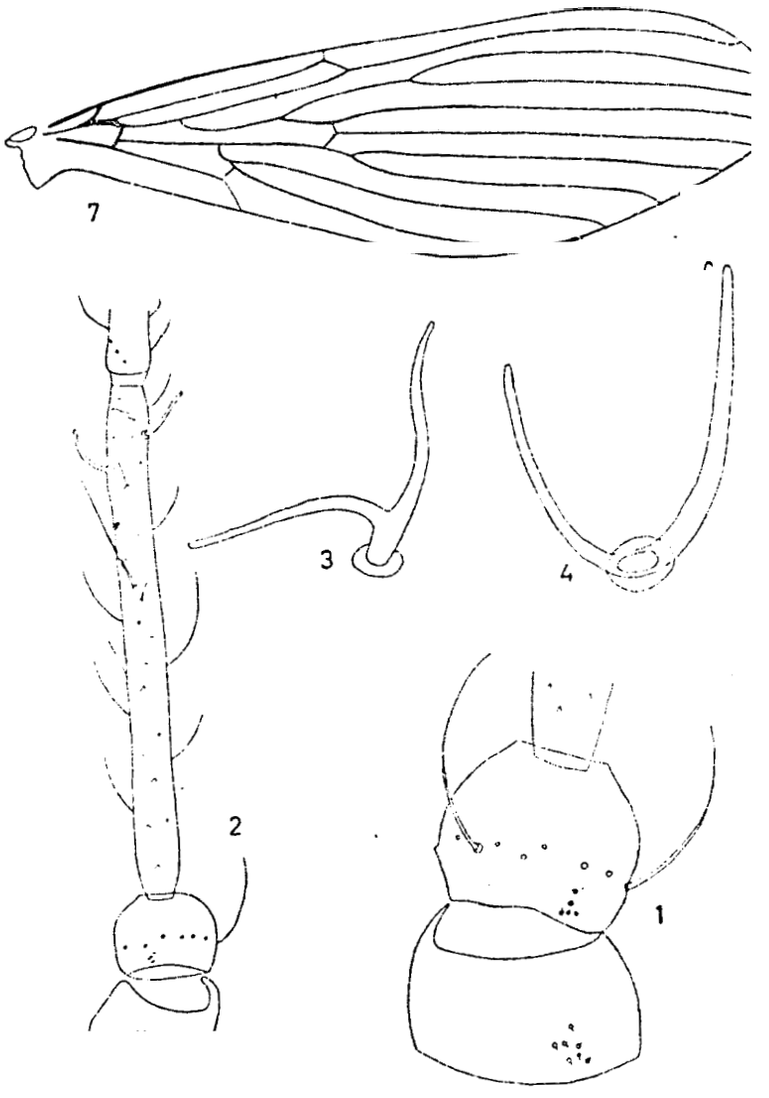
1. Rotten wood in a branch hole of a fig tree.
2. Moist soil at the bottom or base of the cavities.
3. Fallen decaying leaves of the medlar trees.
4. Moist soil from rock crevices.
5. Rotten wet wood and leaves of other different trees.

Although psycholid larvae were found in some of the materials, no early stages of *N. flavus* were discovered. In view of this, I now believe that the

adults of *N. flavus* are crepuscular or nocturnal insects which use the cavities only during daytime as resting places, leave them at nightfall, and breed some distance away in a still unknown environment.

Nemopalpus flavus Macquart 1838

Webb and Berthelot, Hist. Nat. d. Iles Canaries, Ent. 1. Can. Dipt. p. 102,



Figs. 1-4, 7. *Nemopalpus flavus* Macquart. 1. Right scape and pedi
2. Left antennal base, 3, 4. Ascoids,

10, Pl. 4, Fig. 5a, b and c.

Other publications in which the species is mentioned: Macquart, 1838 b, p. 81, Pl. 13, Fig. 1, 1a, 1b; (*Nemapalpus flavus*, misspelling) Becker, 1908, p. 71-72, Pl. 2, Fig. 28; Tonnoir, 1922, p. 128; Alexander, 1928, y. 291; 1929, p. 7; Santos Abreu, 1930, p. 123-126, Fig. 8; Fairchild, 1952, p. 260-261, 1955, p. 183, Pl. 1, Fig. 3; Jung, 1958, p. 7. Pl. I, Fig. 1-7, Pl. II, Fig. 8-9.

A large species with grayish brown to light brown vestiture easily distinguished from other species of the genus by wing venation and structure of genitalia in both sexes.

♂♀. Wing length 4.9-5.5 mm.

♂. Head with a tuft of brown erect hairs whose length equals 1/2 of head width; vertex with few shorter erect hairs; eyes kidney-shaped, above bases of antennae approaching each other without having distinct eye-bridges; separated by distance equal to 3-4 facets.

Antenna 16-segmented; scape cylindrical, wider than long; pedicel ball-shaped with a garland of long true setae; both segments with a number of closely grouped, very short sense setae dorsally (Fig. 1); flagellum with dense, flat, short, light brown vestiture and some longer erect setae; flagellar segments elongate cylindrical, distal segments gradually shortening in length so that 15th only 1/3-1/4 as long as 3rd; each segment bears near its distal end two forked ascoids (Figs. 2-6); in some specimens some of ascoids forked several times (Fig. 5); terminal segment with a distinct apiculus which equals 1/5-1/6 of the segment length (Fig. 6).

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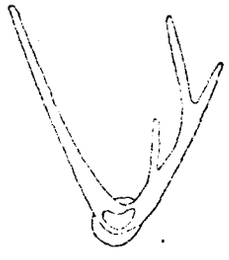

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Figs. 5, 6. *Nemopalpus flavus* Macquart. 5. Ascoid, 6. Tip of antenna.

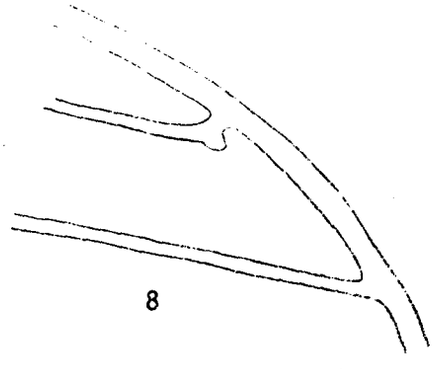

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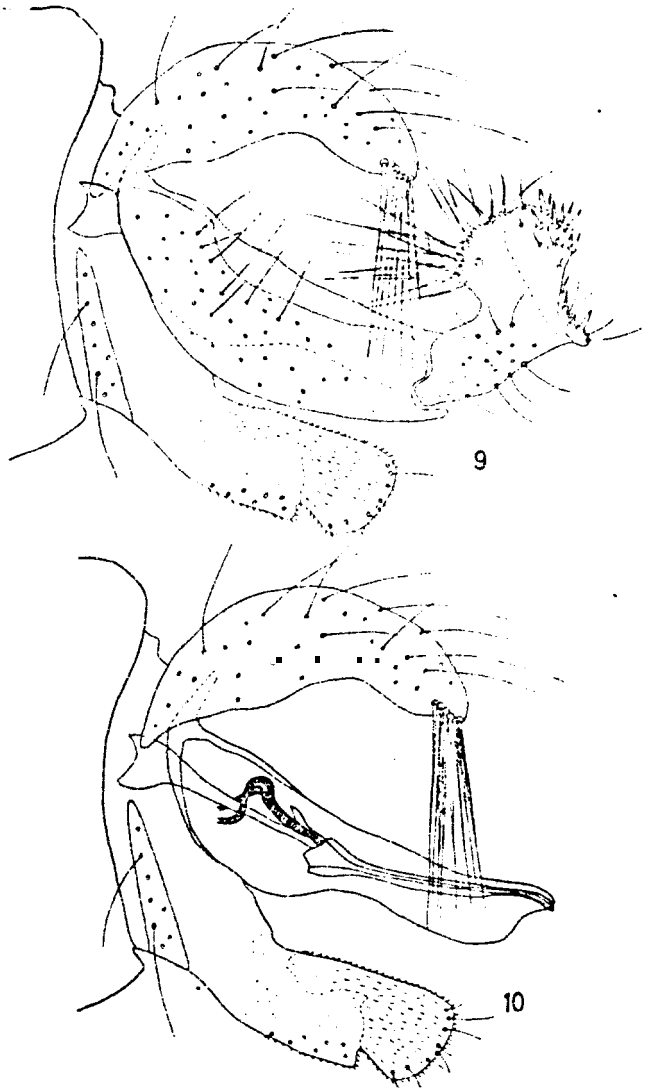
Fig. 8. *Nemopalpus flavus* Macquart. Wing, tips of R_1 and R_2.

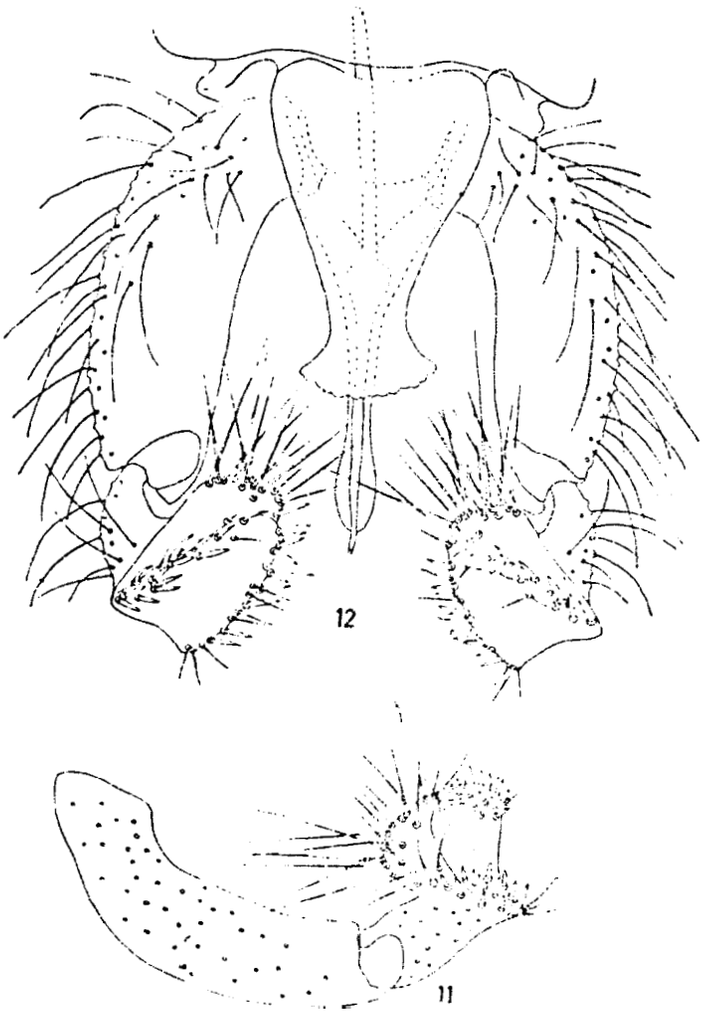
Palpus with five segmenfc covcred with light brown hairs; basal segments also with longer erect setae; distal segments carried inwards by living animal; palpal formula = 10:25:75:170.

Thorax with long, erect. light brown hairs; bare laterally except one tuft of hairs below wing base.

Wing (Fig. 7) elongate, Sc forked distally and ending in wing border and R_1; stem **of** radial fcrk (R_{2+3}) arises at distance before distal end of basal cell



Figs. 9, 10. *Nemopalpus flavus* hlncqunrt. 9. 9th sternite, left forceps **and** cerci seen from left, 10. 9th sternite. aedeagus **and** cerci, leteral **view.**



Figs. 11, 12. *Nemopalpus flavus* Macquart. Right forceps seen from left. 12. Yih sternite, forceps and aedeagus, dorsal view.

equal to about twice width of basal cell; R_2 in some specimens near apex with a chort process (Fig. 8); rounded tip of wing at the apex of R_3 or between R_3 and R_4; R_2/R_3 fork distad of M_1/M_2 fork; r-m crossvein at about same level as apex of Sc; Cu very short, distance between ni-cu crossvein and apex two to three times as long as m-cu crossvein.

Wing with evenly distributed, grayish brown vestiture; costal node with a few erect hairs; dark brown fi-inges at anterior margin of Sc vertically spread frorn wing border, beyond gradually leaning against margin and becoming brighter; fringes beyond apex oí R_1 gradually increasing in size and more erect from

margin; longest fringes of wing margin found basally at Cu apex; alula with distinct tuft of hair; all veins on both sides of wing covered with grayish brown smooth hairs; erect hairs only at base of Sc.

Legs twice as long as body; coxae with a row of iong light brown hairs posteriorly; femora with a row of thin, inclined, light brown hairs posteriorly; tibiae and tarsi also with oppressed, brown hairs and some erect setae; spurs of tibiae only weakly developed

Abdomen dorsally and ventrally with long brown hairs arranged in tufts: genital capsule clothed with long brown setae.

Hypopygium (Figs. 9–12); 9th sternite forming a broad continuation directed caudad, apically bearing a row of long. true setae and covering a greater part of the aedeagus; coxite cylindrical, about three times as long as wide with relatively thin clothing of hnirs; stylus with strong. striking setae, on outside with concave area with strong. short setae on margins; aedeagus long, thickened before apex; vasa deferentia thin, very long, ending in sac-like gonads; cerci without special characteristics.

♀ Similar to ♂; head lateral as in Figure 13; external genitalia ventral view as in Figure 14; lateral view as in Figure 15; single spermatheca a large membranous sack without special characteristics.

Larva and pupa unknown.

Typus: Place of discovery and deposition unknown, presumably in Mus. Hist. Nat., Paris.

Speciniens examined: ♂ and ♀, La Palma. Canary Island, Barranco del

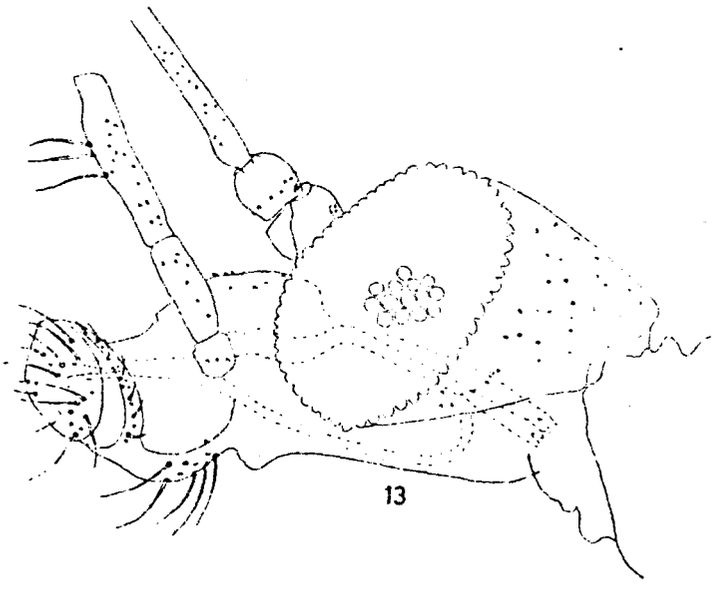


Fig. 13. *Nemopalpus flavus* Macquart. Head and mouth-parts of female.

Rio, E 011 (21. 4. 58), E 012 (21. 4. 58), E 013 (22. 4. 58). E 014 (22.4. 58), E 016 (20. 4. 58), E 017 (28. 4. 58). BE 01 (coll. Becker) La Palma (no date and locality).

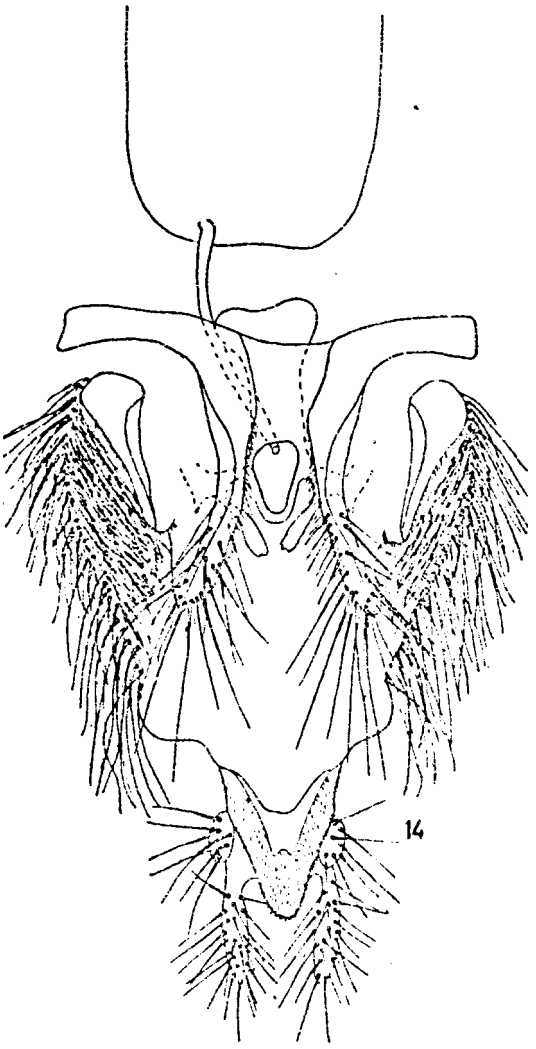


Fig. 13. *Nemopalpus flavus* Macquart. Ventral view of female genital structures.

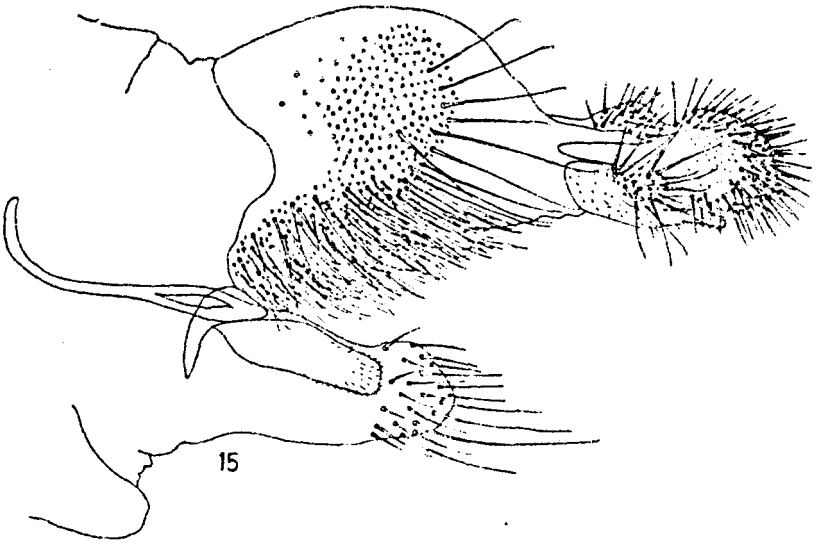


Fig. 15. *Nemopalpus flavus* Macquart. Structurcs of female genitaiia, lateral vicw.

Acknowledgements

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