

THE GENITAL FILAMENTS OF PHLEBOTOMUS DURING
COPULATION^{1, 2}
(DIPTERA, PSYCHODIDAE)

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In the study of Central American species of *Phlebotomus* there has been noted a rough correlation between the thickness and length of the genital filaments of the male and the ducts of the spermathecae of the female. In general, those species with short, heavy filaments (which are actually tubes) have correspondingly short, broad spermathecal ducts. Particularly striking are the species of the *Brumptomyia* group, e.g., *Phlebotomus galindoi* (1) where both filaments and ducts are extraordinarily long, slender and convoluted. The matter is of some importance since it may aid in matching males and females of new species. It had appeared likely that the filaments actually penetrated the ducts during copulation, although we had not observed the phenomenon in several thousand specimens of various species, nor were we aware that it had been described until, during the preparation of this note, we happened onto Sinton's (2) observation. He figured the genital filaments *in situ* within the body of a female *P. major*, where they had been broken off in mounting a copulating pair. Sandflies are occasionally taken in copula but they usually separate immediately.

During a heavy evening flight of *P. perfiliewi* in the Abruzzi, Italy (August 1948), a number of specimens were caught in a suction tube and transferred directly to alcohol. In identifying this batch one pair was found still in copula. The genital filaments, to about one-fourth of their total length, completely filled the ducts of the spermathecae. (Figs. 1 and 2.)

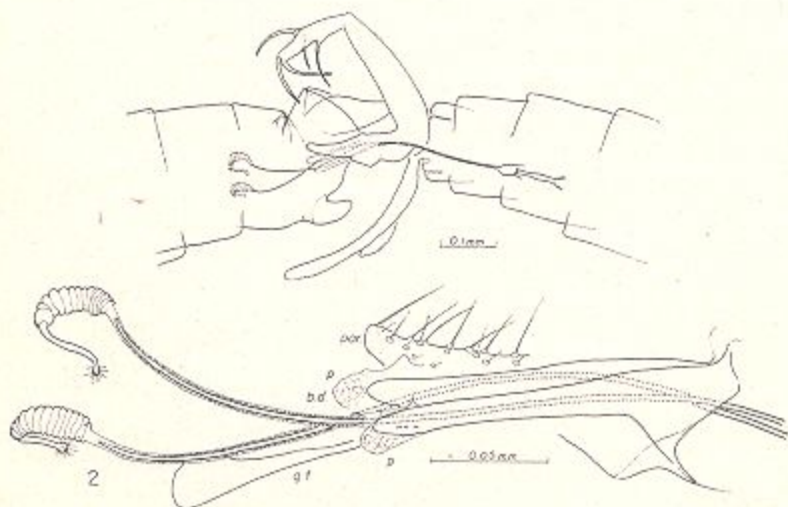
One of the apical spines of each style was in contact with the last obvious (ninth) tergite. The parameres were both on the outside, compressing the body of the female slightly. The tips of the aedeagus, slightly ventral to the parameres and approximately in line with the stem of the genital fork, were inserted in two separate pouches, both partly filled with granular debris. In this species the ducts of the spermathecae are separate and their basal portions are thin-walled, funnel-like expansions (Saccà (3)), Fig. 2, *b.d.* There is a posterior, transverse, dorsal fold common to both the pouches and the

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bases of the ducts, which in the drawing appears as though it were a tooth-like projection of the aedeagus. The lateral lobes were held away from the female by the long hairs (not shown in the drawing) borne by these structures and by the lobes of the eighth sternite. The cerci appeared to have had their bases telescoped by pressure, but this feature was also noted in a number of free females. The granular debris in the pouches was also noted in other specimens.

Some workers in describing species have given the measurements of the portion of the filaments which may project beyond the aedeagus. In our experience this is extremely variable. The tips of the filaments are often within the aedeagus or just barely extruded, a position which the mechanics of copulation would seem to call for in the initial stages. However, it is very common to find the filaments extruded. The four other males of the same lot of *P. perfiliewi* had the filaments extruded to about the same extent as the one in copula (average extrusion 100μ of an average total length of 475μ). In 18 males of other lots, all but two had the filaments extruded at least one-sixth of their total length. In a random sampling of six Central American species, about half the males showed appreciable extrusion except in one species (undescribed) with very short filaments (about 160μ) and extremely



TEXT FIGURE.

Figs. 1 and 2, *Phlebotomus perfiliewi* in copula, phenol mount, camera lucida drawings; fig. 2, detail showing aedeagus, genital filaments filling ducts of spermathecae; *b.d.*, base of spermathecal duct; *gf.*, stem of genital fork; *p.*, pouches with granular debris; *par.*, tip of paramere.

short ducts (about 10μ), where there was no extrusion. In the other species the extruded portion rarely exceeded the length of the spermathecal ducts. In the extreme case of *P. galindoi* the genital filaments of our one male specimen have a total length of about 2440μ , with about 640μ extruded in a coiled mass. The ducts of the spermathecae measure about 1300μ coiled within a longitudinal distance of only 320μ . The maximum extrusion of the filaments in a series of males may prove to be useful as an index of the length of the ducts when the females are unknown.

In many American species of *Phlebotomus* the spermathecae have a common duct with the bifurcation often at some distance from the external opening. The tips of the genital filaments are in some cases sharply bent or somewhat flared. Whether these modifications serve to guide the filaments into the separate ducts, and indeed the whole matter of the degree of penetration, must await other chance findings of specimens which remain in copula.

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