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THREE NEW *DROSOPHILA* SPECIES (DIPTERA: DROSOPHILIDAE) FROM BRITISH COLUMBIA, HAWAII, AND THE CANARY ISLANDS[1,2]

Haruo Takada, Jong S. Yoon[3]

ABSTRACT: *Drosophila canadiana* n. sp. from Smithers, British Columbia, Canada, *D. canaryana* n. sp. from Tenerife, Canary Islands, and *D. soonae* n. sp. from Kona, Island of Hawaii, are described. Their relationships to other species in the *virilis* species group, the *obscura* species group, and the modified mouthparts species group, respectively, are discussed.

The National *Drosophila* Species Resource Center (NDSRC) at Bowling Green State University, Ohio, maintains a collection of living cultures of *Drosophila*, totaling more than 350 named species and several undescribed species. This is the largest collection of living eukaryotic organisms ever assembled whose evolutionary relationships and genetic biology have been studied extensively

In order to maintain the quality of stock and to provide better services for the scientific community, it is necessary to verify the authenticity of the stock, and to identify unnamed species. During the course of this study, three of these unnamed species are described: the first species is from British Columbia, the second is from the Canary Islands, and the third is from the Island of Hawaii.

Drosophila canadiana n. sp.

(Figs. 1-2)

Diagnosis: Distinguished from other members of the *virilis* species group by cylindrical shaped spermatheca, phallosomal index of 2.3-2.5 and evenly scattered dorsal hairs on the aedeagus.

Description:

External characteristics of adults: Male and female. Arista with usually 7 branches including a terminal fork. Antennae brown, third joint darker. Frons dark reddish brown, ocellar triangle dark brown. Anterior reclinate orbital bristle less than 1/2 length of pro-

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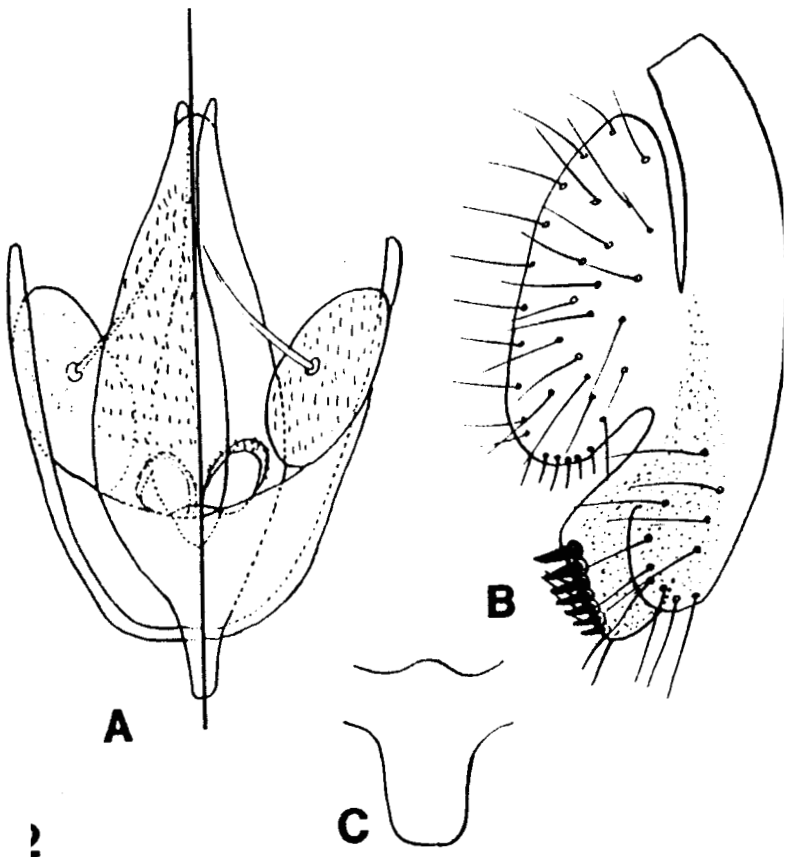

Fig. 2. *Drosophila canadiana* n. sp. A. phallic organs of male; left half in dorsal aspect and right half in ventral aspect B. periphallic organs of male; right half in posterior aspect C. bridge connecting claspers.

since 1961. This strain exhibited distinctive differences in karyotype and longevity (Durbin and Yoon, 1987, and unpublished data).

D. canadiana belongs to the *virilis* species group of the subgenus *Drosophila*. It is closely related to but clearly differs from the European *D. littoralis* Meigen 1830. *D. canadiana* has a cylindrical shaped spermatheca, phallosomal index of 2.3 - 2.5, and evenly scattered dorsal hairs on the aedeagus, while *D. littoralis* from Switzerland has a hemispherical spermatheca, phallosomal index of 1.4 - 1.8, and aedeagal hairs on only the dorsal half.

Drosophila canaryana n. sp.

(Figs. 3-5)

Diagnosis: Distinguished from other members of the *obscura* species group by male sex combs with a row of long black teeth on each basal and second tarsal segment of foreleg.

Description:

External characteristics of adults: **Male.** Body blackish brown. Eye dark red with dark pile. Arista with 3 dorsal and 2 ventral branches in addition to terminal fork. Antennae brown, third joint blackish brown, pollinose. Clypeus and carina pale brown, front dark brown. Ocellus pale yellowish brown. Two prominent orals. Middle orbital about 1/2 length anterior proclinate, 1/3 that of posterior reclinate. Palpus with single prominent bristle. Carina narrow above, gradually widening below, somewhat rounded, not sulcate. Cheeks grayish yellow, narrow, their width less than almost 1/5 greatest diameter of the eyes.

Mesonotum and scutellum dark brown. Acrostichal hairs in 8 rows, anterior scutellars convergent. Anterior dorsocentrals 1/2 length posterior dorsocentrals. Pleura dark brown. Anterior sternopleural 1/2 length posterior; middle one undeveloped.

Legs pale grayish yellow. Fore femur swollen, with a row of bristles on posterior surface, and inner surface of posterior end clouded. Basal tarsal segment of fore leg with row of long black teeth, 26 in number, the row placed slightly obliquely on the segment. Second tarsal joint also with large prominent sex-comb, consisting of a row of long black teeth slightly curved to apex, 20-25 in number, placed obliquely, not parallel, to axis. Position and size of these combs are shown in Figure 1 d and e.

Abdominal tergites brownish black, slightly shining. Haltere white. First tergite paler than others.

Wing hyaline, two prominent bristles at distal costal break. Third costal section with heavy bristles on basal 1/3. Coastal index 2.9; 4th vein index 1.7; 4C index 0.9 and 5x index 2.0.

Length of body 2.2 mm. Wings 2.2 mm.

Female. As above, except that no tarsal combs are present. Spermathecae small spherical bodies, dark brown in color and chitinized.

Male genitalia: Periphallic organs. Middle and lower portions of genital arch with 28 or more bristles, upper portion with 7 bristles; toe elongate and swollen. Primary clasper without prominent process; 8 primary teeth, 9 spines on posterior tip of anal plate in two rows.

Phallic organs. Hypandrium semi-elliptical in shape with a short pair of paramedian spines. Anterior parameres as long as posterior parameres and with 8 sensilla. Aedeagus bifurcate and rather longer than both parameres. Phallosomal index 0.6.

Eggs: Two filaments, with distal ends expanded.

Chromosomes: 2n = 12, 5R1D. Karyotype observed in brain ganglion of third instar larvae of male.

Types: Holotype male. The original specimen collected in December, 1971, at Tenerife, Canary Islands; Stock No. 1410-1211 (3265.1) of the NDSRC. Allotype female and paratype males and females are same as above. Type specimens have been deposited at the AMNH.

Remarks: On the basis of the external morphology this species appears to be closely related to *Drosophila subobscura* Collin, 1936 (see Pomini, 1940), subgenus *Sophophora*, Genus *Drosophila*, but can be separated from all known members of the *obscura* species group by the phallic organs and sex-combs of the male.

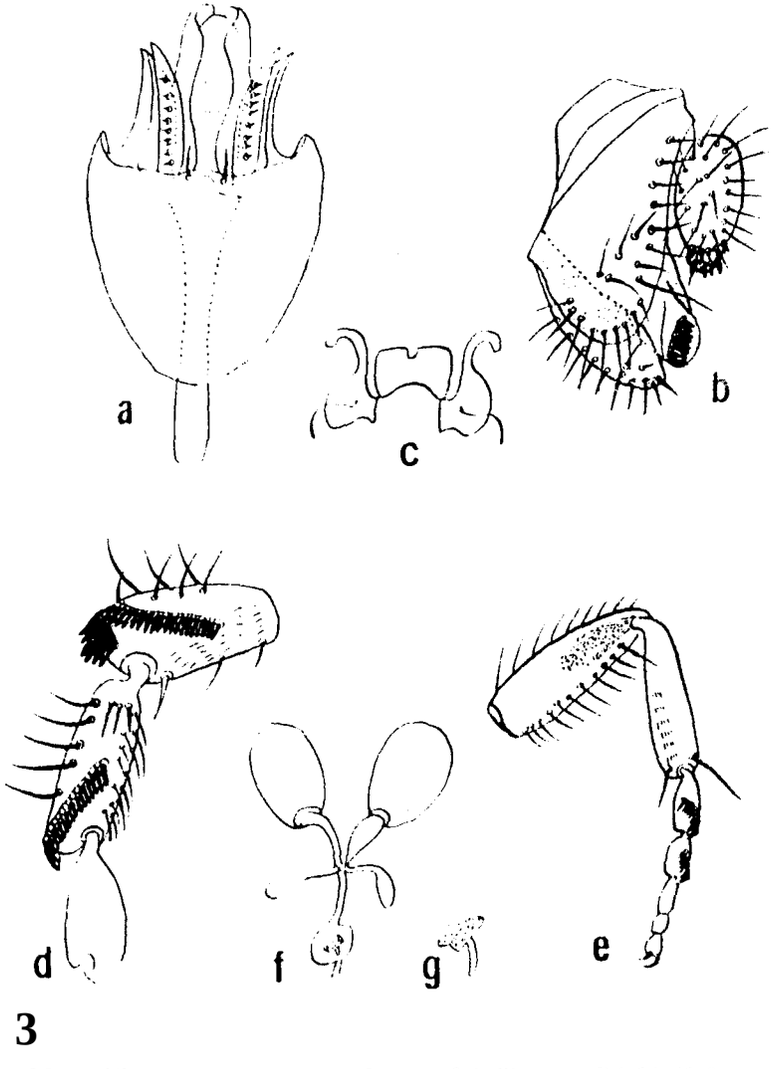

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Fig. 3 *Drosophila canaryana* n. sp. A. ventral aspect of phallic organs B. left half of external male genitalia C. the bridge connected claspers D. fore basal tarsus and 2nd tarsus of male E. fore leg of male F. internal genitalia of male G. sperm pump.

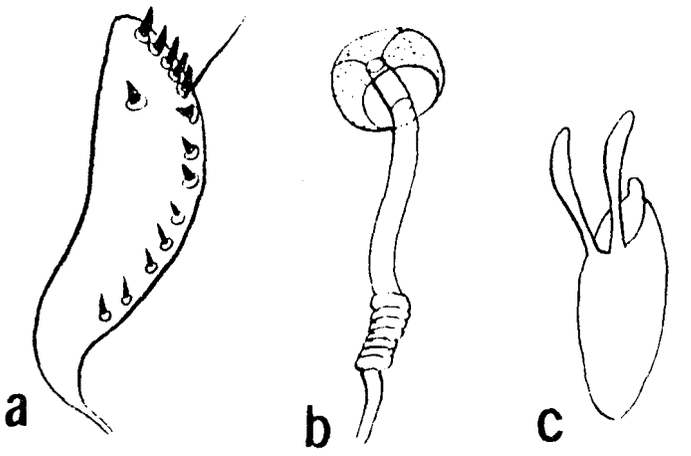

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Fig. 4. *Drosophila canaryana* n. sp. A. egg-guide B. spermatheca C. egg

Drosophila soonae n. sp.

(Figs. 6-7)

Diagnosis: Distinguished from other species of Hawaiian *Drosophila* by modified mouthparts: each labellum with a series of long, curved bristle-like processes extending from the apex.

Description:

External characteristics of adults: **Male.** Body tannish yellow, eyes scarlet in live specimens. Arista with 6 dorsal and 2 ventral branches in addition to the fork. Third antennal segment darker. Frons tan, orbits and ocellar triangle paler. Carina, cheeks and clypeus tan; carina flat. Ocelli tannish yellow. Proclinate orbital 5/6 length posterior reclinate, anterior reclinate thin, 1/3 length proclinate, proclinate orbital situated a little middle of the front and near anterior reclinate. Oral bristles are made up of a row of short black bristles of about equal length. Palpi with a long apical bristle and with densely blackish setae around apical one third. Each labellum with a series of long, curved, bristle-like processes extending from the apex.

Mesonotum tannish yellow. Acrostichal hairs in 8 somewhat irregular rows. Posterior dorsocentral bristles long, anterior ones small and thin. Ventral surface of sternopleurite with 14 long, curved, black bristles. Haltere yellow. Lateral surface of second tergite with numerous upright bristles on the posterior margin, each tergite with an apical brownish band and widely interrupted at middle on sixth tergite. Fourth, fifth and sixth sternites with marginal bristles. Middle sternopleural small. Sterno-index 0.6.