D. argentostriata: A New Species of *Drosophila* from New Guinea

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Introduction

New Guinea possesses numerous and diverse species of the genus *Drosophila*, many of which are still undescribed. The *Drosophila* fauna of this region contains a number of relatively rare large species, as well as the more common large species of the *immigrans* group. *D. rubida*, a common species of the *immigrans* group, has been extensively studied because of its ease of culturing, good polytene chromosomes, and large number of inversions, many of which alter in relative frequency seasonally (Mather, 1961a, 1963). Recent collecting has revealed a new relatively rare species of potential genetic interest. The following is a description of this species.

Type material

Holotype and allotype (pinned material): deposited at the Australian Museum, Sydney. Paratypes: British Museum (Natural History); U.S. National Museum; C.S.I.R.O. Division of Entomology, Canberra; Queensland Museum; School of Public Health and Tropical Medicine, University of Sydney.

Techniques

For the following bilateral characters, five adults of each sex were measured on each side of the body: arista branches, cheek-eye ratio, sterno-index, wing length

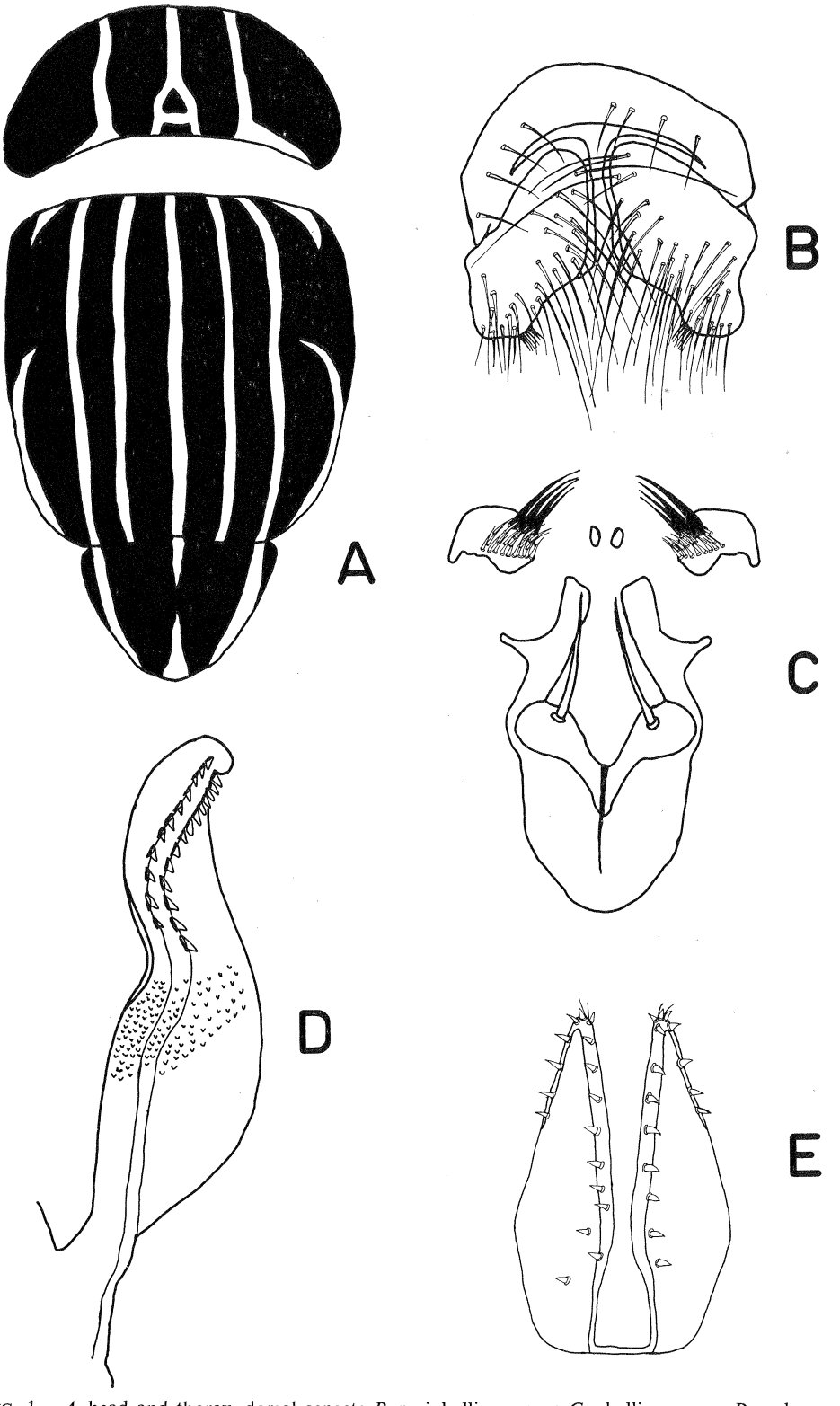

FIG. 1.—*A*, head and thorax, dorsal aspect; *B*, periphallic organs; *C*, phallic organs; *D*, aedeagus; *E*, egg guides.

(expressed as an average) and indices. Five adults of each sex were measured for body length, which has also been expressed as an average. Five pupae were examined for pupal characters. Techniques are otherwise similar to those described by Mather (1955, 1960, 1961b) and Angus (1964).

DROSOPHILA ARGENTOSTRIATA sp. nov.

General. Light brown with longitudinal thoracic silvery stripes (hence the specific name *argentostriata*); two pairs of dorsocentral bristles; prescutellars absent.

Cultures—Type source. Bisianumu, Papua, May 1965. Easy to maintain in culture.

Body length. ♂, 4.0 mm; ♀, 4.1 mm.

Head ♂ and ♀. Arista usually with 7 branches, including terminal fork; range 6–9 branches. Number of branches on each side of head occasionally different. Front with 3 narrow silvery stripes (Fig. 1,*A*), the lateral 2 along the eye margins, the median one splitting to enclose the ocellar triangle. Broad, shiny, reddish-brown bands between the stripes; a trace of dark brown about the silvery V enclosing the ocellar triangle. Thin, dark brown lines at lateral edges of these bands adjoining the silvery stripes. Ocelli pale orange. Eye colour (Maerz & Paul, 1950) 2K6. Orbital bristles in ratio of 4:2:3. Greatest width of cheek 0.15–0.2 greatest diameter of eye. Carina flat.

Thorax ♂ and ♀. Brown with 5 complete silvery stripes, the lateral 2 continuing along the lateral edges of the scutellum, the middle one extending along midline of scutellum for a short distance, reappearing at posterior edge of scutellum (Fig. 1,*A*). Two lateral silvery stripes in addition to the 5 complete ones extending as far forward as the transverse suture. Two short triangular silvery stripes in humeral region of thorax. Lateral thoracic sclerites pale brown with 3 poorly defined pale silvery stripes. Acrostichal hairs in 6 regular rows on brown bands of thorax in front of dorsocentral bristles, 4 rows between dorsocentral bristles. Anterior dorsocentral bristles half length of posterior ones. Sterno-index 0.5. Preapical bristles on first and third tibiae; apicals on first and second tibiae. No sex-combs. Fore-femora very broad. Postero-medial border of first femur with row of approximately 12 small bristles. Major part of scutellum brown as in rest of thorax; two very dark, thin, brown stripes along inner margins of lateral silvery stripes. Posterior scutellar bristles convergent but not crossed; crossed posterior scutellars are typical of the genus *Drosophila* (see subsequent discussion on relationships).

Wings ♂ and ♀. Transparent. Costal index 3.4 $\pm$ 0.3; fourth vein index 1.8 $\pm$ 0.2; 5X index 1.4 $\pm$ 0.2; 4C index 0.8. The 4C index is the most constant of the four wing indices, deviating from the value given above by less than 0.1 in all specimens measured. Third costal section with heavy bristles on basal half or slightly more. Wing length ♂ 3.0 mm, ♀ 2.9 mm.

Periphallic organs (Fig. 1,*B*). Anterior margin of genital arch straight; genital arch hirsute. No heel or toe. Anal plate oval, attached to genital arch partly by an area of sclerotization continuous with genital arch, partly by membrane. Approximately 30 large bristles on anal plate in 3 irregular longitudinal rows, and a thick patch of shorter bristles about the rear angle. Numerous small bristles about lateral portion of anal plate. Claspers with approximately 26 large black bristles arranged in one row of 4–5 very large bristles above, and two or three poorly defined rows of smaller bristles below. Decasternum consisting only of 2 tiny oval areas of sclerotization embedded in hirsute membrane.

Phallic organs (Fig. 1,*C*). Aedeagus long, straight, expanded and horizontally flattened apically. Approximately 25 small teeth in 2 rows on each side (Fig. 1,*D*). Middle portion of aedeagus broader and deeper, vertically flattened, ornamented

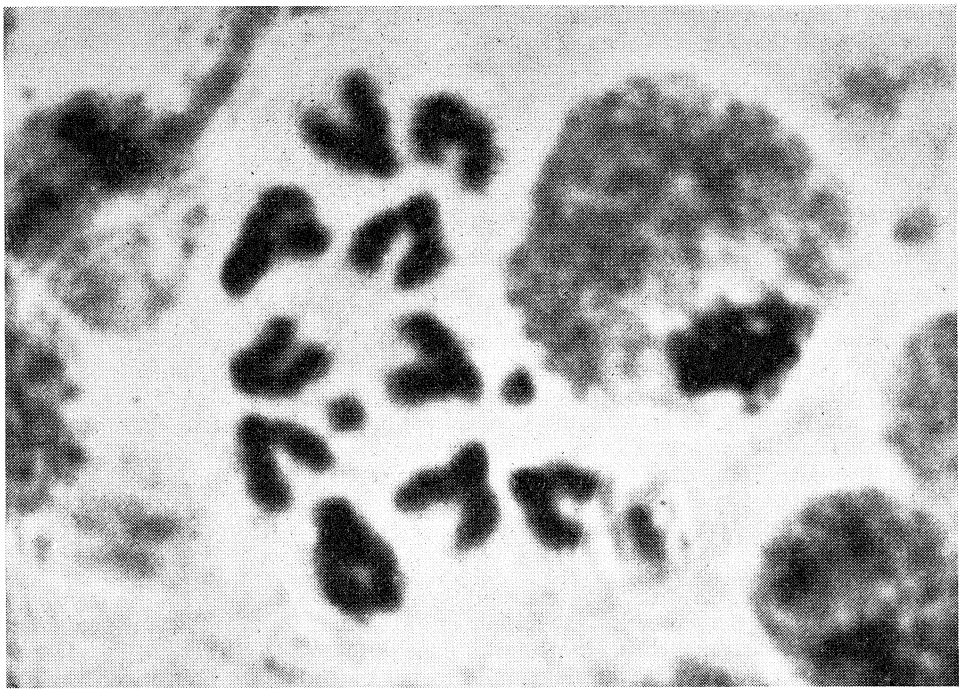

FIG. 2.—Female metaphase plate

with numerous minute spherules on the more apical portion. Ventral fragma quadrate, rounded ventrally. Phallic formula (Okada, 1956) abCDef$_o$GHIkLMN. Phallosomal index slightly greater than 1.

Egg guides. Brown, pointed, with 15–18 teeth and 2 subterminal hairs. Basal isthmus 2/11 length of lobe (Fig. 1,*E*).

Internal structures ♂ *and* ♀. Intestinal coiling index 1. Rectal index 1.0. Malpighian tubules, 2 anterior, free, common trunk 0.1 total length; 2 posterior, free, common trunk 0.1 total length. Anterior and posterior of equal length.

Internal genitalia ♂. Testes dark yellow, with 5 outer coils and 3 small paler inner coils. Sperm pump with pair of caeca twice as long as bulb.

Internal genitalia ♀. Ventral receptacle short, with 3–4 coils. Spermathecae sclerotized, almost spheroidal.

Egg filaments. Two, expanded and flattened at apices.

Pupae. Anterior spiracles divergent, with 2–4 tiny branches arising from one large middle branch, which may occasionally be split. Posterior spiracles 1/15 pupal body length. Ratio pupal stalk/pupal body length 1/7 (the stalk measurement including the large branch). The large branch is composed of approximately 12 tightly bound, thin branches. Each small branch likewise contains a few fused thinner branches.

Life cycle. Eggs are visible in the culture medium on the day following preparation of a culture of mature *D. argentostriata.* Two days later, small larval tunnels are evident. The larvae feed for approximately 16 days before leaving the medium to

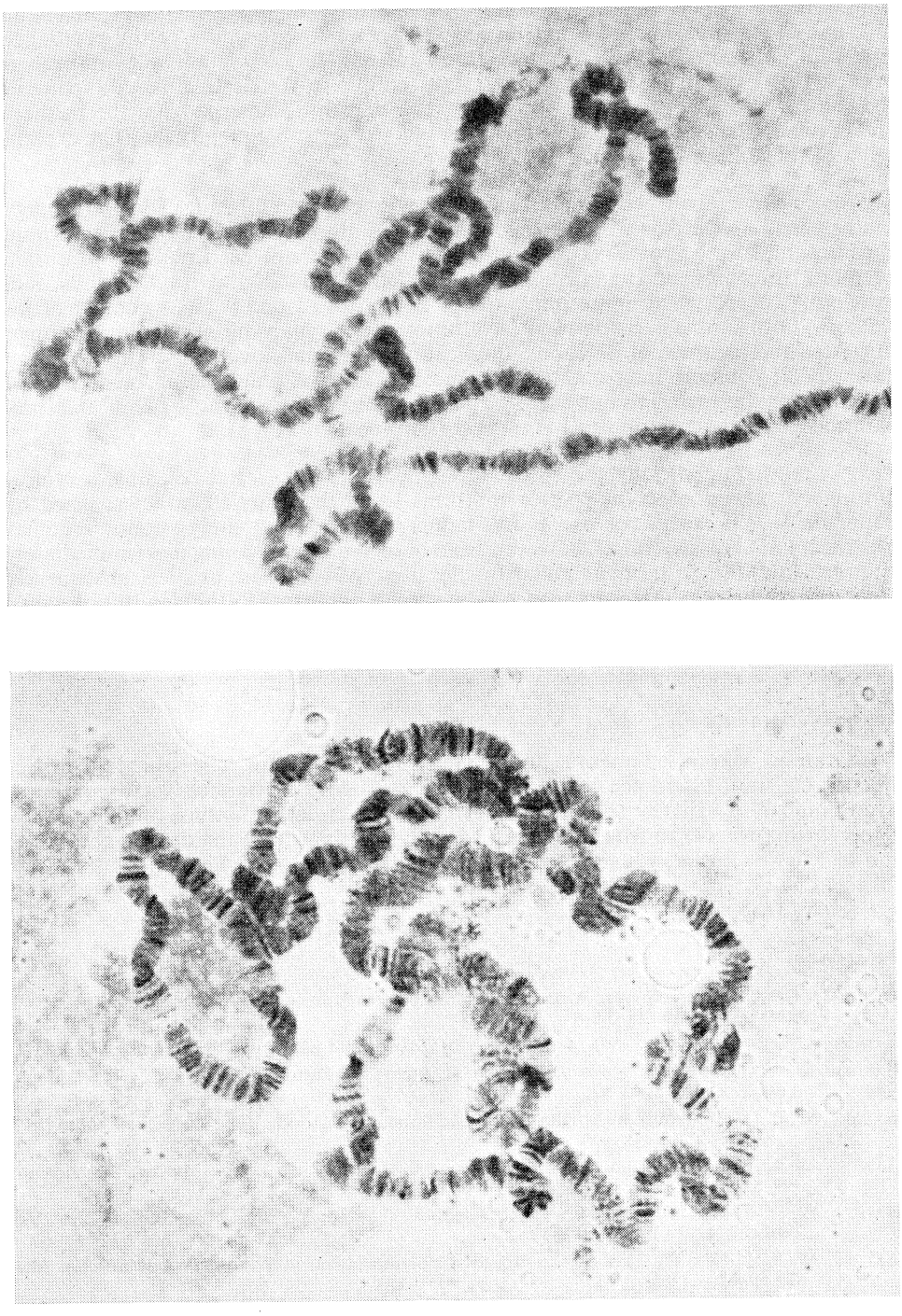

FIG. 3.—Salivary gland chromosomes. *A*, unusually good spread demonstrating the five long arms; *B*, more typical squash showing poor spreading of chromosomes.

pupate in the paper. The adults emerge after 8 days of pupal metamorphosis, an unusually long time for a *Drosophila* species. Presumably because of the prolonged period of pupation, final instar larvae store large amounts of (yellow) fat within their bodies. Final instar larvae are also very susceptible to rough treatment. Jarring of the culture bottle, for example, induces large numbers to emerge from the medium and crawl up the sides of the culture bottle, where they subsequently die. The explanation of this unusual phenonemon is obscure.

Chromosomes. Larval ganglion squashes show 5 pairs of subequal rods with large centromeres, and a pair of conspicuous dots in both sexes (Fig. 2). Salivary gland chromosomes have proved extremely refractory. It has not been possible to obtain adequate spreading of the chromosomes, which are small and fragile, whilst still preserving the polytene figure intact. Most larvae tested had a large number of inversions, both simple and complex. In addition, poor synapsing of the chromosomes suggested the presence of deletions, duplications, or small inversions. This situation has helped to obscure interpretation of squashes. There is a definite chromocentre of heterochromatic material and 5 arms can be discerned in the most favourable preparations. The short sixth arm has not yet been located (Fig. 3).

Relationships. Superficially the species described above does not resemble a typical *Drosophila*; nevertheless the species conforms to all the generic characters listed by Patterson (1943) except for one point, namely the fact that the posterior scutellar bristles are not crossed. It has, however, been observed that in young flies (immediately after eclosion) the posterior scutellar bristles are crossed. These bristles subsequently separate a short time after emergence. The species conforms to the description given by Patterson & Stone (1952) for the subgenus *Sophophora*, but does not conform to the description of an existing species group.

Acknowledgments

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