THE MESOPHRAGMATICA GROUP OF THE GENUS *DROSOPHILA* WITH DESCRIPTION OF THREE NEW SPECIES

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Resumen

El grupo de especies *mesophragmatica* del sub-género *Drosophila* comprende hasta el momento las siguientes seis especies neotropicales: *D. mesophragmatica* Duda 1927, *D. gaucha* Jaeger y Salzano 1953, *D. pavani* Brncic 1957, *D. altiplanica* sp. nov., *D. orkui* sp. nov. y *D. viracochi* sp. nov.

En la presente publicación se define el grupo; se da una clave de determinación de especies; se redescriben *D. mesophragmatica* Duda y *D. pavani* Brncic; se describen las tres especies nuevas, y se incluyen datos sobre los cromosomas, la distribución geográfica y el aislamiento sexual de los miembros del grupo.

Zusammenfassung

Die *Mesophragmatica*-Gruppe der Untergattung *Drosophila* umfasst bisher die folgenden sechs neotropischen Arten: *D. mesophragmatica* Duda 1927, *D. gaucha* Jaeger und Salzano 1953, *D. pavani* Brncic 1957, *D. altiplanica* sp. nov., *D. orkui* sp. nov. und *D. viracochi* sp. nov.

In der vorliegenden Arbeit wird die Gruppe beschrieben, ein Schlüssel zur Bestimmung der Arten angegeben, *D. mesophragmatica* Duda und *D. pavani* Brncic neu beschrieben und die drei neuen Arten bestimmt. Ausserdem werden einige Angaben über die Chromosome, geographische Verteilung und geschlechtliche Isolierung dieser Gruppe beigegeben.

Introduction

Since the revision of Patterson and Stone (1952) on the contributions which the study of the dynamics of Drosophila populations have made towards the better knowledge of evolutionary processes, the list of known species has increased greatly. This is due mostly to the fact that the investigations have extended to geographic regions which up to now had not been explored from this point of view. The discovery of new species and the analysis of old or not well known ones, by means of genetical, breeding and ecological techniques, has contributed greatly towards the establishment of a number of extremely interesting relationships among

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the different members of the genus. In the neotropical zone, the richest in species, the studies on the structure of Drosophila populations are still in the stage of collection of data. There are still many regions which remain unstudied, and very little is known about the biological behavior of a great number of species.

During the last few years the authors have been interested in problems of the dynamics of the populations of certain members of the genus Drosophila, which have been included in the *mesophragmatica* species group. In this paper, the group is defined, and the new entities which belong to it are described. In further publications other aspects of the genetics, cytology and evolution will be given.

Several reasons have stimulated the authors to study this group. Many of its members are the dominant species in vast regions of Perú, Bolivia, Chile and Argentine. It may therefore be supposed that they play quite an important part in the biological balance of the drosophila populations which inhabit these zones. The six species which are known up to now constitute an excellent genetic material, as they can be easily reared in the laboratory, and also have chromosomes which offer no great difficulties in their study. Finally, a comparative analysis of them has shown several interesting evolutionary relationships.

Taxonomic History

Under the name of *D. mesophragmatica*, Duda described in 1927 a species collected at La Paz (Bolivia) and at Cuzco (Perú). In 1947, at Campos de Jordan, Sao Paulo (Brazil), Pavan and Da Cunha found some flies which morphologically seemed quite similar to Duda's species, and which they included in their paper as a redescription of *D. mesophragmatica*.

Studying flies collected at Cuzco (Perú) by one of the authors (Brncic), and at La Paz (Bolivia) by Mr. J. Stiffel, it was found that some differed from the forms of Pavan and Da Cunha in several minor characteristics, and did not cross with them. On the other hand, the species of these Brazilian authors gave 100% fertile hybrids and was morphologically undistinguishable from *D. gaucha*, a form described by Jaeger and Salzano in 1953 from material collected in the South of Brazil, Uruguay and Argentine.

In the present paper the name *D. gaucha* Jaeger and Salzano has been maintained for the Brazilian species, including that which Pavan and Da Cunha redescribed as *D. mesophragmatica*. A form found at La Paz and Cuzco, the type localities given by Duda, is redescribed as *D. mesophragmatica*, as it adjusts better to its discoverer's original description.

In Chile, Brncic reported the existence of flies morphologically identical to *D. gaucha*, but which, when crossed with the latter gave 100% sterile hybrids. It is probably a sibling species of *D. gaucha*, and has been named *D. pavani* Brncic 1957.

Finally, a further study of the abundant material from Perú and Bolivia, revealed the existence of three other members of the group which are described here under the names of *D. altiplanica* sp. nov.; *D. orkui* sp. nov; *D. viracochi* sp. nov.

General characteristics of the group

The following are the common traits of the six species which can be included in the *mesophragmatica group*.

Brown forms. Arista with 7 to 9 branches. Carina prominent and sulcate. 8 rows of acrostichal hairs. Mesonotum pollinose and with faint longitudinal stripes. Abdominal tergites with transversal bands, interrupted in the mid line and diffusely spread out towards the lateral angles. Anterior Malpighian tubes free; posterior fused with continuous lumen. Belongs to the sub-genus Drosophila.

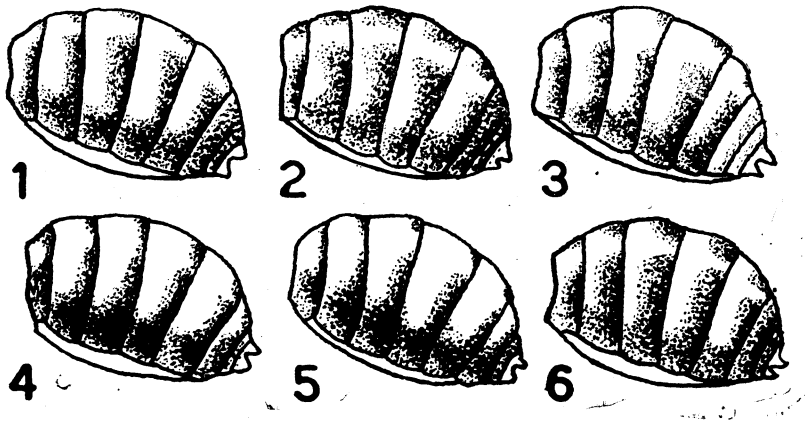

FIG. N.° 1: Color patterns of abdomen of *D. pavani* [1], *D. gaucha* [2], *D. mesophragmatica* [3], *D. altiplanica* [4], *D. orkui* [5] and *D. viracochi* [6].

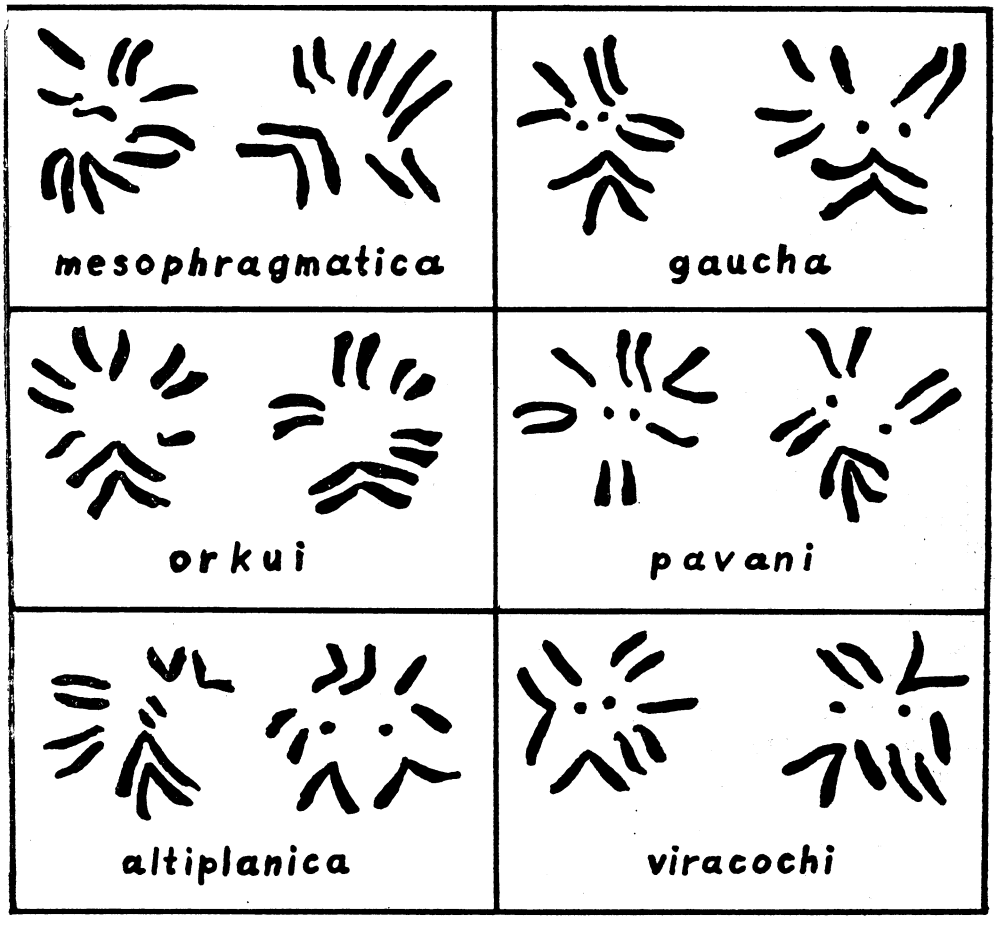

FIG. N.° 2: Camera lucida drawings of the metaphase plates of the six species included in the *mesophragmatica* group.

D. mesophragmatica Duda 1927 has been taken as type species, and the group includes up to the present: *D. gaucha* Jaeger and Salzano 1953; *D. pavani* Brncic 1957; *D. altiplanica* sp. nov.; *D. orkui* sp. nov.; *D. viracochi* sp. nov.

Excepting *D. gaucha* and *D. pavani*, both of which form a pair of sibling species, the other members of the group can be easily distinguished by external characteristics of the imagines. The following key may be useful for the recognition of the species:

1. Anterior scutellars divergent 2
   Anterior scutellars convergent ..... *D. viracochi* sp. nov.
2. Third costal section with heavy bristles on its basal $^1/_5$ or less 3
   Third costal section with heavy bristles on its basal $^1/_4$ or more 4
3. Arista with about 7 to 8 branches; costal index 3,3; dark bands on the posterior margin of tergites cleary interrupted in the middle ..... *D. mesophragmatica* Duda.
   Arista with about 8 to 9 branches; costal index about 4; dark bands on the posterior margin of tergites, diffusely or faintly interrupted in the mid line ..... *D. altiplanica* sp. nov.
4. Mesonotum dull dark brown, darker in the mid line with several faint light stripes; legs tannish brown with coxas darkened ..... *D. orkui* sp. nov.
   Mesonotum brown, not as above; legs yellow ..... *D. pavani* Brncic or *D. gaucha* Jaeger & Salzano.

D. pavani is very difficult to distinguish from *D. gaucha* by its morphological characteristics, but nevertheless, when both species are examined simultaneously under the microscope, they may be separated by some details: in *D. gaucha* the emergence of the orbitals and verticals cannot be distinguished clearly from the neighboring regions, nor does it have the silvery reflections of the Chilean species; in *D. pavani* the 5x index is $1{,}32 \pm 0{,}13$ in males and $1{,}27 \pm 0{,}14$ in females while in *D. gaucha* it is $1{,}09 \pm 0{,}08$ in males and $1{,}02 \pm 0{,}07$ in females. The external genitalia of the males are also a little different in both species: The inferior margin of the clasper is a little straighter in the Chilean than in the Brazilian member; the inferior margin of the genital arch is strongly convex and forms a prominence in the Brazilian species, while in the Chilean forms this convexity is not so pronounced.

The six species show a varying degree of sexual isolation. *D. gaucha* and *D. pavani* mate freely under laboratory conditions, but the hybrids are all sterile. Concerning the other members of the group, only very seldom, hybrids between *D. mesophragmatica* females and *D. gaucha* or *D. pavani* males develop to the stage of pupae. Most of the other species copulate, but the sperms, are rapidly inactivated, and the eggs the females lay are not fertilized. In addition, there is good chromosomal and genetic evidence to show that no gene exchange takes place in the natural populations of the six species of the group, in spite of the fact that some are sympatric in certain regions, including the two sibling species *D. pavani* and *D. gaucha*. (Brncic and Koref, 1957).

Descriptions

Drosophila mesophragmatica Duda.

1927. *D. mesophragmatica* Duda. Arch. Naturgesch., 91A, **11-12:** 205.

External characters of imagines:

♂ & ♀ Arista with about 7 to 8 branches, 8 being the usual number. Antennae brown; third joint pilose and darker than the other two. Front brown. Space between the ocelli blackish, their sides forming a triangle. Base of all orbitals and verticals dark brown almost undistinguishable from the rest of the front, only slightly pollinose. Anterior orbital about the same size as posterior; middle orbital about $^1/_3$ to $^1/_2$ the length of

the other two. Only one prominent oral bristle; second one about $^1/_4$ to $^1/_3$ length of the first. Carina prominent and sulcate, gradually broadening below. Face grayish yellow. Cheeks grayish yellow, with some pollinosis, their greatest width about $^1/_5$ to $^1/_4$ greatest diameter of eye. Eyes wine red with dark pilosity.

Acrostichal hairs in 8 regular rows. No prescutellars. Anterior scutellars divergent. Mesonotum dark brown with pollinose. Very faint diffuse darker streaks inside and outside the dorsocentral rows. Scutellum dark brown. Pleurae very dark brown, with darkened sutures. Sterno-index about 0.7. Legs tannish brown; apical bristles on first and second tibiae, preapicals on all three.

Abdomen light yellow with dark brown bands, on the posterior margins of each tergite, interrupted in the middle, and covering a little less than $^1/_2$ the segment width. On the lateral margins the bands expand forwards reaching the anterior border of the tergite and forming solid black areas. In females the last abdominal segments almost entirely yellow, or only slightly darkened.

Wings clear, slightly tannish. Veins light brown; crossveins slightly clouded, posterior crossvein a little more clouded. Apex of first costal section with two prominent bristles of equal lenght; third costal section with heavy bristles on its basal $^1/_6$ - $^1/_5$. Costal index about 3.3; 4th vein index about 1.4; 5x index about 1.0; 4c index about 0.70.

Length body about 2,9 - 3,6 mm. Wings about 2,8 - 3,1 mm.

Internal characters of imagines.

Anterior Malpighian tubes free; posterior fused with continuous lumen.

Testes yellow with about 3 to 4 inner, and 5 outer coils. Spermatic pump with two posterior diverticles.

Ventral receptacle with about 30 coils. Spermathecae cherry shaped, brown, chitinized, with a strongly marked waved base.

Other characteristics, relationships, distribution.

Eggs.—4 filaments, posterior slightly longer.

Puparia.—Brown; horn index about 1 x 7.5; anterior spiracle with about 18 branches.

Chromosomes. — Metaphase plates show one pair of V shaped chromosomes, and 4 pairs of rods. One pair of rods is shorter, about $^1/_2$ the lenght of the others.

Relationships.—Belongs to the sub-genus Drosophila, closely related to *D. gaucha* Jaeger and Salzano (1953) and to *D. pavani* Brncic (1957).

Types.—Type material for the present redescription from Cuzco (Perú).

Distribution.—Duda records this species for Cuzco (Perú) and La Paz (Bolivia). In the summer of 1956 one of the authors (Brncic) collected this species in the same localities as Duda, and also at Machu Pichu (Perú).

Drosophila gaucha **Jaeger and Salzano**

1947. *D. mesophragmatica* Pavan and Da Cunha. Bol. Fac. F. C. e L. Univ. Sao Paulo. 86. Biol. Geral. **7**: 41.

1953. *D. gaucha* Jeager and Salzano. Rev. Brazil. Biol. **13**: 205.

The authors described this species based on specimens collected at "Muitos Capoes", Rio Grande do Sul, Brazil, in June, 1952. According to a personal communication from them, it is abundant in the South of Brazil, in Uruguay and Argentine. This is the same species which Pavan and Da Cunha (1948) redescribed as *D. mesophragmatica*, based on flies collected at Campos de Jordan, Sao Paulo, Brazil.

Stocks from Sao Paulo and Rio Grande do Sul, Brazil, and flies collected by Brncic in Argentine (Cordoba and San Luis) have been examined in this laboratory.

Drosophila pavani **Brncic**

1956. *D. mesophragmatica* Brncic. Acta Physiol. Lat. Amer. **6**: 45.

1957. *D. pavani* Brncic. Especies chilenas de *Drosophilidae*. Imp. Stanley Stgo.

External characters of imagines.

♂ & ♀ Arista with 7 to 8 branches, 8 being the most frequent. Antennae light brown, third joint darker and clothed with fine black pile. Front brown. Ocellar triangle brown. Emergence of orbitals and verticals yellowish brown, clearly distinguishable from the neighboring regions, and with silvery reflections according to light incidence. Anterior orbital about the same size as posterior; middle orbital about $^1/_3$ lenght of other two. Only one prominent oral bristle, second one less than ¼ the first. Carina prominent, wider below and strongly sulcate. Face yellowish brown. Cheeks grayish yellow, their greatest width about $^1/_5$ greatest diameter of eye. Palpi yellow with three long bristles on their distal end. Eyes dark red and covered with fine dark pile.

Acrostichal hairs in 8 regular rows; no prescutellars. Anterior scutellars divergent. Mesonotum brown and pollinose, with faint diffuse longitudinal stripes inside and outside the dorsocentral bristles. Scutellum darker. Pleurae grayish brown with dark pollinose areas. Sterno-index about 0.8. Legs yellow. Apical bristles on first and second tibiae, preapicals on all three.

Abdomen yellowish brown, each segment having a posterior dark brown band, interrupted medianly, except in the last segment of the males, which is darker than the others; each band faintly expanded near the angle of the tergite towards the anterior margin.

Wings clear, slightly yellowish; veins brown. Crossveins, specially the posterior, slightly clouded in some individuals. Apex of first costal section with two prominent bristles. Third costal section with heavy bristles on its basal third. Costal index about 3.6; 4th vein index about 1.6; 4c index about 0.7; 5x index about 1.3.

Length body: 3,1 to 3,7 mm; wings about 2,8 to 3,2 mm.

Internal characters of imagines.

Anterior Malpighian tubes free; posterior tubes apposed with apparently continuous lumen.

Testes yellow with about 4 to 5 inner and 5 outer coils. Spermatic pump with two long posterior diverticles. Seminal vesicles shaped.

Ventral receptacle with about 30 coils. Spermathecae well chitinized, cherry shaped.

Other characteristics, relationships, types, distribution, and notes.

Eggs.—4 filaments, the posterior slightly longer than the anterior.

Puparia.—Orange-brown; horn index about 1 × 7; each anterior spiracle with about 16 branches.

Chromosomes.—The metaphase plates show one pair of Vs, three pairs of rods, and one pair of dots. One of the pairs of rods is slightly larger than the other two, and heteromorphic in the male.

Relationships.—Belongs to the *mesophragmatica* group of the sub-genus Drosophila, very closely related to *D. gaucha* Jaeger and Salzano 1953, forming with it a group of sibling species.

Type material for the present description from Florida, Santiago.

Distribution.—It was found for the first time at Bellavista (Santiago) in October 1953. Since then it has been collected in the following localities of Chile: Atacama (Copiapó, Vallenar) · Coquimbo (La Serena, Vicuña, Paihuano, Rapel); Santiago (Arrayán, Bellavista, Peñaflor); Colchagua (Los Alpes); Ñuble (Chillán); Valdivia (Angachilla), and in the following places in Ar-

gentine: Mendoza (Cuyo) and San Luis (San Luis). Although it is a fly found most frequently in wild habitats, it has been collected often in orchards and gardens.

Notes.—Named in honor of Professor Crodowaldo Pavan from the University of Sao Paulo, Brazil. It is a species easy to maintain in the laboratory.

Drosophila altiplanica sp. nov.

External characters of imagines.

♂ & ♀ Arista with about 8 to 9 branches, 9 being the most frequent. Antennae tannish brown; third joint darker and clothed with fine black hairs. Front velvety, reddish brown. Ocellar triangle blackish with silvery reflections. Emergence of orbitals light brown or blackish according to light incidence. Anterior orbital slightly shorter than posterior one; middle orbital about $^1/_3$ length of anterior and about $^1/_4$ length of posterior. Only one prominent oral bristle, the second one slenderer and less than $^1/_3$ length of first. Carina prominent and sulcate. Face yellowish tan. Palpi yellow with three prominent bristles. Cheeks grayish yellow, their greatest width abouth $^1/_5$ to $^1/_4$ greatest diameter of eye. Eyes cherry red, clothed with thick black pile.

Acrostichal hairs in 8 rather irregular rows. No prescutellars. Anterior scutellars divergent. Mesonotum with pollinose, dark brown, slightly striped. Scutellum dark brown with light pollinosic areas on the posterior margin and towards the scutoscutellar suture. Pleurae dark brown with gray pollinosic areas. Sternoindex about 0.7. Legs yellow; last two tarsal segments blackish. Apical bristles on first and second tibiae, preapicals on all three.

Abdomen yellowish brown, each segment having a posterior dark brown band, indented and thinned down in the mid line, but apparently uninterrupted, and expanding laterally forming solid areas. Sternites grayish brown.

Wings clear, veins yellow; crossveins clouded, posterior one slightly more so. Apex of first costal section with two prominent bristles of equal length; third costa section with heavy bristles on its basal $^1/_6$ to $^1/_5$. Costal index about 4; 4th vein index about 1.3; 5x index about 1.1; 4c index about 0.56.

Length body about 3,6 mm; wings about 3,6 mm.

Internal characters of imagines.

Anterior Malpighian tubes free; posterior ones apposed with continous lumen.

Testes yellow with about 3 to 4 inner and 5 outer coils. Spermatic pump with two posterior diverticles.

Spermathecae cherry shaped, well chitinized. Central receptacle with about 40 to 45 irregular coils.

Other characteristics, relationships, types, and distribution.

Eggs.—4 filaments.

Puparia.—Orange-brown; horn index about 1 × 7; each anterior spiracle with about 14 to 16 branches.

Chromosomes.—Metaphase plates show one pair of large V shaped chromosomes, 3 pairs of rods, one of them bent in the middle, giving the appearance of a small pair of Vs, and one pair of elongated dots.

Relationships.—Belongs to the *mesophragmatica* group of the sub-genus Drosophila.

Types.—Type material for the present description from La Paz, Bolivia.

Distribution.—The only known record is from La Paz, Bolivia.

Drosophila orkui sp. nov.

External characters of imagines.

& ♂ ♀ Arista with about 7 to 8 branches, 7 being the usual number. Antennae brown, third joint blackish and covered with short pile. Front dark brown, slightly pollinose.

Space between ocelli black, their sides forming a triangle. Base of all orbitals and verticals, blackish. In some individuals the orbitals emerge from a light zone with silvery reflections according to light incidence. Anterior orbital a little shorter than the posterior; middle orbital about $^1/_3$ to $^1/_2$ length of the anterior. Only one prominent oral bristle; second one slender and less than $^1/_3$ length of the first. Carina blackish, prominent and sulcate. Face tannish brown. Cheeks blackish yellow, with some pollinosis, their greatest width about $^1/_5$ greatest diameter of eye. Eyes wine red, clothed with thick black pile.

Acrostichal hairs in 8 regular rows. No prescutellars. Anterior scutellars divergent. In some individuals there are two pairs of increased hairs in front of the anterior dorsocentral bristles. Mesonotum dull dark brown, darker in the mid line, and with the following faint markings: towards the anterior margin of the thorax and just inside the dorsocentral bristles there is a faint light band which gradually disappears backwards; outside the dorsocentrals there are slight marks or light bands. Scutellum very dark brown, with its border lighter, slightly pollinose. Pleurae very dark brown with strong pollinosis. Sterno index about 0.5 to 0.6. Legs tannish brown; coxae slightly darkened; apical bristles on first and second tibiae, preapicals on all three.

Abdomen light yellow with dark brown bands which become thin and interrupted in the mid line. On the lateral margins of the tergites these bands expand forwards, reaching the anterior border.

Wings clear, slightly tannish. Veins brown; crossveins slightly clouded, specially the posterior. Apex of the first costal section with two prominent bristles of equal length; third costal section with heavy bristles on its basal $^1/_4$ to $^1/_3$. Costal index about 3.8; 4th vein index about 1.5; 5x index about 1.1; 4c index about 0.65.

Length body about 3,2 mm; wings about 3,0 mm.

Internal characters of imagines.

Two anterior Malpighian tubes free; posterior fused with continuous lumen.

Testes light brown with about 3 inner and 4 to 5 outer coils. Spermatic pump with two posterior diverticles.

Ventral receptacle with about 30 irregular coils. Spermathecae cherry shaped, brown, chitinized, with a strongly marked waved base.

Other characteristics, relationships, types, distribution, and notes.

Eggs.—4 filaments, the posterior slightly longer.

Puparia.—Brown; horn index about 1 × 7; each anterior spiracle with about 16 to 18 branches.

Chromosomes.—Metaphase plates show one pair of V shaped chromosomes, and four pairs of rods, one pair of which is about ½ the length of the others.

Relationships.—Belongs to the *mesophragmatica* group of the sub-genus Drosophila.

Types.—Type material for the present description from Saczihuamán, Cuzco, Perú.

Distribution.—Collected for the first time in April, 1956, at Cuzco, Perú.

Note.—The name of this species was suggested by the word "orku" which in Quechua language means mountain.

Drosophila viracochi **sp. nov.**

External characters of imagines.

♂ & ♀ Arista with about 7 branches. Antennae dark brown. Third joint pilose and about the same color as the other two. Front brown, posterior half darker. Space between the ocelli blackish, their sides forming a triangle. Base of all orbitals and verticals slightly darker than front. In some individ-

uals the orbital bristles emerge from light pollinose zones. Anterior orbital slightly shorter than posterior; middle orbital about 1/2 the other two. Only one prominent oral bristle, second one less than 1/3 to 1/2 length of the first. Carina prominent and sulcate, gradually broadening below. Face grayish yellow. Cheeks grayish yellow, with some dark pollinosis, their greatest width about 1/6 to 1/5 greatest diameter of eye. Eyes wine red, covered with dark pilosity.

Acrostichal hairs in 8 regular rows, increased in prescutellar region. No prescutellars. Anterior scutellars convergent. Mesonotum dark brown with pollinosis, slightly striped in some individuals. Scutellum dark brown, same color as mesonotum. Pleurae brown. Sterno-index 0.8 to 0.9. Legs yellowish; apical bristles on first and second tibiae, preapicals on all three.

Abdomen light yellow with dark brown bands on the posterior margins, moderately interrupted in the middle, and covering about 1/2 the tergite width. On the lateral margins the bands expand forwards, reaching the anterior border of the tergite, and forming solid black areas.

Wings clear. Veins yellow. Apex of first costal section with two prominent bristles of equal length; third costal section with heavy bristles on its basal 1/4. Costal index about 3.5; 4th vein index about 1.7; 5x index about 1.1; 4c index about 0.70.

Length body about 3,0 mm; wings about 2,8 mm.

Internal characters of imagines.

Anterior Malpighian tubes free; posterior fused with continuous lumen.

Testes yellow, with about 4 to 5 inner and 5 outer coils. Spermatic pump with two posterior diverticles.

Ventral receptacle with about 35 to 40 tangled and irregular coils. Spermathecae cherry shaped, brown, chitinized and with a strongly marked waved base.

Other characteristics, relationships, types, distribution.

Eggs.—4 filaments, the posterior slightly longer.

Puparia.—Orange brown; horn index about 1 × 7,5; anterior spiracles with about 14 to 16 branches.

Chromosomes.—Metaphase plates show one pair of V shaped chromosomes, 3 pairs of rods and one pair of dots.

Relationships.—Belongs to the *mesophragmatica* group of the sub-genus Drosophila.

Types.—Type material for the present description from Machu Pichu, Perú.

Distribution.—Collected for the first time by Dr. Marta Breuer from the University of Sao Paulo, Brazil, at Machu Pichu, Perú, in February, 1956. In April of the same year, it was collected at the same place by one of the authors (Brncic).

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LITERATURE

BRNCIC, D. 1957. Las—especies chilenas de *Drosophilidae*. Imprenta Stanley. Santiago, Chile.

BRNCIC, D. and S. KOREF. 1957.—The *mesophragmatica* group of species of the genus Drosophila. Evolution (In Press).

DUDA, O. 1927.—Die Südamerikanischen Drosophiliden unter Berücksichtigung auch der anderen Neotropischen sowie Nearktischen Arten. Arch. Naturgesch., **91 A. (11-12)**: 1-229.

JAEGER, C. P. and F. M. SALZANO. 1953.—*Drosophila gaucha*, a new species from Brazil. Rev. Brazil. Biol., **13**: 205-208.

PAVAN, C. and A. B. DA CUNHA. 1947.—Especies brasileiras de *Drosophila*. Bol. Fac. Fil. Cien. e Letras. Univ. S. Paulo. 86. Biol. Geral, **7**: 3-46.

PATTERSON, J. T. and W. STONE. 1952.—Evolution of the Genus *Drosophila*. The MacMillan Co. New York.