SYSTEMATICS OF THE \textit{BLASTE POSTICATA} COMPLEX WITH DESCRIPTIONS OF THREE NEW SPECIES (PSOCOPTERA: PSOCIDAE)

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\textbf{ABSTRACT}

This paper treats the systematics of a complex of species of \textit{Blaste} (Psocidae) which occurs in southeastern United States, Mexico, Guatemala, Belize, and Honduras. Four species are recognized, 3 of which are described as new. The fourth, \textit{B. posticata} (Banks), is redescribed.

\textbf{Resumen}

Este trabajo sistematico trata un grupo de especies de \textit{Blaste} (Psocidae) que ocurre en el sudeste de los Estados Unidos, Mexico, Guatemala, Belize y Honduras. Cuatro especies son reconocidas, 3 de las cuales son descritas como nuevas. La cuarta, \textit{B. postica} (Banks), es redescrita.

"Psocus" \textit{posticatus} Banks originally described from Guadalajara, Mexico, has a wide north-south range in eastern Mexico, extending southeastward into Guatemala, Honduras, and Belize. Its 3 close relatives here are described as \textit{B. garciorum}, n. sp., from southeastern Texas, eastern Mexico, and Honduras, \textit{B. pusilla}, n. sp., from southern Sinaloa, and \textit{B. osceola}, n. sp., from Florida and southern Georgia. These 4 species constitute a complex (the \textit{B. posticata} complex) which stands apart from other New World species of \textit{Blaste} in possessing a 3-pronged distal process of the hypandrium. The closest affinities of the complex seem to be with \textit{B. opposita} (Banks) of eastern United States and with 4 Cuban species. Within the complex, \textit{B. posticata} and \textit{B. osceola} appear to form one species pair, while \textit{B. garciorum} and \textit{B. pusilla} appear to form another. The speciational events which produced these species appear to have occurred in situ in southern North America following disruptions of previously continuous distributions. The speciational event producing \textit{B. posticata} and \textit{B. osceola} must have been initiated by interruption of a range around the northern Gulf of Mexico. Based on degree of morphological difference, this interruption is suggested to have been pre-Pleistocene. Because of their central, largely overlapping distributions, \textit{B. garciorum} and \textit{B. posticata} are likely to be essentially the same as the ancestors of the 2 species pairs. The almost completely overlapping ranges suggest that these 2 species have been genetically separate longer than the 2 species of either species pair. Such a temporal relationship is also required by the proposed phylogeny.

Females of the \textit{Blaste posticata} complex are readily recognized by presence of a brown spot bordering the distal segment of vein \textit{Cu}$_{1a}$ in the forewing. The forewing is otherwise virtually unmarked except for a dusky pterostigma and stigma saum or a dark spot distally in the pterostigma extending onto the stigma saum. Males generally lack the dark spot along vein \textit{Cu}$_{1a}$ but are readily recognized as members of this complex by presence
on the posteromedial margin of the hypandrium of 3 prongs, 2 of them lying side by side above a larger one. Identification of the species within the complex is a question of examination of head markings and external genitalia characters of both sexes.

**Materials and Methods**

This study is based on my examination of 177 adult specimens of the *B. posticata* complex, including the type of *B. posticata* (*Psocus posticatus* Banks). I also include records sent to me by Dr. A. N. García Aldrete of 29 additional specimens determined by him according to my criteria. Collections containing the specimens seen are designated in the section on material examined at the end of each description according to these acronyms: A. N. García Aldrete (ANGA), E. L. Mockford (ELM), Museum of Comparative Zoology (MCZ).

The species descriptions presented below are preceded by a composite description of the complex. This is based on characters shared by all species of the complex and has allowed shortening of the species descriptions. Variation patterns, where noted, are discussed within or following the description of a species. A key to the species follows the descriptive section. A brief discussion of relationships based on morphological comparisons and distributions is included.

All illustrations were executed with the aid of a drawing tube or microprojector. All measurements were made on slide-mounted parts with a filar micrometer. The micrometer unit for wing measurements was 2.63 µm and 0.987 µm for all others. All leg measurements were made condyle to condyle. Color descriptions were prepared from observations through a dissecting microscope with direct light on specimens preserved in 80% ethanol for a period of 10 to 25 years.

In addition to the standard abbreviations used for direction and distance in the records for each species, the following are used for measurements (Table 1): FW — forewing length; HW — hindwing length; F — length of hind femur; T — length of hind tibia; t₁, t₂ = length of first and second hind tarsomeres; t₁ct = number of ctenidia (comb-based setae) on first hind tarsomer; f₁, f₂, f₃ = length of first, second, and third flagellomeres; IO/d = shortest distance between eyes divided by transverse diameter of eye in dorsal view.

**Composite Description of the *Blaste posticata* Complex**

**Male Color**—Compound eyes and ocellar interval black. Head otherwise pale straw brown with faintly indicated dotted areas bordering median edcysial line and medial margins of compound eyes, and with darker markings as noted for each species. Antennae and legs pale to medium brown. Thoracic terga dark brown on the lobes, pale straw brown on the bordering sutures and depressions between the lobes. Thoracic pleurae and sterna pale to medium brown with darker areas as noted for some species. Forewing unmarked except for dark or partially dark pterostigma and stigma-saum, dark spot at nodulus, and in some specimens faint brown clouding in basal one-third of cell R₁ and along distal segment of vein Cu₁a. Abdomen with precinuous segments dull white marked with reddish brown subcuticular pigmentation: segments 2-4 with incomplete reddish brown bands
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aFW = forewing length; HW = hindwing length; F = length of hind femur; T = length of hind tibia; t₁, t₂ = length of first and second hind tarsomeres; t₁, t₂ = number of setae (comb-based setae) on first hind tarsomere; f₁, f₂, f₃ = length of first, second, and third flagellomeres; IO/d = shortest distance between eyes divided by transverse diameter of eye in dorsal view.
consisting of a dorsal series of transverse lines on each side, the 2 series broadly separated along dorsal midline, usually faded laterally but continuous with 2 ventral series of transverse lines broadly separated along ventral midline; segments 5-8 each with a mid-dorsal transverse spot separated on each side (segments 5-6) from a transverse line continuing to ventral surface (lacking on 7), the lines broadly separated along ventral midline. Clunium and hypandrium medium to dark brown; epiproct and paraprocts pale straw brown, darker around margins.

**Male Structural Characters**—Forewing venation as in Fig. 1; the species overlapping in all variable characters observed. Epiproct semi-circular (Fig. 2) with field of small papillae in each lateral angle. Paraproct normal for the genus. Hypandrium 2-segmented; distal segment terminating (Fig. 3, 4) in pair of broad, lateral claspers and 3 median prongs, 2 above the other. Phallosome Y-shaped (Fig. 5), the stem weakly sclerotized and with at least slight indication of median division; arms each terminating in a hook separated from the rest of the arm by a suture.

**Female Color**—As described for male except forewing (Fig. 6) with a distinct brown mark along distal segment of vein Cu₁₈. Abdominal segments 2-4 with lateral reddish brown lines variable, from distinct to absent.

**Female Structural Characteristics**—Epiproct (Fig. 7A) triangular, most heavily sclerotized along sides; band of relatively long setae along each side including 2 setae on each side longer than the others, one of these the most distal of the band; 3 short setae before apex distal to the lateral bands; apex bearing several short, acuminate spines. Paraproct (Fig. 7B) normal for the genus. Subgenital plate (Fig. 8) with apical lobe relatively short and broad, bearing setae only on its distal margin. Ninth sternum (Fig. 10) with pigmented zone around spermatheca and 3 delimited submembranous regions, one to each side of and one posterior to pigmented area (the posterior region indistinct in *B. puilla* n. sp. and *B. oaccola* n. sp.). Ovipositor valvulae (Fig. 11): first valvula long, slender, reflexed near tip with a few short spines near and at tip; second valvula broad through most of its length, tapering in distal one-fourth to acuminate tip, bearing 3 fields of minute spines—one on median margin before tapering tip, one on tapering distal quarter concentrated on median margin, one on lateral margin beyond region of contact with third valvula; third valvula bearing long setae over much of basal half; distal lobe of moderate length, bare.

*Bliste posticata* (Banks)

*Psocus posticatus* Banks 1905: 3.
*Psidus posticatus* (Banks), Smithers 1967: 110.

**Male Color**—As described for the complex, plus the following. Vertex (Fig. 12) with dotted areas along median ecdysial line and median margins of compound eyes more pronounced than in other species of the complex, forming a nearly continuous brown band along length of median ecdysial line. Postclypeus striated. Pterostigma (Fig. 1) generally with dark pigmentation over distal two-thirds except extreme distal margin, contrasting sharply with colorless basal one-third and distal margin; this pigmentation separated from dark pigmentation of stigmasaum by colorless or very lightly pigmented borders of vein delimiting pterostigma. Some specimens with pigmentation of pterostigma and stigmasaum more diffuse,
as described for *B. garciorn* n. sp. Dorso-lateral series of transverse reddish brown spots of abdominal terga 2-4 joined antero-posteriorly to form a single elongate spot on each side; transverse lateral reddish brown lines of segments 5-6 joined together antero-posteriorly and joined to a transverse line on segment 4 along its posterior margin, the three lines forming a large spot on each side; ventral series of spots of segments 5-7 also joined together antero-posteriorly forming an elongate spot on each side.
Fig. 6-11. *Blaste posticata* (Banks). 2. 6.) Forewing; scale = 0.05 mm. 7A, 7B.) Epiproct (A) and left paraproct (B); scale = 0.1 mm. 8.) Subgenital plate; scale = 0.1 mm. 9.) Ninth sternum (specimen from Allende, N.L., Mexico); scale = 0.1 mm. 10.) Ninth sternum (specimen from near Guatemala City); scale of Fig. 9. 11.) Ovipositor valvulae; scale of Fig. 7.
Male Measurements—Table 1.

Male Structural Characters—Hypandrium with claspers (Fig. 3, 4) each terminating in a pointed process tapering from a broad base; median ventral prong truncate or bifid distally; median dorsals pointed distally, separated at their base by about width of ventral prong. Phallosome (Fig. 5) with basal struts about half length of each arm; distal hook of each arm
terminating in a blunt point; a denticle or series of minute denticles laterally on hook before apex.

**FEMALE COLOR** As described for male, differing only as noted in description of the complex.

**FEMALE STRUCTURAL CHARACTERS**—Subgenital plate as described for the complex; apical lobe (Fig. 8) completely pigmented except for an extremely narrow and incomplete clear zone around free margin. Ninth sternum (Fig. 9, 10) with median pigmented area slightly longer than broad to slightly broader than long; if latter, the area attenuated on each side between lateral and posterior submembranous areas; posterior submembranous area including a transverse selerite generally showing no bilobing; inner zone of each lateral submembranous area with its posterior margin slanting slightly to decidedly backward toward midline. Opisthosoma valvulae (Fig. 11) as described for the complex; third valvula with rounded distal lobe abruptly jutting from the base.

**TYPE MATERIAL**—Holotype ♀ Mexico: Jalisco: Guadalupe, VIII (McClendon). MCZ type #11853.

Mockford: Blaste posticata

El Salto near Naranjo, 13 14 VIII-1958, beating broadleaf trees, 1 ♀, E. L. Mockford (ELM); same locality, 28-III-1961, beating miscellaneous vegetation in gallery forest above falls, 1 ♀, 2 ♂, E. L. Mockford (ELM); same locality, 19-VI-1962, beating miscellaneous vegetation, 1 ♂, 4 ♀, E. L. Mockford (ELM); Rio Verde, 20-X-1963, 1 ♀, E. Hernández (ELM); Huichihuayán, 21-VI-1962, beating orange trees at edge of woods, 1 ♂, F. Hill and E. L. Mockford (ELM); near Huichihuayán, 26-VI-1960, 1 ♂, M. W. Sanderson (ELM); 3.5 K W Naranjo, 20-VI-1962, beating Sabal palms, 1 ♂, F. Hill and E. L. Mockford (ELM). Tabasco: Ejido Libertad, 1.6 K SW Frontera, 31-III-1-IV-1964, beating broad-leaf trees and shrubs in tropical evergreen forest and beating coconut palms (Cocos nucifera Linneaus), 7 ♀, E. L. Mockford and A. Manzano (ELM). Tamaulipas: 3.2 K N Antiguoo Morelos, 18-VI-1962, beating miscellaneous vegetation, 1 ♀, F. Hill (ELM); Gómez Farías, 27-III-1961, beating miscellaneous vegetation, 1 ♂, 1 ♀, E. L. Mockford (ELM); 8 K W Gómez Farías, 15-VI-1962, beating miscellaneous vegetation, 1 ♀, E. L. Mockford and J. M. Campbell (ELM); 14.4 K S Villagrán, Highway 85, 15-VI-1962, beating vegetation in scrub woodland, 1 ♂, 2 ♀, E. L. Mockford and F. Hill (ELM); same locality and date, in black light trap, 1 ♀, E. L. Mockford (ELM). Veracruz: 27.2 K N Alvarado, Highway 180, 16-III-1964, beating shrubs in pasture, 1 ♀, E. L. Mockford and A. Manzano (ELM); Road to Cerro San Martin from San Andrés Tuxtla, 5.9-12.8 K E Highway 180, 14-15-VII-1973, beating miscellaneous vegetation, 6 ♂, 6 ♀, E. L. Mockford and J. R. Taber (ELM); 4.2 K E Catemaco on road to Coyame, 16-VII-1973, beating broad-leaf trees and shrubs, 3 ♂, 1 ♀, E. L. Mockford and J. R. Taber (ELM); 9.6 K N Lerdo, Highway 180, 23-VI-1966, beating shrub vegetation in pasture, 1 ♀, E. L. Mockford, R. Sloan, A. Manzano (ELM); 8 K S Tecolutla, 26-VI-1962, beating strand vegetation bearing numerous dead leaves, and sweeping grass, 2 ♂, 5 ♀, E. L. Mockford (ELM); unspecified locality in Veracruz, 29-V-1962, with pineapple fruit (Ananas ananas (L.) Lyons) intercepted at Hidalgo, Texas, 1 ♀, M. W. Doffing (ELM).

Variation—About 14% of specimens examined lack a pale margin around the pterostigma separating pigmentation of the pterostigma from that of the stigmasaum. There appears to be no geographic pattern to this variation. Variation occurs in the distal prongs of the hypandrium. Some individuals have the dorsals parallel, others diverging. The ventral prong is relatively stout in local populations from the Tecolutla region of Veracruz (Fig. 3) and Gómez Farías, Tamaulipas. Variation in extent of furcation of the apex of the ventral prong exists from a relatively deeply forked tip (Fig. 3) to a truncated tip with no furcation (Fig. 4). The variation in this character appears to be geographic in that all males examined from Guatemala, Belize, Honduras, and Chiapas have the tip truncated, while north of Veracruz, nearly all males have the tip bifid. Variation in the shape of the pigmented area of the female ninth sternum (Fig. 9, 10) does not show a geographic pattern. Variation in size exists (see measurements, Table 1) such that individuals from Veracruz and San Luis Potosí, hence the middle of the north-south range, are smallest. Those from the southern end are largest, and those from the northern end appear to be somewhat larger than those from the middle of the range.
MALE COLOR—As described for the complex plus the following. Vertex (Fig. 13) with pair of parallel brown lines running from its posterior margin to about two-thirds distance to ocellar interval. Postclypeus striated Pterostigma colorless in extreme base and along extreme distal margin, otherwise dull brown (as in Fig. 14 of female). Stigmata dull brown in distal two-thirds, the color separated from that of pterostigma only by the vein outlining the latter. Dorsal-lateral series of transverse reddish brown spots of abdominal terga 2-4 joined antero-posteriorly to form two continuous spots the length of these segments.

MALE MEASUREMENTS—Table 1.

MALE STRUCTURAL CHARACTERS—Hypandrium with claspers (Fig. 15) each terminating in a pair of short, stout teeth; median prongs pointed distally, the dorsals arising close together. Phallosome (Fig. 16) with basal struts only slightly shorter than arms; distal hook of each arm rounded and beset with minute denticles at end.

FEMALE COLOR—As described for male, differing only as noted in description of the complex.

FEMALE MEASUREMENTS—Table 1.

FEMALE STRUCTURAL CHARACTERS—Subgenital plate as described for the complex; apical lobe (Fig. 17) with relatively wide clear zone around free margin, otherwise pigmented. Ninth sternum (Fig. 18) with median pigmented area slightly less than twice as long as broad; posterior submembranous region containing a bilobed sclerotized zone; inner zone of each lateral submembranous area with its posterior margin slanting slightly forward toward midline. Ovipositor valvulae as described for B. posticata (Fig. 11); third valvula with rounded distal lobe abruptly jutting from the base.

TYPE MATERIAL—Holotype ♂, allotype ♀, 3 ♂ and 4 ♀ paratypes and 6 nymphs: United States: Texas: Hidalgo Co.; Bendix Rio Grande Valley State Park, 28-I-1958, beating branches of thorny trees and shrubs. E. L. Mockford collector. The holotype and allotype will be deposited in the Florida State Collection of Arthropods, Gainesville, Florida (FSCA). A pair of paratypes will be deposited in the collection of Dr. A. N. García Aldrete, Instituto de Biología, Universidad Nacional Autónoma de México, Mexico City. The remaining paratypes will be deposited in my collection.

OTHER MATERIAL—HONDURAS: Choluteca Dept.: 1 K W San Marcos de Colón, 24 VIII 1977, beating vegetation, 1 ♂, C. W. O'Brien (ANGA). MEXICO: CHIAPAS: 12.8 K S Las Cruces, Highway 195, 20-VIII-1968, beating shrubs and small trees in pasture, 1 ♂, E. L. Mockford and A. N. García Aldrete (ELM); Tapachula, 19-IV-1983, light trap, 1 ♂, 1 ♀. H. Braulowsky and E. Barrera (ANGA); 8 K E Tuxtla Gutiérrez, Highway 190, 9 VIII 1975, beating vegetation, el. 410 m, 1 ♂, A. N. García Aldrete and B. García González (ANGA); 14 K N Tuxtla Gutiérrez, 14-VII-1982, beating Quercus sp., bearing numerous dead leaves on forest edge, 1 ♂, E. L. Mockford, J. M. Campbell, and F. Hill (ELM). Nuevo León: Allende, 12-VIII-1958, beating orange trees at night, 8 ♂, 8 ♀ (ELM); 23 K SW Cerralvo, 26-VIII-1978, beating desert scrub, el. 400 m, 3 ♂, 2 ♀, A. N. García Aldrete (ANGA); 73.8 K NE China, 11-VI-1962, beating desert shrubs and yuccas, 3 ♀, E. L. Mockford (ELM); El Diente near Monterrey, 15-X-1963, beating Celtis sp. and Quercus sp., 1 ♀, E. L. Mockford (ELM); 26 K SW Linares,

**DEDICATION**—This species is named with much affection for my former student, Dr. Alfonso N. García Aldrete of the Instituto de Biología, Universidad Nacional Autónoma de México, who has made important contributions to psocidology, and for his wife, Dr. María Teresa Míchá de García, of the Colegio de México, who has, with tremendous energy, combined the career of wife and mother with that of teacher and scholar of Latin American literature and folklore.

*Blaste pusilla* Mockford, **NEW SPECIES**

**MALE COLOR**—As described for the complex with additions as noted for *B. garciorum* n. sp. except for following. Pterostigma brown except along distal margin and at base, the color continuous with the same color of the stigmaless. Dorsal-lateral series of transverse reddish brown spots of abdominal terga 2-4 barely joined antero-posteriorly, each spot faded before posterior border of its segment. Ventral-lateral series of spots of segments 5-7 weakly developed, the spots of each side not joined antero-posteriorly.

**MALE MEASUREMENTS**—Table 1.

**MALE STRUCTURAL CHARACTERS**—Hypantrium with elaeapora (Fig. 19) shorter and broader than in *B. garciorum*, terminating in pair of tooth-like projections shorter and broader than in *B. garciorum*; median prongs pointed distally, relatively much shorter than in *B. garciorum*. Phallosome (Fig. 20) with arms decidedly longer than basal struts, terminal hooks denticulate at tips.

**FEMALE COLOR**—As described for male, differing as noted in composite description and in following. Pterostigmal color distinctly separated from that of stigmaless by colorless or pale vein R1. Reddish brown markings of abdominal segment 4 forming almost continuous ring around segment, broken only along ventral midline, but faint in some specimens along dorsal midline.
Fig. 19-22. *Blaste pusilla*, n. sp. 19.) Male, distal segment of hypandrium; scale = 0.1 mm. 20.) Male, epiproct; scale = 0.1 mm. 21.) Female, apical lobe of subgenital plate; scale = 0.1 mm. 22.) Female, 9th sternum; scale = 0.1 mm.

**Female Measurements**—Table 1.

**Female Structural Characters**—Subgenital plate as described for the complex; apical lobe (Fig. 21) with relatively wide clear zone around free margin, the clear zone deepest in middle and extended in some specimens by nearly colorless median line to base of lobe. Ninth sternum (Fig. 22) with median pigmented area relatively small, slightly less than twice as long as broad; posterior submembranous region apparently without a distinct sclerotized zone. Ovipositor valvulae as described for the complex; third valvula as described and figured for *B. osecola* n. sp. (Fig. 30), tapering from broad base to rounded end of distal lobe.

**Type Material**—Holotype ♀, allotype ♂, and 2 ♀ paratypes, Mexico: *Sinaloa*: 4.8 K NW Villa Unión, Highway 15, 18-VII-1963, beating scrubby woodland vegetation, E. L. Mockford and F. Hill. The holotype and allotype will be deposited in the Florida State Collection of Arthropods, Gainesville, Florida. The accompanying paratypes, as well as those listed below, will be deposited in my collection.

**Additional Paratypes**—Mexico: *Sinaloa*: 4.8 K E Concordia, Highway 40, 18-VII-1963, beating scrubby woodland vegetation, 1 ♀, E. L. Mockford
Mockford: Blaste posticata

and F. Hill (ELM); 22.4 K SE Villa Unión, Highway 15, 19-VII-1963, beating scrubby woodland vegetation, 1 δ, E. L. Mockford and F. Hill (ELM).

Blaste asceola Mockford, New Species

Male Color—As described for the complex plus the following. Vertex (Fig. 23) with an irregular brown spot on each side of midline from posterior margin forward to about two-thirds distance to ocellar interval. Postclypeus (Fig. 23) with a brown spot in each dorsolateral quadrant covering most of the quadrant, the pigment extending slightly out of the spot dorsally and ventrally as striations. Thoracic pleura pale straw brown with a dark brown band above legs extending length of thorax, covering only ventral one-third in meso- and metathorax, but covering entire propleuron. Pterostigma (Fig. 24) colorless basally and around entire posterior margin, with a medium brown spot covering distal two-thirds. Stigma medium brown in distal two-thirds, the color separated from pterostigmal spot by colorless margin of pterostigma.

Male Measurements—Table 1.

Male Structural Characters—Hyandrium with claspers (lateral lobes) each terminating in a long, bluntly-pointed process tapering from a broad base; median prongs pointed distally, the dorsals arising a distance apart greater than twice the width of the base of a prong, the ventral arising from a broad base (Fig. 25). Phalosome (Fig. 26) with basal struts about half length of each arm; distal hook of each arm terminating in a point.

Female Color As described for male, differing only as noted in description of the complex and in stigma being pigmented only in its distal one-third (Fig. 27).

Female Measurements—Table 1.

Female Structural Characters—Subgenital plate (Fig. 28) as described for the complex; apical lobe pigmented except for a distinct clear zone around free margin. Ninth sternum (Fig. 29) with median pigmented area slightly more than 1.5 x broader than long; posterior submembranous region lacking a distinct sclerotized zone. Ovipositor valvulae (Fig. 30) as described for the complex; third valvula gradually tapering from broad base to rounded end of distal lobe.

Type Material—Holotype δ, allotype 2, 3 δ and 1 ♀ paratypes, FLORIDA: Clay Co.: Goldhead Branch State Park, 21-X-1973, beating turkey oak (Quercus lauris Walt) and other trees in sand scrub, E. L. Mockford collector. The holotype, allotype, and one δ paratype will be deposited in the Florida State Collection of Arthropods, Gainesville, Florida. The remaining paratypes will be deposited in my collection.

Fig. 23-30. *Bluete oseola*, n. sp. 23.) Male, anterodorsal view of head; scale = 0.2 mm. 24.) Male, pterostigma and surrounding area; scale = 0.5 mm. 25.) Male, distal segment of hypandrium; scale = 0.1 mm. 26.) Male, phallosome; scale of Fig. 25. 27.) Female, pterostigma and surrounding area; scale of Fig. 24. 28.) Female, subgenital plate; scale = 0.1 mm. 29.) Female, 9th sternum; scale = 0.1 mm. 30.) Female, ovipositor valvulae; scale = 0.1 mm.

Key to the Species of the *Blaste posticata* Complex

1. Males: 9th abdominal sternum part of a 2-segmented hypandrium terminating distally in 3 median prongs flanked by a pair of claspers (Fig. 3) .............................................................. 2.

1'. Females: 9th abdominal sternum internal; 8th sternum a partially sclerotized subgenital plate (Fig. 8) terminating in a rounded apical lobe ('egg guide'); structures flanking apical lobe (ovipositor valvulae) completely separate from subgenital plate .......................................................... 5.

2(1). Claspers of hypandrium terminating in 2 pointed processes (Fig. 15, 19); phallosome with distal hooks denticulate at their apices (Fig. 16, 20) .......................................................... 3.

2'. Claspers of hypandrium terminating in a single pointed process (Fig. 3); phallosome with distal hooks lacking denticles at their apices .......................................................... 4.

3(2). Distal processes of hypandrium short and stubby (Fig. 19); prominence of clasper beyond body of hypandrium slightly less than half distance between clasper bases on slide-mounted hypandrium

3'. Distal processes of hypandrium relatively long and slender (Fig. 15); prominence of clasper beyond body of hypandrium nearly two-thirds distance between clasper bases on slide-mounted hypandrium ................................................. *B. gasciorum* n. sp.

4(9'). Median distal process of hypandrium slightly widened and truncated or bifid at tip (Fig. 3, 4); species from Mexico and Central America ........................................... *B. posticata* (Banks)

4'. Median distal process of hypandrium bluntly pointed at tip (Fig. 25) species from southeastern United States (Florida and Georgia) ........................................... *B. osecolla* n. sp

5(1). Third valvula triangular, the margin curving gently from most medial point of basal lobe to posterior end of distal lobe (Fig. 30). Posterior membranous region of 9th sternum indistinct and lacking a sclerite (Fig. 22, 29) ...................... 6.

5'. Third valvula with distal lobe distinctly set off from basal lobe, the median margin forming a distinct angle at junction of the 2 (Fig. 11). Posterior membranous region of 9th sternum distinct, containing a sclerite (Fig. 9) ...................... 7.

6(5). Pigmented zone around spermaphore decidedly longer than wide (Fig. 22). Species of coastal Sinaloa, Mexico ........ *B. pusilla* n. sp.

6'. Pigmented zone around spermaphore decidedly wider than long (Fig. 29). Species of Florida and Georgia ........ *B. osecolla* n. sp.

7(5'). Pigmented zone around spermaphore decidedly longer than
wide (Fig. 18); sclerite of posterior membranous zone of 9th sternal bilobed (Fig. 18) ................................ B. garciorum n. sp.

7'. Pigmented zone around sperm pore variable, from slightly longer than wide to decidedly wider than long (Fig. 9, 10); sclerite of posterior membranous zone of 9th sternal short and wide, not bilobed (Fig. 9, 10) ............... B. postica (Banks).

Comments on Relationships and Distribution of the Blastia postica Complex

The Blastia postica complex stands apart from all other Blastia species in possessing a 3-pronged tip of the hypandrium. It is likely that this complex is part of a larger assemblage which includes the described species B. opposita (Banks) of eastern United States and the Cuban species B. immobilia Mockford, B. capriconata Mockford, B. longicauda Mockford, and B. fasciata Mockford. In all of these species there is at least slight pigmentation (generally expressed in both sexes) along the distal segment of vein Cu_{an} in the forewing. In B. opposita the pigmentation extends distally to cover all of cell M_{an}. The terminal processes of the hypandrium of the B. postica complex seem most readily derivable from the terminal process seen in B. capriconata and B. longicauda, which has a dorsal and a ventral lobe. The highly specialized female genitalia of the latter 2 species, however, rule out the possibility of either of them, or their immediate common ancestor, being parental to the B. postica complex. These similarities suggest, however, that the B. postica complex has close New World affinities and is not close to the Old World forms of Blastia (Euclisiaria) with similar forewing markings but with dissimilar hypandrium.

Within the B. postica complex, data are not complete enough to allow a cladistic synthesis. The following remarks about phylogenetic relationships must be regarded as preliminary.

Twelve characters appear to carry phylogenetic information. These characters and the relationship which each suggests are listed as follows (members of a cluster are linked by hyphens; clusters are separated by a slanting line):

1. The hypandrial clasper terminates in 1 or 2 pointed processes. B. postica-B. osceola/B. garciorum-B. pusilla;
2. The median ventral process of the hypandrial apex is broadened at the apex or not. B. postica/B. garciorum-B. pusilla-B. osceola;
3. The ratio of arm to basal strut length of the phallosome is 2:1 or greater versus ca. 1:1. B. postica-B. pusilla-B. osceola/B. garciorum;
4. Apleal denticles on arms of the phallosome are present or absent. B. garciorum-B. pusilla/B. postica-B. osceola;
5. Subapical denticles on arms of the phallosome are present or absent. B. postica/B. garciorum-B. pusilla-B. osceola;
6. The median dorsal processes of the hypandrial apex touch at their bases or are separated by the width of the median ventral process. B. garciorum-B. pusilla/B. postica-B. osceola;
7. The distal lobe of the female subgenital plate is almost completely pigmented, or has a wide unpigmented zone around the free edge. B. postica-B. osceola/B. garciorum-B. pusilla;
8. The third valvula has a distinct distal lobe or is triangular, the
distal lobe gradually merging into the base of the valvula. *B. garciorum-B. posticata/B. pusilla-B. osceola*;

9. The distal sclerite of the female ninth sternum is present or absent. *B. garciorum-B. posticata/B. pusilla-B. osceola*;

10. The lateral sclerite of the female ninth sternum has its posterior edge approximately transverse or slanting with median end more posterior. *B. garciorum-B. pusilla/B. posticata-B. osceola*;

11. The postclypeal marking is a pair of spots or longitudinal parallel lines. *B. osceola/B. garciorum-B. pusilla-B. posticata*;

12. The vertex is marked with a solid median band or the median band is darker on its edges than in the middle. *B. posticata/B. garciorum-B. pusilla-B. osceola*.

Six patterns of relationship are possible among these 4 species. Five of them appear on the above list. The most frequently occurring one (5 examples) is that of *B. garciorum-B. pusilla/B. posticata-B. osceola*. An hypothesis that this represents the true phylogenetic pattern for the group is valid, being refutable in various ways with additional data.

The distribution of the *B. posticata* complex (Fig. 31) suggests that the speciations which gave rise to the extant species occurred in situ in southern North America following disruptions in previously continuous ranges. The speciational event setting apart the population which gave rise to

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**Fig. 31.** Map showing distribution of the species of the *Blaste posticata* complex.
B. osceola from that which produced its closest relative among the Mexican-South Texas species—B. posticata according to the above hypothesis—must have involved disruption of a previously continuous distribution around the northern edge of the Gulf of Mexico. Such disruptions have sometimes been attributed to Pleistocene climatic shifts (C. F. Mengel 1964), but the relative distinctness of the 2 species dealt with here suggests greater age of the event.

Blaste garciorum is not currently known from areas close to the range of B. pusilla, its presumed closest relative, but there is a large region of north-central Mexico which remains poorly collected, and the hiatus between these 2 species may be due in part to inadequate sampling.

The ranges of B. posticata and B. garciorum coincide almost the entire length of eastern Mexico and apparently into Central America. It seems likely that the speciational event which gave rise to the ancestor of the B. posticata-osceola pair and that of the B. garciorum-pusilla pair (because of the central ranges of B. garciorum and B. posticata, it is reasonable to suppose that the ancestors may have been virtually indistinguishable from these 2 extant species), occurred so long ago as to leave no trace of the geographic areas involved in the original isolations.

ACKNOWLEDGMENTS

Field work which resulted in most of the collections reported in this paper was supported by National Science Foundation grants to Illinois State University: NSF-G 19823, NSF-GB-2713, NSF-GB-5163, and NSF-GB-7729. Records were also received from Dr. A. N. Garcia Aldrete of the Instituto de Biología, UNAM, Mexico City. The type of Blasté posticata (Banks) was sent by Mr. Charles Vogt, Custodial Assistant, Museum of Comparative Zoology, Cambridge, Massachusetts (MCZ). To these individuals and institutions I express my sincere thanks.

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