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# OVIPOSITION BEHAVIOR, GUILDS, HOST RELATIONSHIPS AND NEW HOST AND DISTRIBUTION RECORDS FOR THE GENUS *MEROBRUCHUS* BRIDWELL (COLEOPTERA: BRUCHIDAE)

CLARENCE DAN JOHNSON AND DAVID H. SIEMENS[1]
Department of Biological Sciences
Northern Arizona University
Flagstaff, AZ 86011

## Abstract

All 18 species of *Merobruchus* Bridwell for which we have data attach eggs to the outside of the fruit valves of their host plants (Fabaceae: Mimosoideae). The adults emerge through the pod valves. There is a trend for *Merobruchus* to feed in partially dehiscent pods because species of *Merobruchus* feed in 40 species of hosts with partially dehiscent pods and feed in only four species of hosts with indehiscent pods. Based on numbers of host species, *M. insolitus* (Sharp) (19 hosts) and *M. sonorensis* Kingsolver (13 hosts) are generalist species of *Merobruchus*. *Merobruchus columbinus* (Sharp), *M. hastatus* Kingsolver, *M. major* (Fall), *M. politus* Kingsolver, *M. solitarius* (Sharp), *M. vacillator* (Sharp) and *M. xanthopygus* Kingsolver are specialists with one host each. Other species range from two species of hosts (*M. santarosae* Kingsolver) to eight species (*M. placidus* (Horn)). *Merobruchus julianus* (Horn), *M. terani* Kingsolver, and *M. placidus* (Horn) feed only in several species of *Acacia* Miller, but only two species of these *Acacia* are the same. Species of *Merobruchus* range from the southwestern United States to southern Brazil and Argentina, including Mexico, Central America and the West Indies. This is the first report that several species are common in Honduras, Panama, Colombia, Venezuela and Brazil.

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Most of the research on *Merobruchus* Bridwell has been conducted on its taxonomy and host plants (*e.g.*, Forister and Johnson 1970; Center and Johnson 1976; Janzen 1977a,b; Johnson 1979, 1981; Kingsolver 1980, 1988; Hetz and Johnson 1988; Maes and Kingsolver 1991; Macêdo *et al.* 1992; Nilsson and Johnson 1993). In this paper, however, we report the results of our research of the oviposition behavior of 18 species of *Merobruchus* (Table 1). This interesting area of study was made possible through intensive and extensive collecting of host seeds of bruchids in Latin America. Collecting of host seeds is important because it allows us to learn more about bruchid ecology and behavior, and, in this case, to put species of *Merobruchus* into the scheme of bruchid oviposition guilds of Johnson (1981). We list new host plants and new distributions for ten of the above species (Appendix 1). We also describe and discuss the relationships between *Merobruchus* and its host plants (Table 2). Although most of the distribution records for species of *Merobruchus* are in North, Central, and northern South America, several described and undescribed species are distributed in central and southern South America.

## Methods and Materials

Specimens used in this study were acquired during specialized collecting trips to the study areas (Appendix 1). Rearing from seeds proved to be of great

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[1] Present address: Division of Biological Sciences, University of Montana, Missoula, MT 59812.

**Table 1.** Oviposition behavior of species of *Merobruchus*.

1. Filaments attach egg to fruit valve: *M. julianus* (Horn)
2. Cement many eggs in clumps to fruit valve: *M. major* (Fall)
3. Cement usually one egg to fruit valve: *M. bicoloripes* (Pic), *M. boucheri* Kingsolver, *M. chetumalae* Kingsolver, *M. columbinus* (Sharp), *M. insolitus* (Sharp), *M. knulli* (White), *M. paquetae* Kingsolver, *M. placidus* (Horn), *M. porphyreus* Kingsolver, *M. santarosae* Kingsolver, *M. solitarius* (Sharp), *M. sonorensis* Kingsolver, *M. terani* Kingsolver, *M. triacanthus* Kingsolver, *M. vacillator* (Sharp), and *M. xanthopygus* Kingsolver.

**Table 2.** Known hosts for the 21 species of *Merobruchus* treated in this paper. Hosts are from Appendix 1, Center and Johnson (1976), Forister and Johnson (1970), Hetz and Johnson (1988), Janzen (1977*a*, *b*, 1980), Johnson (1968, 1979), Kingsolver (1980, 1988), Macêdo *et al.* (1992), Nilsson and Johnson (1993), Terán and Muruaga de L'Argentier (1981). *Pithecellobium saman*, *P. mangense*, *P. undulatum*, and *Chloroleucon ebano* are the only known hosts of *Merobruchus* discussed in this paper with indehiscent fruits. The other 40 species in this table have partially (tardily) dehiscent pods. * = No fruits available for examination for oviposition behavior.

*M. boucheri*: *Lysiloma divaricata*, *Pithecellobium mangense*, *P. scalare*, *P. tortum*, *P. undulatum*

*M. bicoloripes*: *Enterolobium contortisiliquum**

*M. chetumalae*: *Lysiloma* sp., *L. latisiliqua*

*M. columbinus*: *Pithecellobium saman*

*M. hastatus*: *Lysiloma desmostachys**

*M. insolitus*: *Acacia occidentalis*, *A. tenuifolia*, *Albizia adinocephala**, *A. caribaea*, *A. lebbek*, *A. occidentalis*, *A. sinaloensis*, *Lysiloma acapulcensis*, *L. candida*, *L. divaricata*, *L. kellermani**, *L. microphylla*, *L. seemannii**, *L. thornberi*, *Pithecellobium brevifolium*, *P. mangense*, *P. pallens*, *P. sonorae*, *P. undulatum*

*M. julianus*: *Acacia berlandieri*, *A. coulteri*, *A. greggii*, *A. roemeriana*, *A. wrightii*

*M. knulli*: *Lysiloma acapulcensis*, *L. microphylla*, *L. thornberi*, *L. watsoni**

*M. lysilomae* Kingsolver: *Acacia richii**, *A. simplicifolia**, *Albizia lebbek**, *A. polyphylla**, *Lysiloma latisiliqua**, *L. sabicu**

*M. major*: *Chloroleucon ebano* (= *Pithecellobium flexicaule*)

*M. paquetae*: *Albizia adinocephala**, *A. caribaea*, *A. guachepele*, *A. lebbek*, *A. longipedata**

*M. placidus*: *Acacia angustissima*, *A. bicolor**, *A. cuspidata**, *A. filicoides*, *A. goldmani*, *A. rosei**, *A. texensis*, *A. villosa*

*M. politus*: *Pithecellobium leptophyllum**

*M. porphyreus*: *Lysiloma acapulcensis*, *L. kellermani**

*M. santarosae*: *Acacia coulteri*, *Lysiloma desmostachys*

*M. solitarius*: *Acacia angustissima*

*M. sonorensis*: *Albizia adinocephala**, *A. caribaea*, *A. lebbek*, *A. occidentalis*, *A. ortegae**, *A. sinaloensis*, *A. tomentosa*, *Lysiloma divaricata*, *L. seemannii**, *L. tomentosa*, *Pithecellobium mangense*, *P. sonorae*, *P. tortum*

*M. terani*: *Acacia angustissima*, *A. berlandieri*, *A. gaumeri*, *A. picachensis*, *A. tenuifolia*

*M. triacanthus*: *Acacia acatlensis*, *A.* aff. *riparioides*, *A. coulteri*, *Leucaena guatemalensis*, *Lysiloma divaricata*

*M. vacillator*: *Lysiloma divaricata*

*M. xanthopygus*: *Lysiloma acapulcensis* value because large numbers of specimens and valuable ecological and behavioral data were obtained.

Our technique for rearing bruchids was to collect seeds and voucher specimens of plants in the field. The seeds were placed in brown paper bags and taken to the laboratory. The bags were carefully opened, and any adult bruchids that had emerged were collected and killed. The seeds were then put into jars, the openings of which are covered with paper towels that have been treated with a solution of 0.5–1.0% Kelthane in acetone. The jars were placed on shelves covered with Kelthane-treated towels. We have found this to be an excellent method to kill any mites in the family Pyemotidae that otherwise might prey on the immature bruchids. The cultures were examined weekly to remove any adult bruchids that had emerged.

Once the bruchids were mounted and labelled, they were sorted to species with the use of a dissecting microscope. Then various ecological data (e.g., host plant preferences) were recorded. Where eggs were placed on pods or seeds and how they were attached was observed with a dissecting microscope. The seeds and pods of hosts reported by Kingsolver (1988) but collected by CDJ were examined to determine the ovipositional behavior of *Merobruchus* spp.

Most of the voucher plant samples that we collected and from whose seeds we reared species of *Merobruchus* are deposited in the Missouri Botanical Garden, St. Louis, with duplicates in the Deaver Herbarium, Northern Arizona University, Flagstaff. A seed and pod collection of many of these plants is maintained in the C. D. Johnson collection, where the beetles are deposited.

## Results and Discussion

**Bruchid Guilds**. Johnson (1981) described three guilds of bruchids that oviposit either (A) on the pod while on the plant (Mature pod guild), or (B) on seeds while on the plant (Mature seed guild), or (C) on seeds after they had been exposed on the substrate (Scattered seed guild). All of the species of *Merobruchus* (Table 1) for which data are available are in guild A. They oviposit on the pod valves and the adult beetles emerge through the pod valves.

Indehiscent pods are often fleshy and adhere tightly to seeds. They are often fed upon only by unique Guild A bruchids that feed only in indehiscent fruits. For example, *M. columbinus* (Sharp) feeds only in *Pithecellobium saman* (Jacquin) Merrill and *M. major* (Fall) feeds only in *Chloroleucon ebano* (Berlandier) L. Rico (Appendix 1, Table 2). Indehiscent pods occasionally may be fed upon by Guild B bruchids. For example, while technically indehiscent, more mature *C. ebano* pods may open very slightly along the suture of the valves while still on the plant. *Stator beali* Johnson oviposits through these cracks and their larvae feed on seeds. Also, seeds of plants with indehiscent pods may be exposed when the pods are broken while on the tree. *Stator limbatus* (Horn), a member of Guild B, oviposits upon seeds of *Pithecellobium saman* after they have been exposed in this way (Janzen 1977a). Usually seeds of indehiscent pods are exposed only after they have been dispersed. Pods may be dispersed by falling to the substrate or vertebrates may eat the fruits but not digest the seeds which are then voided with the feces. On the substrate, the fruits may be broken open and the seeds exposed by rot, wind, water, animals, etc. These seeds are used by Guild C bruchids.

Occasionally species of *Merobruchus* feed in both indehiscent and partially dehiscent pods. For example, *Merobruchus boucheri* Kingsolver feeds in seeds of the indehiscent *Pithecellobium mangense* (Jacquin) Macbride and *P. undulatum* (Britton and Rose) Gentry. *Merobruchus sonorensis* Kingsolver feeds also in seeds of *P. mangense*. Both of these bruchids, however, feed also in seeds of plants with partially dehiscent pods (Appendix 1, Table 2). All of the other species feed in seeds of the 40 species of plants that are known to have partially dehiscent pods (Table 2).

Partially (tardily) dehiscent pods have relatively thin pod valves when ripe, and a millimeter or more between the seeds and pod valves. These may be fed upon by all three guilds of bruchids. Bruchid genera in Guild B gain access to these seeds by entering through exit holes of Guild A bruchids or openings between pod valves caused by partial dehiscence. The dispersed, exposed seeds on the ground are used for oviposition by Guild C bruchids (*e.g.*, *Stator sordidus* (Horn)).

**Oviposition Behavior**. We recorded the oviposition behavior of 14 species of *Merobruchus* in the lab and four species from the literature (*i.e.*, *M. bicoloripes* (Pic), *M. columbinus*, *M. julianus* (Horn), and *M. major*) (Table 1). These species cement eggs to the outside of pod valves. The larvae burrow through the pod valve into seeds where they feed, molt several times and pupate inside seeds. The adults emerge from the seeds and through the pod valve.

*Merobruchus bicoloripes* oviposits on fruits or folioles of *Enterolobium contortisiliquum* (Velloso) Morong. The larvae enter the pods and the adults exit the pods as do the other species here (Terán and Muruaga de L'Argentier 1981). *Merobruchus julianus* is unique in that it attaches eggs with filaments that radiate out from them (Forister and Johnson 1970). Presumably these filaments prevent eggs from falling off rapidly growing, immature pods. *Merobruchus major* is also unique because it oviposits clumps of 5–10 eggs (Nilsson and Johnson 1993). (We observed recently that *Acanthoscelides oblongoguttatus* (Fåhraeus) oviposits 10–20 eggs onto fruits of *Acacia cornigera* (Linnaeus) Willdenow from Guatemala in a manner similar to *M. major*.) Our data indicate that other species of *Merobruchus* glue eggs singly to pods without anchoring filaments.

**Host Preferences**. This study adds significant numbers of hosts for *Merobruchus* from Latin America, especially South America (Appendix 1). Based on numbers of host species (Table 2), *M. insolitus* (Sharp) (19 hosts) and *M. sonorensis* (13 hosts) are generalist species. *Merobruchus columbinus, M. hastatus* Kingsolver, *M. major, M. politus* Kingsolver, *M. solitarius* (Sharp), *M. vacillator* (Sharp) and *M. xanthopygus* Kingsolver are specialists with one host each. Other species range from two species of hosts (*M. santarosae* Kingsolver) to eight species (*M. placidus* (Horn).

Species of *Merobruchus* are reliably reported to feed only in the legume genera *Acacia* Miller, *Albizia* Durazz., *Chloroleucon* Britton & Rose ex. Record, *Leucaena* Bentham, *Lysiloma* Bentham, and *Pithecellobium* Martius. Botanists have shuffled species between the closely-related genera *Albizia, Chloroleucon, Pithecellobium* and *Pseudosamanea* Harms. For reasons stated by Nielsen (1981), we do not use the genus *Pseudosamanea*. Twelve species of *Merobruchus* feed in the seeds of *Lysiloma*, eight in *Acacia*, seven each in *Pithecellobium* and *Chloroleucon*, four in *Albizia*, and one in *Leucaena*. Most of the species in these plant genera have partially dehiscent fruits except for the mostly indehiscent fruits of *Pithecellobium* and *Chloroleucon*.

Feeding preferences are displayed by species of *Merobruchus*. *Merobruchus boucheri, M. columbinus, M. major,* and *M. politus* feed primarily or solely in seeds of *Pithecellobium* or *Chloroleucon*. The species *M. chetumalae* Kingsolver, *M. hastatus*, *M. knulli* (White), *M. porphyreus* Kingsolver, *M. vacillator*, and *M. xanthopygus* feed primarily or solely in seeds of *Lysiloma*. *Merobruchus julianus*, *M. placidus*, *M. solitarius*, *M. terani* Kingsolver, and *M. triacanthus* Kingsolver feed primarily or solely in seeds of *Acacia*. Only *M. paquetae* Kingsolver and *M. sonorensis* feed predominantly in seeds of *Albizia*. *Leucaena* is probably an occasional host for *M. triacanthus*. Based on this evidence, one could theorize that *Acacia*, *Chloroleucon*, *Pithecellobium*, and *Lysiloma* are the ancestral hosts of species of *Merobruchus* and species of *Merobruchus* have adapted to *Albizia* and *Leucaena* based on similarity in pod morphology. The generalist species *M. insolitus* feeds in seeds of four host genera and does not show significant preferences for any.

Forty species of host plants of *Merobruchus* have partially dehiscent pods but only four species have indehiscent pods (Table 2). Thus the trend in *Merobruchus* is to feed in partially dehiscent pods. *Mimosestes* Bridwell, *Algarobius* Bridwell, *Scutobruchus* Kingsolver, and *Pseudopachymerina* Zacher (Johnson and Siemens 1996a,b) feed almost solely in fleshy, indehiscent pods. Thus, there is a distinct dichotomy in the species of hosts fed upon by these genera. Apparently most species of *Merobruchus* evolved into using partially dehiscent pods as hosts while most or all species in the other four genera evolved into using indehiscent pods as hosts.

**Phylogenetic Considerations**. Kingsolver (1988) discussed host relationships according to phylogenetic groups of *Merobruchus*. His conclusions were about the same as ours: species of *Merobruchus* feed in seeds of the legume subfamily Mimosoideae, but species groups do not show affinities for taxonomic groups of Mimosoideae. There are, however, some host relationships that are worth noting. The very distinct species *M. columbinus* and *M. major* both feed in very distinct host plants: *Pithecellobium saman* and *Chloroleucon ebano* respectively. *Merobruchus julianus*, *M. terani*, and *M. placidus* feed only in several species of *Acacia*, and only two species of these *Acacia* are the same (Table 2).

**Distribution**. Species of *Merobruchus* are distributed from the southwestern United States to southern Brazil and Argentina, including Mexico, Central America and the West Indies (Kingsolver 1988; Teran and Muruaga de L'Argentier 1981). Here we report that the distribution of these species not only extends to southern South America but that several species are common in Honduras, Panama, Colombia, Venezuela and Brazil (Appendix 1).

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## Appendix 1

New host and distribution records for *Merobruchus* spp. from Latin America. The collection numbers refer to lot numbers in the field notebooks of C. D. Johnson.

*Merobruchus boucheri* Kingsolver

***Lysiloma divaricata*** (Jacquin) Macbride. **Mexico**. *Sonora*: 3 mi W Alamos, XII-27-77 (165–77).

***Pithecellobium mangense*** (Jacquin) Macbride. **Mexico**. Michoa*can*: 37 km N Playa Azul, XII-30-79 (1213-79). Guerrero: 39 km NW Zihuatanejo, XII-31-79 (1261-79).

***Pithecellobium*** aff. *mangense* (Jacquin) Macbride. **Panama**. 11 km W Santiago, III-22-79 (950-79).

***Pithecellobium scalare*** Griseb. **Brazil**. *Rio de Janeiro*: Praia Flamengo, Rio de Janeiro, VIII-4-82 (2548-82) & VIII-6-82 (2552-82) & (seeds on ground, not on tree) VIII-6-82 (2554-82).

***Pithecellobium undulatum*** (Britton & Rose) Gentry. **Mexico**. *Sonora*: 5 mi W Alamos, II-23-73 (162-73); 1100′, 4 mi NW Alamos, XII-23-76 (175-76). *Oaxaca*: 35 km W Zanatepec, XII-23-78 (341-78). *Sinaloa*: 1 mi SE Rosario, III-4-79 (599-79).

*Merobruchus columbinus* (Sharp)

***Pithecellobium saman*** (Jacquin) Merrill. **Panama**. *Canal Zone*: Gatun Locks, III-25-79 (1001-79). **Venezuela**. *Zulia*: ca. 100′, Estacion La Concordia, I-26-85 (3791-85); ca 100′, 11 km S Machiques, I-27-85 (3808-85); ca 200′, 31 km SW Machiques, I-28-85 (3814-85); 20 km N El Guayabo, II-21-89 (4536-89); Encontrados, II-21-89 (4538-89). *Aragua*: 1 km S Barbacoas, II-5-89 (4368-89); Camatagua, III-25-89 (4827-89); 10 km E Camatagua, II-5-89 (4356-89). *Portuguesa*: 33 km SW Guanare, II-17-89 (4492-89); 6 km W Acarigua, II-16-89 (4480-89); 56 km SW Acarigua, III-18-89 (4803-89). *Yaracuy*: 15 km SW San Felipe, II-14-89 (4444-89). *Guárico*: 24 km SW Calabozo, III-4-89 (4605-89). *Bolívar*: Upata, III-11-89 (4705-89).

*Merobruchus insolitus* (Sharp)

***Acacia occidentalis*** Rose. **Mexico**. *Sinaloa*: 14 mi S Culiacan, I-7-73 (132-73).

***Acacia tenuifolia*** (L.) Willdenow. **Mexico**. *Yucatán*: 7 km N Uxmal, III-4-80 (1677-80); 2 km W Chemax, III-8-80 (1757-80).

***Albizia lebbek*** (L.) Bentham. **Mexico**. *Baja California Sur*: San Jose Del Cabo, XII-27-75 (129-75).

***Albizia occidentalis*** T. S. Brandegee. **Mexico**. *Baja California Sur*: 700′, 12 mi N San Jose Del Cabo, XII-28-75 (141-75).

***Albizia sinaloensis*** Britton & Rose. **Mexico**. *Sonora*: Alamos, XII-30-75 (146-75) & II-18-93 (4947-93).

***Albizia*** sp. **Mexico**. *Yucatán*: 7 km N Uxmal, III-4-80 (1682-80). **Honduras**. Comayagua: 1800′, 11 mi SW Comayagua, III-18-79 (874-79). **Venezuela**. *Sucre*: 33 km E Cumana, VIII-7-84 (3450-84).

***Lysiloma acapulcensis*** (Kunth.) Bentham. **Mexico**. *Chiapas*: ca 3400′, 20 mi S Comitan, III-31-79 (1041-79). *Oaxaca*: 32 km NW Oaxaca, XII-20-78 (260-78). *Jalisco*: ca 5700′, 3 mi E Tuxcueca, III-5-79 (606-79). **Honduras**. *Comayagua*: 22 km SE Comayagua, III-23-80 (2102-80).

***Lysiloma divaricata*** (Jacquin) Macbride. **Mexico**. *Sinaloa*: 12 mi S Guamuchil, XII-26-72 (176-72). *Sonora*: 3 mi W Alamos, XII-27-77 (165-77); 4 mi W Alamos, XII-25-72 (163-72); 10 mi W Alamos, II-23-73 (151-73); Lake Mocuzari, XII-24-72 (153-72) & XII-22-76 (131-76); 10 mi E Navojoa, XII-30-77 (200-77); 11 mi E Navojoa, II-24-73 (173-73); 10 mi N Guaymas, XII-27-76 (202-76) & I-3-78 (221-78 & 223-78, seeds on ground, 222-78, seeds on tree) & III-1-79 (595-79) & IV-10-79 (1142-79, seeds on tree, 1143-79, seeds on ground). *Baja California Sur*: ca 1600′, 9 mi S El Triunfo, XII-26-75 (123-75). *Jalisco*: ca 4000′, 3 mi S Tecolatlan, I-1-73 (3-73). *Michoacán*: 31 km N Playa Azul, XII-30-79 (1212-79). *Oaxaca*: 3500′, 51 mi SE Oaxaca, VII-6-68 (229-68); 93 km SE Oaxaca, I-5-79 (574-79).

***Lysiloma microphylla*** Britton & Rose. **Mexico**. *Jalisco*: ca 5700′, 3 mi E Tuxcueca, III-5-79 (605-79). *Oaxaca*: 22 km NW Puerto Escondido, I-6-80 (1369-79).

***Lysiloma*** sp. **Mexico**. *Guerrero*: 16 mi W Coyuca de Benitez, III-8-79 (710-79).

***Pithecellobium brevifolium*** Bentham. **Mexico**. *Oaxaca*: 17 km NE Juchitan, XII-23-78 (338-78).

***Pithecellobium sonorae*** S. Watson. **Mexico**. *Sonora*: ca 3 mi W San Carlos Bay, XII-22-72 (138-72) & XII-20-76 (118-76 & 119-76); 10 mi N Guaymas, I-3-78 (218-78, seeds on tree, & 219-78, seeds on ground).

***Pithecellobium undulatum*** (Britton & Rose) Gentry. **Mexico**. *Sonora*: 5 mi W Alamos, II-23-73 (162-73). Oaxaca: 35 km W Zanatepec, XII-23-78 (341-78).

*Merobruchus knulli* (White)

***Lysiloma acapulcensis***. **Mexico**. *Jalisco*: ca 5700′, 3 mi E Tuxcueca, III-5-79 (606-79).

*Merobruchus major* (Fall)

***Chloroleucon ebano*** (Berlandier) L. Rico (= *Pithecellobium flexicaule* (Bentham) Coulter). **USA**. *Texas*. Cameron Co.: Brownsville, IX-19-92 (4883-92) & IX-21-92 (4893-92); 6 mi N Los Fresnos, IX-21-92 (4887-92); 4 mi E La Paloma, IX-21-92 (4892-92). Starr Co.: 50′, 14 mi SE Rio Grande City, IX-23-92 (4902-92). Zapata Co.: 50′, Zapata, IX-24-92 (4906-92).

*Merobruchus paquetae* Kingsolver

***Albizia*** sp. **Venezuela**. *Distrito Federal*: ca 50′, Los Caracas, II-5-85 (3906-85). Falcón: Coro, VII-18-84 (3373-84). *Zulia*: ca 200′, Machiques, I-28-85 (3812-85). **Brazil**. *Rio de Janeiro*: Praia Flamengo, Rio de Janeiro, VIII-4-82 (2550-82) & VIII-11-82 (2558-82).

***Albizia guachepele*** (HBK.) Dugand. **Colombia**. *Antióquia*: Santa Fe, X-25-83 (3106-83). *Cundinamarca*: 1000′, 12 km E Girardot, X-19-84 (3575-84). Cachipay, 1000 m, X-21-83 (3070-83). *Valle del Cauca*: Palmira, VII-13-82 (2435-82).

*Merobruchus placidus* (Horn)

***Acacia angustissima*** (P. Miller) Kuntze. **USA**. *Arizona*. Pima Co.: Kitt Peak, ca 5500′, X-5-72 (94-72) & 4000′, X-15-76 (75-76). **Mexico**. *Sinaloa*: 4 mi S Culiacan, XII-26-72 (185-72). Nayarit: 43 mi SW Compostela, II-28-73 (265-73). *Jalisco*: ca 1000′, 12 mi N La Barra de Navidad, I-2-73 (9-73); 8 mi N La Barra de Navidad, III-8-73 (436-73); 9 mi E Cihuatlan, I-2-73 (31-73). *Colima*: 16 mi E Manzanillo, I-2-73 (38-73). *Guerrero*: 33 mi W Tecpan, III-7-79 (691-79); 47 km SE Petatlan, XII-28-79 (1165-79); 7 km SE Cruz Grande, I-8-80 (1451-80). *Oaxaca*: 27 km N Puerto Escondido, I-3-80 (1322-79); 2 km W Pinotepa Nacional, I-8-80 (1431-80). *Veracruz*: 27 km ESE Cordoba, II-28-80 (1501-80). **Venezuela**. *Guárico*: Valle de la Pascua, III-6-89 (4638-89); 700′, 16 km W Chaguaramas, II-9-85 (3962-85). *Portuguesa*: ca 400′, Turen, I-22-85 (3753-85); 6 km W Acarigua, II-16-89 (4481-89). *Táchira*: ca 3000′, 6 km NW San Cristobal, I-26-85 (3782-85). **Colombia**. *Santander*: Barbosa, X-2-84 (3499-84). *Valle del Cauca*: 6–9 km NW Yumbo, VII-17-82 (2455-82).

***Acacia villosa*** (Sw.) Willdenow. **Venezuela**. *Miranda*: ca 1300′, 16 km W Paracotos, I-17-85 (3664-85).

*Merobruchus sonorensis* Kingsolver

***Albizia*** sp. **Mexico**. *Campeche*: 7 km N Francisco Escarcega, III-30-80 (1619-80). **El Salvador**. ca 1000′, 4 mi N La Libertad, III-16-79 (829-79). **Honduras**. *Comayagua*: 1800′, 11 mi SW Comayagua, III-18-79 (874-79).

***Lysiloma divaricata*** (Jacquin) Macbride. **Mexico**. *Sonora*: 10 mi N Guaymas, III-1-79 (595-79); 6 mi N Guaymas, II-25-93 (4950-93); 10 mi W Alamos, II-23-73 (151-73). *Oaxaca*: 93 km SE Oaxaca, I-5-79 (574-79). **Guatemala**. *Santa Rosa*: 20 mi SE Taxisco, III-15-79 (810-79).

***Pithecellobium mangense*** (Jacquin) Macbride. **Venezuela**. *Bolívar*: Villa Lola, III-13-89 (4749B-89); 15 km SE Upata, III-13-89 (4758-89).

***Pithecellobium sonorae*** S. Watson. **Mexico**. *Sonora*: 1 mi W & 1.5 mi E San Carlos Bay, VIII-12-70 (71-70) & XII-24-77 (149-77); 13 mi NW Navojoa, XII-30-77 (210-77).

***Pithecellobium tortum*** Martius. **Colombia**. *Cundinamarca*: 3800′, 17 km NE Boqueron, VIII-15-84 (3468-84). **Venezuela**. *Anzoátegui*: ca 300′, 12 km N San Mateo, II-20-85 (4116-85).

*Merobruchus terani* Kingsolver

***Acacia tenuifolia*** (L.) Willdenow. **Mexico.** *Yucatán*: 2 km W Chemax, III-8-80 (1757-80).

*Merobruchus vacillator* (Sharp)

***Lysiloma divaricata*** (Jacquin) Macbride. **Mexico.** *Jalisco*: ca 4000′, 3 mi S Tecolatlan, I-1-73 (3-73).

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## SCIENTIFIC NOTE

### *Thrincopyge alacris* LeConte (Coleoptera: Buprestidae), Borer of the Inflorescences of Ponytail Palm, *Beaucarnea recurvata* Lem. (Nolinaceae) in Tamaulipas, México

According to Nelson (1980, *Pan-Pacific Entomologist* 56:297–310), *Thrincopyge alacris* LeConte occurs in Arizona, New Mexico, and Texas in the United States, and in Chihuahua, Coahuila, Durango, Zacatecas, San Luis Potosí, Jalisco, Guanajuato and Puebla, México. In Texas scape inflorescences of *Dasylirion leiophyllum* Englemann and *D. wheelerii* S. Watson are known as hosts of *T. alacris* (Nelson 1980, *Pan-Pacific Entomologist* 56:297–310).

In southern Tamaulipas, México, we found *T. alacris* larvae for the first time boring within the female inflorescence rachises of *Beaucarnea recurvata* Lem., the "soyate" or ponytail palm. This palm is a woody, dioecious monocot, up to 15 m high, distributed in the tropical deciduous forest of Tamaulipas, San Luis Potosí and Veracruz, México (Fig. 1) (Hernández 1993, Ph.D. Dissertation, University of Texas, Austin). *Beaucarnea recurvata* is currently considered a threatened species (Hernández 1993, *Cactaceas y Suculentas Mexicanas* 38(1):11–13; *Diario Oficial de la Federación* 1994, may 16th), which endangers the associated entomofauna.

At Aldama five female inflorescences were collected on January 21, 1993. Two inflorescences, 91 and 95 cm long, were not infested with larvae of *T. alacris*. The others, 1.05, 1.08 and 1.22 m long, each had one larva. One of the larvae was dead; the two living larvae emerged as adult females on February 27, 1993. The galleries in the florescences were 15 cm long for the dead larva, and 19 and 26 cm long for those that emerged as adults; all had widths of 1–8 mm. In the Sierra de Tamalave, five inflorescences were examined, two undamaged, and three with buprestid larvae. Only one adult of a possibly undescribed species of *Thrincopyge* emerged, boring larger galleries than *T. alacris*, 33–35 cm long. On mount El Bernal de Horcasitas two larvae of *Thrincopyge* sp. were collected in two female inflorescences of *B. recurvata* but no adults emerged. The wide distribution of *T. alacris* in United States and México seems to be associated with the distribution of *Beaucarnea recurvata* and *Dasylirion* spp. (Nolinaceae). In addition, Nelson (1980, *Pan-Pacific Entomologist* 56:297–310) reported another species, *T. ambiens* Le Conte, associated with *Nolina* spp. It is probable that the genus *Thrincopyge* is closely associated with plants in the family Nolinaceae.

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***Manuel Lara Villalón,***[1] ***Pedro Reyes-Castillo,***[2] ***Gerardo Sánchez-Ramos***[1] *and* ***Luis Hernández Sandoval,***[1] [1]*Instituto de Ecología y Alimentos, Universidad Autónoma de Tamaulipas. Blvd. Adolfo López Mateos No 928. Cd. Victoria, Tamaulipas 87040 México;* [2]*Instituto de Ecología, A.C., Apartado Postal 63, Xalapa, Veracruz 91000 México.*

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