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A Checklist and Bibliography of the Japygoidea  
(Insecta: Diplura) of North America,  
Central America, and the West Indies

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The Pearce-Sellards Series is an occasional, miscellaneous series of brief reports of museum and museum-associated field investigations and other research. All manuscripts are subjected to extramural peer review before being accepted. The series title commemorates the first two directors of the Texas Memorial Museum, both now deceased: Dr. J. E. Pearce and Dr. E. H. Sellards, professors of anthropology and geology, respectively, at The University of Texas at Austin.

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# A CHECKLIST AND BIBLIOGRAPHY OF THE JAPYGOIDEA (INSECTA: DIPLURA) OF NORTH AMERICA, CENTRAL AMERICA, AND THE WEST INDIES

By James R. Reddell<sup>1</sup>

## ABSTRACT

The japygoid fauna of North America, Central America, and the West Indies includes one fossil and 103 extant species and four "varieties." Complete synonymies, bibliographic citations, and records are included for all species. The presumed type-locality and a summary of ecological data are given for each taxon. In addition, records and references are provided for all undescribed or undetermined specimens reported in the literature.

## INTRODUCTION

The apterygote insects of the dipluran superfamily Japygoidea are a neglected element of the soil and litter fauna of the New World. This list of the species known from North America, Central America, and the West Indies includes one fossil and 103 extant species and an additional four "varieties" (some of which may prove to be valid species when they are restudied). This probably represents only a small percentage of the number of species that occur in this area. For example, there are 32 species endemic to California, but no japygoids have been reported from Nicaragua, El Salvador, or Belize in Central America, or from many states in the United States and Mexico.

The first japygoid reported from the New World was *Japyx saussurei*, described by A. Humbert in 1868 from Veracruz, Mexico. Since that time, single new species of japygoids have been described by various authors (Packard, 1874; Parona, 1888; MacGillivray, 1893a; Swenk, 1903; Hansen, 1930; Nosek, 1981); three new species by Cook (1899) and by Ewing (1941); four new species by Fox (1941); six new species by Pagés (1975a; 1975b; 1977; 1982); seven new species by Ewing and Fox (1942); and the only fossil japygoid by Pierce (1950). Most of our knowledge of New World japygoids is the result of the work of Silvestri from 1902 to 1948 and of L.M. Smith from 1959 to 1964. Silvestri studied japygoids in several museums, but most of his descriptions are based on material he collected during several extensive trips through the United States, Mexico, and the West Indies. He described a total of 42 species and four varieties from this region and laid the foundation for the systematics of the group. Smith described 32 species, of which 27 are endemic to California.

The Japygoidea is world-wide in distribution and is represented by a large number of genera and more than 400 species. Although some genera occur in both the Old and New Worlds, most are restricted to a few areas. The majority of japygoid species are also very limited in distribution, as is true with most soil and litter forms. Two species, *Metajapyx steevesi* Smith and Bolton

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and *M. subterraneus* (Packard), are widely distributed throughout the eastern United States, and both occur in similar wooded habitats throughout their ranges. The reported wide distribution of several Mexican species is probably based on inadequate study, and these species may prove to be divisible into complexes of closely related species. One species, *Parajapyx (Parajapyx) isabellae* (Grassi), is cosmopolitan in distribution, but because it is frequently associated with the soil around plant roots it is presumably distributed by commerce.

Japygoids have been reported from under rocks, deeply buried in soil, in humus and other litter, and in rotten wood. Price (1973) in a study of the microarthropod fauna of a California pine forest soil found "japygids" to be most abundant below two inches in the soil. Price and Benham (1977) in a study of the soil fauna of an agricultural habitat in California reported that "japygids" were usually found below a depth of 30.5 cm and that the mean depth at which 75 percent of specimens were collected was 102.5 cm. The supposed rarity of this group appears, therefore, to be primarily a result of failure to sample deeply enough in the soil layers. Most species are associated with a moist environment but a few have been collected in arid regions. Many of the species listed in this report were taken in the soil of peach orchards and other agricultural habitats. A few are reported from caves, but most species identified from a subterranean habitat show no signs of adaptation for a cavernicole existence. An undescribed taxon from caves in Texas, however, is apparently a troglobite (obligate cavernicole).

Only a few studies have been made on the life history of North American japygoids. Smith (1961) has described the postembryonal development of *Evalljapyx decorus* Smith and *Parajapyx (P.) isabellae* collected at Davis, California. The egg cluster of *E. decorus* consists of a spherical mass containing more than 30 eggs, while that of *P. (P.) isabellae* consists of four eggs laid in a straight row. The mother guards the egg cluster and the first-instar nymphs, which are nonmotile and remain attached to the egg cluster. The second instars leave the cluster after molting. The number of instars in immature japygoids is not generally known but appears to be three, with the fourth instar being adult. There appear, furthermore, to be two adult instars in the males and possibly as many as five in the females of *Evalljapyx helferi* Smith (Smith, 1959d).

Few data are available on the feeding habits of japygoids. Gut contents in a few species of Japygidae have indicated that they are predators, feeding on thrips, mites, insect larvae, and other small arthropods. Ingram (1931) reports that "*Japyx*" sp. was observed to feed on sugarcane roots. *Parajapyx (P.) isabellae* (family Parajapygidae) is reported by Zimmerman (1948) to cause damage to the root cortex. The frequency with which members of the Parajapygidae are found in association with wheat, peach trees, and other cultivated plants indicates they may have some economic importance.

The systematic arrangement of species in this list follows Pagés (1959), with the modifications of Smith and other recent workers. Paclt (1957) in a review of the order Diplura synonymized many genera and rearranged the species to fit his classification. The result is almost certainly artificial, and in recent studies of generic groups the authors have not followed Paclt's system



(Pagés, 1962; Smith, 1959b). The descriptions of many species do not include sufficient detail to enable proper placement of the species. The original designations are used in this paper.

In the following list all references are given for each species with the appropriate page and figure numbers. This is followed by the type-locality and, in parentheses, the museum in which the holotype is deposited or, in the case of some of the older references, where it is believed to be deposited. All additional published records are included and brief comments give pertinent data on the habitat, taxonomy, and so forth, of each species. Appended to the checklist is a list of states and countries with the species known from these regions.

Museum acronyms used below:

CAS	California Academy of Science
MSNG	Museo Civico di Storia Naturale di Genova "G. Doria"
MCZ	Museum of Comparative Zoology, Harvard University
MHNG	Museum d'Histoire Naturelle, Genève
IEAUN	Istituto di Entomologia Agraria dell'Università di Napoli, Portici
USNM	National Museum of Natural History, Smithsonian Institution
UN	University of Nebraska
YU	Yale University
ZIM	Zoologisches Institut und Museum, Hamburg

#### ANNOTATED LIST OF SPECIES

##### Fossil Species

##### Genus *Onychojapyx* Pierce

*Onychojapyx* Pierce, 1950:103.

**Type-species.**—*Onychojapyx schmidti* Pierce, 1950.

**Comment.**—This is a monotypic genus.

##### *Onychojapyx schmidti* Pierce

*Onychojapyx schmidti* Pierce, 1950:103, 104, pl. 34 (fig. 2); Pierce, 1951:44; Paclt, 1957:11.

**Type-locality.**—Bonner Quarry, Arizona (Los Angeles County Museum Fossil Insect Collection, No. BQ2).

**Comment.**—This species is the only known fossil japygoid. It was found in onyx marble of Miocene or Pliocene age. The description by Pierce does not give any clue as to the higher placement of the species.

##### Extant Species

#### FAMILY JAPYGIDAE

#### UNDETERMINED SUBFAMILY

##### Undetermined genus

##### Undetermined species 1

Japygidae: Westcott, 1968:11.

**Records.**—Idaho: Ice caves

**Comment.**—Westcott (1968) reports the presence of this species as a regular inhabitant of ice caves. The cave or caves from which japygids were collected was not specified but includes one or more of the following caves he studied:

Crystal Falls Cave, Clark County; Boy Scout Cave, Butte County; Crystal Ice Caves, Power County.

Undetermined species 2

Japygidae, genus and species undetermined: Peck, 1971:430.

**Record.**—PANAMA: Chilibrillo Cave.

**Comment.**—A single specimen of this species was collected under a rock near bat guano in darkness in the above cave.

Undetermined species 3

Japygidae: Serafino and Fraile Merino, 1978:142, 144, 145, 146, 147, 148.

**Record.**—Costa Rica: Barreal de Herredia; Turrialba.

**Comment.**—Serafino and Fraile Merino (1978) reported the presence of 87.5 japygids per square meter at depths of 0–5 cm, 5–10 cm, and 15–20 cm; and 75 per square meter at a depth of 10–15 cm in the soil of a cultivated coffee field at Barreal de Herredia. The same authors reported 25 specimens at a depth of 5–10 cm, 200 at a depth of 10–15 cm, and 112.5 at a depth of 15–20 cm in the soil of a forest at Turrialba.

Undetermined species 4

Japygidae: von Wicklen, 1963:157.

**Record.**—Oklahoma: Marshall and Johnston Counties: University of Oklahoma Biological Station on Lake Texoma.

**Comment.**—Von Wicklen (1963) reported a total of 22 japygids, six from under logs, five from grass clumps, and 11 from under leaves, in a wooded area.

**SUBFAMILY PROVALLJAPYGINAE**

Genus *Ctenjapyx* Silvestri

*Ctenjapyx* Silvestri, 1948f:310-312; Smith, 1964a:33.

**Type-species.**—*Ctenjapyx boneti* Silvestri, 1948f.

**Comment.**—This genus is known only from the two species listed here. Although Silvestri (1948f) placed the genus in the Evalljapyginae, Smith (1964a) removed it to the Provalljapyginae and considered it most closely related to *Nanojapyx*.

*Ctenjapyx boneti* Silvestri

*Ctenjapyx boneti* Silvestri, 1948f:297, 311, 312-313, fig. VIII(1-18); Marcus, 1949:45; Silvestri, 1949:42; Pagés, 1951:27; Paclt, 1957:85; Smith 1964a:33, 34, 36.

**Type-locality.**—Sierra de San Lazaro, Baja California Sur, Mexico (?IEAUN).

**Comment.**—This species is known only from the holotype.

*Ctenjapyx parkeri* Smith

*Ctenjapyx parkeri* Smith, 1964a:33-36, Fig. 1-9.

**Type-locality.**—23 mi. S Matfas Romero, Oaxaca, Mexico (CAS).

**Comment.**—This species, known only from the holotype male and a juvenile, was collected in leaf mold.

Genus *Eojapyx* Smith

*Eojapyx* Smith, 1960c:262.

**Type-species.**—*Eojapyx pedis* Smith, 1960c.

**Comment.**—This is a monotypic genus.

*Eojapyx pedis* Smith

*Eojapyx pedis* Smith, 1960c:261–266, fig. 1–8.

**Type-locality.**—Stoddard County, Missouri (USNM).

**Comment.**—This species, known only from the holotype male, was collected in peach orchard soil in association with *Parajapyx (Parajapyx) isabellae* and *Metajapyx subterraneus*.

Genus *Nanojapyx* Smith

*Nanojapyx* Smith, 1959a:100–101.

**Type-species.**—*Nanojapyx pagesi* Smith, 1959a.

**Comment.**—This genus is known only from the five California species listed here.

*Nanojapyx coalingae* Smith

*Nanojapyx coalingae* Smith, 1959a:104, 105, 106, fig. 17.

**Type-locality.**—Near Coalinga, Fresno County, California (CAS).

**Comment.**—This species, known only from the holotype female, was collected in juniper leaf mold.

*Nanojapyx gentilei* Smith

*Nanojapyx gentilei* Smith, 1959a:102, 103, 104, 105, 107, fig. 12, 16.

**Type-locality.**—Near Trenton, Sonoma County, California (CAS).

**Comment.**—This species is represented by the holotype female and a paratype female and juvenile. The specimens were collected ten to twelve inches deep in sandy soil in a growth of poison oak.

*Nanojapyx hamoni* Smith

*Nanojapyx hamoni* Smith, 1959a:104, 105, 106, fig. 14.

**Type-locality.**—Near Half Moon Bay, San Mateo County, California (CAS).

**Other record.**—California: San Mateo County: Wolf Ranch.

**Comment.**—This species is represented by the holotype female and three paratype females. It has been collected in redwood leaf mold and in clay-loam soil and humus under Monterey Cypress.

*Nanojapyx pagesi* Smith

*Nanojapyx pagesi* Smith, 1959a:100, 101–102, 103, 104, 105, 106, fig. 1–11, 13.

**Type-locality.**—Near Oakland, Alameda County, California (CAS).

**Comment.**—This species, known only from two females and two males, was collected in leaf mold.

*Nanojapyx pricei* Smith

*Nanojapyx pricei* Smith, 1959a:102, 104, 105, 107, fig. 15.

**Type-locality.**—San Bruno Mountains, San Mateo County, California (CAS).

**Comment.**—This species, known only from one male and one female, was collected in chaparral leaf mold.

## SUBFAMILY JAPYGINAE

Undetermined genus

Undetermined species

Undetermined genus and species: Reddell and Mitchell, 1971:152–153.

**Record.**—Mexico: San Luis Potosí: Sótano del Arroyo, 12 km NE Ciudad Valles.

**Comment.**—A single anomalous specimen that cannot be further identified was obtained on silt banks in the above cave.

Undescribed genus

Undescribed species

Undetermined genus and species: Reddell, 1966:27.

?*Metajapyx* sp.: Reddell, 1966:27; Mitchell and Reddell, 1971:64, 65, fig. 45.

**Records.**—Texas: Menard County: Powell's Cave; Uvalde County: Indian Creek Cave.

**Comment.**—This species was collected from clay banks above streams in both of the above caves. It is one of the larger species of japygid in the world and is apparently an obligate cavernicole.

Genus *Allojapyx* Silvestri

*Allojapyx* Silvestri, 1948f:302–303.

**Type-species.**—*Japyx allodontus* Silvestri, 1911.

**Comment.**—Paclt (1957) considered this genus to be a junior synonym of *Metajapyx*, but I consider it to be valid.

*Allojapyx allodontus* (Silvestri)

*Japyx allodontus* Silvestri, 1911:73–74, fig. II(1–7); Silvestri, 1912:210; Silvestri, 1948f:302, 303; Silvestri, 1949:45, 54; Paclt, 1957:67.

*Japyx (Metajapyx) allodontus*: Silvestri, 1933a: 140; Silvestri, 1949:45.

*Allojapyx allodontus*: Silvestri, 1948f:303, 304, fig. III(1–8), IV (n. comb., redescription); Silvestri, 1949:45, 54; Paclt, 1957:67; Reddell and Elliott, 1973: 175; Reddell, 1981:36, 203.

*Metajapyx allodontus*: Paclt, 1957:67 (n. comb.).

*Japyx allodontus*: Paclt, 1957:67.

**Type-locality.**—Jalapa, Veracruz, Mexico (?IEAUN).

**Other records.**—México: Distrito Federal: México. Guerrero: Malinaltepec. México: El Guarda. Michoacán: Zitacuaro. Morelos: Tepoztlán; Zempoala. San Luis Potosí: Sótano de la Tinaja, 10 km NE Ciudad Valles.

**Comment.**—The description by Silvestri is vague and specimens from San Luis Potosí may represent an undescribed species.

Genus *Catajapyx* Silvestri

*Catajapyx* Silvestri, 1932:94; Silvestri, 1948d:289–290; Pagés, 1953b:254.

**Type-species.**—*Japyx confusus* Silvestri, 1929c.

**Comment.**—The genus *Catajapyx* is known from Austria, Czechoslovakia, Greece, Italy, Yugoslavia, Rumania, Hungary, and Bulgaria. The species listed below from Arkansas almost certainly does not belong in this genus.

*Catajapyx ewingi* Fox

*Catajapyx ewingi* Fox, 1941:28, 30, fig. 2; Paclt, 1957:65.

*Catajapyx exingi*: Silvestri, 1949:47 (lapsus calami).

*Dipljapyx ewingi*: Paclt, 1957:65 (n. comb.).

**Type-locality.**—Howard County, Arkansas (USNM No. 54834).

**Comment.**—This species, known from two adult specimens, was collected from peach orchard soil. Its correct placement must await restudy of the type-specimens.

Genus *Centrjapyx* Silvestri

*Centrjapyx* Silvestri, 1948a:75, 78.

**Type-species.**—*Japyx tristani* Silvestri, 1931b.

**Comment.**—This monotypic genus was placed by Paclt (1957) in the synonymy of *Indjapyx*. The correct placement of the type-species must await a restudy of the holotype.

*Centrjapyx mahunkorum* Pagés

*Centrjapyx mahunkorum* Pagés, 1982:155, 156–161, 165, figs. 1–10.

**Type-locality.**—Sainte-Lucie: Castries, Piton Flore (MHNG).

**Comment.**—This species, known only from the holotype male, was taken by Berlese extraction from rotten wood in “a closed, very wet virgin forest.”

*Centrjapyx tristani* (Silvestri)

*Japyx tristani* Silvestri, 1929b:65–68, fig. I-III; Williams, 1941:75, 91; Silvestri, 1948a:78; Silvestri, 1949:48, 64; Paclt, 1957:63.

*Centrjapyx tristani*: Silvestri, 1948a:76, 78, fig. LX (n. comb., redescription); Silvestri, 1949:47–48; Pagés, 1951:36; Paclt, 1957:61, 63; Pagés, 1982:160.

*Indjapyx tristani*: Paclt, 1957:63 (n. comb.).

*Catajapyx neotropicalis* Ewing and Fox, 1942:293–294, pl. 33 (fig. 2); Silvestri, 1948a:78 (syn. of *Centrjapyx tristani*); Paclt, 1957:63.

*Indjapyx neotropicalis*: Paclt, 1957:63.

*Indjapyx* (“*Centrjapyx*”) *tristani*: Paclt, 1977:121.

**Type-locality.**—Of *Japyx tristani*: San José, Costa Rica (ZIM); of *Catajapyx neotropicalis*: Barro Colorado Island, Panama (USNM No. 55215).

**Other records.**—Costa Rica: Navarro; Reventazón. Guatemala: Izabal; Bobos. Panama: Porto Bello; Barro Colorado Island.

**Comment.**—This species was collected from humus in Costa Rica.

Genus *Hecajapyx* Smith

*Hecajapyx* Smith, 1959c:366; Smith, 1964b:37.

**Type-species.**—*Hecajapyx vulgaris* Smith, 1959c.

**Comment.**—This genus is known only from the two California species listed below.

*Hecajapyx bucketti* Smith

*Hecajapyx bucketti* Smith, 1964b:37-38, 39.

**Type-locality.**—McKinley Grove, near Dinkey Creek, Fresno County, California (CAS).

**Comment.**—This species was collected under redwood duff.

*Hecajapyx vulgaris* Smith

*Hecajapyx vulgaris* Smith, 1959c:363, 365, 366, 367, 368, fig. 3, 5, 6, 12, 15, 18, 20; Smith, 1964b:37, 38, 39.

**Type-locality.**—San Anselmo, Marin County, California (CAS).

**Other records.**—California: Del Norte County; Lake County; Mendocino County; Napa County: 7 mi. W Oakville; Solano County; Sonoma County: 6 mi. E Petaluma.

**Comment.**—This species, represented by more than 250 specimens, has been collected in oak and redwood duff.

Genus *Holjapyx* Silvestri

*Holjapyx* Silvestri, 1948b:125; Smith, 1959b:177-178.

**Type-species.**—*Japyx diversiunguis* Silvestri, 1911.

**Comment.**—This genus is known with certainty only from the nine California species listed below. Three New Zealand species described by Pagés (1952b) were tentatively placed in *Holjapyx*.

*Holjapyx calaverasae* Smith

*Holjapyx calaverasae* Smith, 1959b:178-179, 180, 181, 182, 183, 184, 185, 186, fig. 6, 19.

**Type-locality.**—2 mi. W San Andreas, Calaveras County, California (CAS).

**Comment.**—This species, known from 10 specimens, was taken in sandy clay loam soil under *Quercus wislizenii* Alfonse de Candolle.

*Holjapyx conspersus* Smith

*Holjapyx conspersus* Smith, 1959b:181, 182, 183, 185, 186, fig. 1, 17.

**Type-locality.**—3 mi. N Sharp Park, San Mateo County, California (CAS).

**Comment.**—This species, known only from one male and one female, was collected in humus under chaparral.

*Holjapyx diversiunguis* (Silvestri)

*Japyx diversiunguis* Silvestri, 1911:72-73, fig. I(1-8); Essig, 1926:56, 57, fig. 33e; Silvestri, 1948b:125, 126; Silvestri, 1949:56; Paclt, 1957:71; Essig, 1958:56, 57, fig. 33e; Smith, 1959b:177.

*Catajapyx diversiunguis*: Fox, 1941:28 (n. comb.); Silvestri, 1949:47; Paclt, 1957:71.

*Iapyx diversiunguis*: Essig, 1942:74, fig. 30 (lapsus calami).

*Iapyx diversiunguis*: Essig, 1942:75; Paclt, 1957:71.

*Holjapyx diversiunguis*: Silvestri, 1948b:126-128, fig. V(1-12), VI(1-9) (n. comb., redescription); Silvestri, 1949:51, 56; Pagés, 1952b:154; Paclt, 1957:71; Smith, 1959b:178, 182, 183, 184, 185, 186, fig. 2, 20 (redescription); Pagés, 1980a:638.

*Holjapyx diversiunguis*: Silvestri, 1948b:126 (lapsus calami).

*Burmjapyx diversiunguis*: Paclt, 1957:8, 71 (n. comb.).

**Type-locality.**—Yosemite Park, California (?IEAUN).

**Other records.**—California: Pine Hurst; Contra Costa County: Berkeley; Marin County: Mill Valley; San Mateo County: Woodside.

**Comment.**—This species has been collected in damp soil. Silvestri (1948b) reported finding eight “larvae” underneath the coiled body of the mother.

*Holjapyx humidus* Smith

*Holjapyx humidus* Smith, 1959b:180, 182, 183, 186, fig. 3, 10, 12–13.

**Type-locality.**—Mendocino, Mendocino County, California (CAS).

**Comment.**—This species is known only from a male and female.

*Holjapyx hyadis* Smith

*Holjapyx hyadis* Smith, 1959b:180–181, 185, 186, fig. 14.

**Type-locality.**—Kings Mountain, San Mateo County, California (CAS).

**Comment.**—This species, known only from a male and female, was collected in deep humus of redwood, madrone, and tan bark oak.

*Holjapyx imbutus* Smith

*Holjapyx imbutus* Smith, 1959b:181–182, 185, 186, fig. 15.

**Type-locality.**—1 mi. N Murphys, Calaveras County, California (CAS).

**Other records.**—California: Calaveras County: Calaveras Big Trees; 3 mi. W San Andreas.

**Comment.**—This species has been collected in humus under an oak tree, in wet humus and soil, and in a rotten redwood log.

*Holjapyx insiccatus* Smith

*Holjapyx insiccatus* Smith, 1959b:182, 183, 186, fig. 7.

**Type-locality.**—9 mi. S Monticello, Napa County, California (CAS).

**Comment.**—This species, known only from two females, was collected under stones on a grassy slope.

*Holjapyx irroratus* Smith

*Holjapyx irroratus* Smith, 1959b:182, 183, 184, 186, fig. 5, 11.

**Type-locality.**—Armstrong State Park, Sonoma County, California (CAS).

**Comment.**—This species, known only from two females, was collected in humus under redwood trees.

*Holjapyx madidus* Smith

*Holjapyx madidus* Smith, 1959b:182, 183, 184, 185, 186, fig. 4, 16.

**Type-locality.**—Near Nashville, El Dorado County, California (CAS).

**Comment.**—This species, known only from the holotype male, was collected in rocky soil.

*Holjapyx schusteri* Smith

*Holjapyx schusteri* Smith, 1959b:179–180, 182, 183, 185, 186, fig. 8, 18.

**Type-locality.**—1 mi. W San Andreas Lake, San Mateo County, California (CAS).



**Other record.**—California: Contra Costa County: Mount Diablo.

**Comment.**—This species has been collected in soil under live oak and in open grassland.

Genus *Indjapyx* Silvestri

*Indjapyx* Silvestri, 1930a:451.

**Type-species.**—*Japyx indicus* Oudemans, 1891.

**Comment.**—This genus is known from India, Malaysia, the East Indies, and the Hawaiian Islands.

*Indjapyx sharpi* (Silvestri)

*Japyx sharpi* Silvestri, 1904:293–294, pl. VIII(fig. 1–8); Silvestri, 1905b:641; Zimmerman, 1948:39, 41–42, fig. 9; Paclt, 1957:62.

*Indjapyx sharpi*: Silvestri, 1930b:223–225, fig. XI(1–11), XII (n. comb., redescription); Womersley, 1934:37; Silvestri, 1949:52; Paclt, 1957:62.

**Type-locality.**—Kaholumano, Kauai, Hawaiian Islands (?IEAUN).

**Other record.**—Hawaiian Islands: Kauai: Halemanu.

**Comment.**—This species has been collected in rotten logs, under logs, and in soil. It is probably an introduced species in Hawaii (Zimmerman, 1948).

Genus *Japyx* Haliday

*Iapyx* Haliday, 1864:441.

*Dicellura* Haliday, 1865:62.

**Type-species.**—Of *Iapyx*: *Iapyx solifugus* Haliday, 1864; of *Dicellura*: *Dicellura solifugus* Haliday, 1865.

**Comment.**—The genus *Japyx* has served as a “catch-all” genus. Its actual distribution as understood today is probably limited to Europe and northern Africa. It does not occur in North America and the identity of material assigned to this genus in the New World must await restudy.

“*Japyx*” sp.

*Japyx* sp.: Kellogg, 1908:62, fig. 92.

**Record.**—California.

**Comment.**—This species, figured by Kellogg (1908), is too diagrammatically shown to be recognizable.

“*Japyx*” spp.

*Iapyx* spp.: Pearce, 1946:139, 148.

**Record.**—North Carolina: Durham County: Duke Forest.

**Comment.**—The identity of this material is unknown. Pearce (1946) reported a total of 21 specimens from litter and soil.

“*Japyx*” sp. 1

*Japyx* sp.: Pearce, 1938:238; Pagés, 1964:192; Reddell, 1971:49.

*Iapax* sp.: Pearce, 1945:174, fig. (*Iapax calami*).

**Record.**—Mexico: Yucatán: Actún Xpukil, 3 km S Calcehtok.

**Comment.**—A juvenile specimen was collected 40 meters from the entrance to the cave.

“*Japyx*” sp. 2

*Japyx* sp.: Ingram, 1931:866, 867, 868; Ingram et al., 1950:13; Fox, 1957:36.

**Records.**—Louisiana: Westfield; Lafayette Parish: Broussard; St. Mary Parish: Franklin; Terrebonne Parish: Huoma.

**Comment.**—Ingram (1931) found an average of 3.29 specimens of *Japyx* sp. per four-inch square in the soil of four sugarcane fields in Louisiana. Ingram et al. (1950) reported that one square foot of soil in a sugarcane field in Louisiana yielded 30 specimens of *Japyx*. This species was observed feeding on the roots of the sugarcane. It is probable that this material actually belongs to the genus *Parajapyx* and may be *P. (P.) isabellae*.

“*Japyx*” sp. 3

*Japyx* n. sp.: Cook, 1898:53.

**Record.**—California: Ventura County.

**Comment.**—This species, exhibited by Cook at a meeting of the Entomological Society of Washington, may be one of the species described by him in 1899, although none were reported as coming from California.

“*Japyx*” sp. 4

Japygidae 1: Hairston and Byers, 1954:7, 22–24, table I, figs. 21–22.

Japygida: Engelmann, 1961:229–232; Wallwork, 1970:128.

*Japex* sp.; Engelmann, 1961:230, 231; Wallwork, 1970:245.

**Record.**—Michigan: Livingston County: University of Michigan Edwin S. George Reserve, 4.5 mi. W Pinckney.

**Comment.**—This undetermined species was taken from an abandoned field. A total of 71 specimens were collected from 0–8.5 inches deep in the soil. Most specimens were taken at levels between 5 and 8.5 inches beneath the surface.

“*Japyx*” sp. 5

*Japyx*: Cook, 1901:486.

**Record.**—Puerto Rico.

**Comment.**—The identity of this material, briefly mentioned in a summary of a paper given at a meeting of the Entomological Society of Washington, is unknown. No description of the Cook specimens has been located.

“*Japyx*” *bidens* Cook

*Japyx* n. sp.: Cook, 1898:53.

*Japyx bidens* Cook, 1899:225, 226, 227, fig. 3a–3b; Swenk, 1903:130;

Kirby, 1904:57; Paclt, 1957:79; Smith and Bolton, 1964:128.

?*Japyx bidentatus*: Ewing, 1928:26, 30, 41, pl. 9.

*Occasjapyx bidens*: Paclt, 1957:79 (n. comb.).

*Metajapyx bidens*: Smith and Bolton, 1964:126–128.

**Type-locality.**—Alabama (USNM).

**Comment.**—Smith and Bolton (1964) have demonstrated that this species does not belong in *Metajapyx* and consider the specimens to be anomalous. The species from Alabama exhibited by Cook at a meeting of the Entomological Society of Washington in 1898 is probably *J. bidens*. Ewing (1928) described certain aspects of the morphology of “the large eastern *Japyx bidentatus*.” *Japyx bidentatus* was described by Schäffer in 1897 from Chile.

It is unlikely that this is the species referred to by Ewing; *bidentatus* is more probably an error for *bidens*.

*"Japyx" goliath* Parona

*Japyx goliath* Parona, 1888:80-83, fig. a-e; Parona, 1892:128; Skorikow, 1900:324; Silvestri, 1902:216, 222, 244; Kirby, 1904:57; Bouvier, 1905:31; Silvestri, 1929a:263, 265-267, fig. III(1-5), IV (redescription); Silvestri, 1949:57; Paclt, 1957:72.

*Japyx goliath*: Oudemans, 1891:78, 79.

*Burmjapyx goliath*: Paclt, 1957:72 (n. comb.).

**Type-locality.**—Guatemala (MSNG).

**Comment.**—This species is known only from a single desiccated specimen. Although Paclt (1957) placed this species in *Burmjapyx*, it is unlikely that it belongs in that genus. The description by Parona (1888) and redescription by Silvestri (1929a) do not give sufficient details to allow correct generic placement of the species.

*"Japyx" molinetti* Silvestri

*Japyx molinetti* Silvestri, 1929a:263-265, fig. I(1-7), II; Silvestri, 1949:60; Paclt, 1957:73.

*Burmjapyx molinetti*: Paclt, 1957:73 (n. comb.).

**Type-locality.**—Guayabal, Oriente Province, Cuba (?IEAUN).

**Other record.**—Cuba: Oriente Province: San Antonio, near Guayabal.

**Comment.**—This species, placed by Paclt (1957) in *Burmjapyx*, must be restudied before it can be correctly placed. The type-specimen was collected under a large rock.

*"Japyx" texanus* Hansen

*Japyx*: Wheeler, 1900:837, 847, 848, 849.

*Japyx* sp.: Rucker, 1901:615.

*Japyx texanus* Hansen, 1930:61, 126, 132, 349, 350-351, pl. V(fig. 3a-d), pl. VI(fig. 1a, 1c) (nomen nudum).

**Record.**—Texas: Travis County: vicinity of Shoal Creek, Austin.

**Comment.**—Hansen (1930) cites this species name with "nomen nudum" in parentheses after it. He describes the structure of the head, mouthparts, and legs, with their related musculature. This species was collected under rocks beneath cedars on a hillside. It has apparently never been formally described.

*"Japyx" turneri* Ewing

*Japyx turneri* Ewing, 1941:72, 73, 74, 75, fig. 7; Silvestri, 1949:65; Paclt, 1957:60.

*Japyx turneri*: Paclt, 1957:60.

**Type-locality.**—Upson County, Georgia (USNM No. 54396).

**Other record.**—South Carolina: Saluda County.

**Comment.**—Correct placement of this species must await a restudy of the type-specimens. The three known specimens were collected from peach orchard soil.

*"Japyx" vivaldii* Silvestri

*Japyx vivaldii* Silvestri, 1929a:268–270, fig. V(1–13), VI; Silvestri, 1949:65; Paclt, 1957:66.

*Teljapyx vivaldii*: Paclt, 1957:66 (n. comb.).

**Type-locality.**—Guayabal, Oriente Province, Cuba (?IEAUN).

**Comment.**—The correct generic placement of this species must await restudy; it almost certainly does not belong in *Teljapyx*.

Genus *Metajapyx* Silvestri

*Japyx (Metajapyx)* Silvestri, 1932:82.

*Metajapyx* Silvestri, 1948d:251–252; Pagés, 1953b:246; Smith and Bolton, 1964:126, 128–132.

**Type-species.**—*Japyx (Metajapyx) aemulans* Silvestri, 1932.

**Comment.**—The genus *Metajapyx* contains 31 described species. An additional five species, previously placed in *Metajapyx*, were removed from this genus by Smith and Bolton (1964). They did not, however, indicate to which genus they belong. Excluding these five latter species, the genus is known to occur in France, Italy, Spain, Switzerland, Belgium, Austria, Yugoslavia, Czechoslovakia, Sicily, Albania, islands in the Aegean Sea, Algeria, and the United States. Smith and Bolton (1964) divided the genus into five species groups, one of which is restricted to the United States. It may eventually prove advantageous to consider this latter group as a distinct genus.

*Metajapyx* sp. 1

*Metajapyx* sp.: Reddell and Elliott, 1973:175; Reddell, 1981:203.

**Record.**—Mexico: San Luis Potosí: Sótano de la Tinaja, 10 km NE Ciudad Valles.

**Comment.**—This apparently undescribed species was taken in total darkness from beneath rotten wood on silt.

*Metajapyx* sp. 2

*Metajapyx* sp.: Dowdy, 1944:214, 217.

**Records.**—Ohio: Cuyahoga County: 14 mi. E Cleveland.

**Comments.**—Specimens from this locality may belong to *M. subterraneus*, the only species known from Ohio. Dowdy (1944) reported the presence of 80 specimens (1.74/meter) from an "Acer-Tilia-Sambucus Associates," and 90 specimens (2.09/meter) from a "Fagus-Acer Associates" in his study area. He found no specimens in the other plant associations he studied.

*Metajapyx confectus* Silvestri

*Metajapyx confectus* Silvestri, 1948e:209, 212–214, 224, 225, fig. 2, pl. 17 (fig. 2); Silvestri, 1949:67; Paclt, 1957:64; Pagés, 1962:739; Smith and Bolton, 1964:131, 132, 133, 137; Valentine and Glorioso, 1978:196.

*Dipljapyx confectus*: Paclt, 1957:64 (n. comb.); Pagés, 1962:739.

**Type-locality.**—Washington, District of Columbia (MCZ).

**Other records.**—North Carolina: Graham County: Unicoi Mountains; Macon County: Coweeta Experimental Forest; Transylvania County: Pink Beds Picnic Area, 8 mi. N Brevard.

**Comment.**—This species is known only from eight specimens.

*Metajapyx folsomi* Silvestri

*Metajapyx folsomi* Silvestri, 1948b:118, 134–136, fig. X(1–9); Silvestri, 1949:67; Paclt, 1957:68; Smith and Bolton, 1964:131, 132, 133, 137.

**Type-locality.**—Grandfather Mountain, Avery County, North Carolina (?IEAUN).

**Other records.**—North Carolina: Macon County: Highlands. Tennessee: Sevier County: Elkmont.

**Comment.**—This species is known from seven specimens, one of which was collected in a tree hole.

*Metajapyx illinoiensis* Smith and Bolton

*Metajapyx illinoiensis* Smith and Bolton, 1964: 127, 131, 135–136, 137, fig. 9.

**Type-locality.**—Ottawa, La Salle County, Illinois (YU).

**Comment.**—This species has been reported from “soil four to six inches deep in tubes in a garden” (Smith and Bolton, 1964).

*Metajapyx multidens* (Cook)

*Japyx multidens* Cook, 1899:225, 226, 227, 228, 229, fig. 4a–4b, 7a; Swenk, 1903:130; Kirby, 1904:57; Silvestri, 1948e:209 (syn. ?*Metajapyx subterraneus*); Silvestri, 1949:60; Paclt, 1957:69 (syn. *Metajapyx subterraneus*); Smith and Bolton, 1964:132.

*Metajapyx multidens*: Paclt, 1957:69; Smith and Bolton, 1964:131, 132–133, 137 (n. comb., redescription).

*Japyx hastatus* Fox, 1941:30–31, fig. 1; Silvestri, 1948b:130; Silvestri, 1949:57; Paclt, 1957:68; Pagés, 1962:740; Smith and Bolton, 1964:132 (syn. *Metajapyx multidens*).

*Metajapyx hastatus*: Paclt, 1957:68 (n. comb.).

*Japyx unidenticulatus* Fox, 1941:29–30, fig. 6; Silvestri, 1949:65; Paclt, 1957:69; Smith and Bolton, 1964:132, 133 (syn. *Metajapyx multidens*).

*Metajapyx unidenticulatus*: Paclt, 1957:69 (n. comb.).

**Type-localities.**—Of *Japyx multidens*: “Alabama” (Lookout Mountain, Hamilton County, Tennessee—Smith and Bolton, 1964) (USNM No. 66787); of *Japyx hastatus*: Upson County, Georgia (USNM No. 54837); of *Japyx unidenticulatus*: Upson County, Georgia (USNM No. 54836).

**Comment.**—This species has been reported from peach orchard soil. Smith and Bolton (1964) noted that the correct type-locality of *Japyx multidens* was Lookout Mountain, Tennessee, and not Alabama as reported by Cook (1899).

*Metajapyx propinquus* (Silvestri)

*Japyx propinquus* Silvestri, 1948b:118, 128–130, fig. VII(1–13); Pagés, 1951:36, Paclt, 1957:64.

*Japyx propinquus*: Silvestri, 1949:61 (lapsus calami).

*Dipljapyx propinquus*: Paclt, 1957:64 (n. comb.); Pagés, 1962:739.

*Metajapyx propinquus*: Smith and Bolton, 1964:131, 133, 137 (n. comb.); Pagés, 1980b:779.

**Type-locality.**—Charlotte, Mecklenburg County, North Carolina (?IEAUN).

**Other records.**—Alabama: Barbour County: 5 mi. S Eufaula Junction; Tuscaloosa County: near Peterson. Tennessee: Great Smoky Mountains National Park; Bledsoe County: Fall Creek State Park; Van Buren County: Fall Creek Falls State Park.

**Comment.**—The type-specimens were collected in humus.

*Metajapyx remingtoni* Smith and Bolton

*Metajapyx remingtoni* Smith and Bolton, 1964:127, 131, 134–135, 136, 137, fig. 1, 10.

**Type-locality.**—Newfoundland (=Newfound) Gap, Great Smoky Mountain National Park [Sevier County], Tennessee (YU).

**Comment.**—This species was found three to five inches deep under rocks.

“*Metajapyx*” *schwarzi* Ewing and Fox

*Metajapyx schwarzi* Ewing and Fox, 1942:294–295, pl. 34(fig. 4); Silvestri, 1949:67, Paclt, 1957:69; Smith and Bolton, 1964:126, 128 (remove from *Metajapyx*).

**Type-locality.**—Livingston, Izabal, Guatemala (USNM No. 55216).

**Other record.**—Honduras: Lombardia.

**Comment.**—Smith and Bolton (1964) pointed out that, due to the falciform nature of the first lamina of the lacinia, this species cannot belong in *Metajapyx*. It probably belongs in an undescribed genus. The remains of a small insect, possibly a larva of the beetle family Staphylinidae, are in the rectum of the holotype.

*Metajapyx steevesi* Smith and Bolton

*Metajapyx steevesi* Smith and Bolton, 1964:127, 131, 136, 137, fig. 2–6, 8; Valentine and Glorioso, 1978:193.

**Type-locality.**—Fall Creek Falls State Park, Bledsoe County, Tennessee (CAS).

**Other records.**—Alabama: Butler County: 2 mi. NW McKenzie on U.S. Rte. 193; Franklin County; Marion County; Tuscaloosa County. Georgia: Dade County; Habersham County; Stevens County; White County. Mississippi: Alcorn County. North Carolina: Graham County; Jackson County; Macon County; Yancy County. South Carolina: Oconee County; Pickens County. Tennessee: Blount County; Hamilton County; Overton County; Pickett County. Virginia: Craig County; Dickenson County; Giles County.

**Comment.**—In Alabama this species has been collected in rich humus under leaf litter. Valentine and Glorioso (1978) studied the grooming behavior of the species.

*Metajapyx subterraneus* (Packard)

*Japyx subterraneus* Packard, 1874b:501–502; Packard, 1886:382, 383; Comstock, 1888:56; Parona, 1888:78, 79, 80; MacGillivray, 1891:269; MacGillivray, 1893a: 173–174; MacGillivray, 1893b:219; Schäffer, 1897:32; Skorikow, 1900:324; Swenk, 1903:130; Kirby, 1904:57; Kellogg, 1980:61; Wolf, 1934–1938:vol. II: 499, vol. III:140; Brimley, 1938:n.p.; Fox, 1941: 29, 30, fig. 4; Jeannel, 1943:143; Pearse, 1943: 416; Silvestri, 1948e: 209; Silvestri, 1949:64; Paclt, 1957:69; Smith and Bolton, 1964:132; Barr, 1968:168.

*Japyx subterraneus*: Karsch, 1887:154; Oudemans, 1891:78–79.

*Japyx subterraneus*: Essig, 1942:75 (lapsus calami).

*Metajapyx subterraneus*: Silvestri, 1948e: 209-212, 224, 225, fig. 1, pl. 17 (fig. 1) (n. comb., redescription); Silvestri, 1949:67; Young, 1952: 332, 333, fig. 1; Chandler, 1957:113; Paclt, 1957:69; Smith, 1960c: 261; Pagés, 1964:192, 195; Smith and Bolton, 1964:127, 131, 132, 137, fig. 7; Valentine and Glorioso, 1978:192.

**Type-locality.**—White's Cave, Jr. [=Little White Cave], Edmonson County, Kentucky (type-depository unknown).

**Other records.**—District of Columbia. Indiana: Lawrence County: near Bedford; Monroe County: canyon of Stoute's Creek north of Bloomington; Owen County: McCormick's Creek State Park. Ripley County: Woodland bordered by Laughrey Creek, on W.S. Lemon Farm south of Friendship; Kentucky: Edmonson County: roadside near Mammoth Cave. Maryland: Montgomery County: Plummer Island. Missouri: Oregon County; Stoddard County. North Carolina: Spruce; Buncombe County: Swannanoa; Durham County: Durham, Duke Forest; Wake County: Raleigh, Ohio: "southern Ohio"; Franklin County: Columbus; Scioto County. Pennsylvania: Washington County: Claysville. Virginia: Hunter; Arlington County: Rosslyn; Bedford County; Fairfax County; Grayson County; Henry County; Montgomery County; Wythe County.

**Comment.**—The type-specimen was collected under a rock in the twilight zone about 40 to 50 feet from the cave entrance. In North Carolina this species was collected under dead leaves, stones, and the bark of dead logs. In Ohio it was collected under a large flat rock at the base of an overgrown hill. The record by Wolf (1934-1938) for this species in Mammoth Cave, Kentucky, is doubtless an error for White's Cave, Jr., which is near Mammoth Cave. Valentine and Glorioso (1978) studied the grooming behavior of the species. Dr. Thomas C. Barr, Jr. (in litt.), reports that this species is very abundant in forested areas of the Mammoth Cave region, including Mammoth Dome Sink and around White Cave and Little White Cave, where it is found beneath stones. Its occurrence in caves is probably accidental.

#### Genus *Mixojapyx* Silvestri

*Mixojapyx* Silvestri, 1933a:135-136; Silvestri, 1948f:297.

**Type-species.**—*Japyx saussurei* Humbert, 1868.

**Comment.**—This genus includes eight species and one "variety" from Illinois, Indiana, Texas, Mexico and Guatemala. Paclt (1957) listed *Mixojapyx* as a junior synonym of *Metajapyx*, but I consider *Mixojapyx* to be a valid genus.

#### *Mixojapyx* sp.

*Mixojapyx* sp.: Reddell and Elliott, 1973:175; Reddell, 1981:203.

**Records.**—Mexico: San Luis Potosí: Sótano de Matapalma; Sótano de la Tinaja.

**Comment.**—This large japygid is apparently an undescribed species. It was taken in total darkness from beneath rotten wood on silt banks.

#### "*Mixojapyx*" *barberi* Ewing and Fox

*Mixojapyx barberi* Ewing and Fox, 1942:296-297, pl. 34 (fig. 7-8); Silvestri, 1949:67; Paclt, 1957:67.



*Metajapyx barberi*: Paclt, 1957:67 (n. comb.).

**Type-locality.**—Cacao, Trece Aguas, Alta Verapaz, Guatemala (USNM No. 55218).

**Other record.**—Guatemala: Baja Verapaz: Purulhá.

**Comment.**—The presence of a falciform distal lamina of the lacinia precludes the placement of this species in *Mixojapyx* or *Metajapyx*. It may belong to an undescribed genus and possibly is congeneric with *Metajapyx schwarzi*. Remains of an oribatid mite, an unidentified beetle, and a possible fungus gnat (Mycetophilidae) are present in the alimentary canal of several specimens of this species.

*Mixojapyx conspicuus* Silvestri

*Mixojapyx conspicuus* Silvestri, 1933a:127, 138–140, fig. VIII–IX; Silvestri, 1949:68; Paclt, 1957:67.

*Metajapyx conspicuus*: Paclt, 1957:67 (n. comb.).

**Type-locality.**—San Francisco, Veracruz, Mexico (?IEAUN).

**Comment.**—This species is known only from the holotype.

*Mixojapyx cooki* Ewing and Fox

*Mixojapyx cooki* Ewing and Fox, 1942:295–296, pl. 34(fig. 5–6); Silvestri, 1949:68; Paclt, 1957:67.

*Metajapyx cooki*: Paclt, 1957:67 (n. comb.).

**Type-locality.**—Tactic, Santa Rosa, Alta Verapaz, Guatemala (USNM No. 55217).

**Comment.**—This species is known from three adults. The remains of a beetle larva (probably Carabidae) are present in the rectum of one of the specimens.

*Mixojapyx dampfi* Silvestri

*Mixojapyx dampfi* Silvestri, 1948f:298–300, fig. I(1–8); Silvestri, 1949:68; Paclt, 1957:67.

*Metajapyx dampfi*: Paclt, 1957:67 (n. comb.).

**Type-locality.**—Taxco El Viejo, Guerrero, Mexico (?IEAUN).

**Comment.**—This species is known only from the holotype.

*Mixojapyx dechambrieri* Pagés

*Mixojapyx dechambrieri* Pagés, 1977:807–810, 814, fig. 1–9.

**Type-locality.**—Tikal, Guatemala (MHNG).

**Comment.**—This species, known only from the holotype female, was collected from soil.

*Mixojapyx impar* Silvestri

*Mixojapyx impar* Silvestri, 1948b:118, 133–134, fig. IX(1–8); Silvestri, 1949:68; Paclt, 1957:68.

*Metajapyx impar*: Paclt, 1957:68 (n. comb.).

**Type-locality.**—College Station, Brazos County, Texas (type-depository unknown).

**Other record.**—Texas: Dallas County: Dallas.

**Comment.**—This species is known from two specimens from College Station and one immature specimen from Dallas. G. Viggiani (pers. comm.) of the Istituto di Entomologia Agraria dell'Università di Napoli reported that the type-specimens were not with other Silvestri types in that collection.

*Mixojapyx notabilis* Silvestri

*Mixojapyx notabilis* Silvestri, 1948f:300–302, fig. II(1–8); Silvestri, 1949:68; Paclt, 1957:68; Pagés, 1977:810.

*Metajapyx notabilis*: Paclt, 1957:68 (n. comb.).

**Type-locality.**—Isla de Cozumel, Quintana Roo, Mexico (?IEAUN).

**Other record.**—Mexico: Quintana Roo: Leona Vicario.

**Comment.**—Silvestri (1948f) expressed reservations about the correct placement of this species and indicated that it may belong in a different genus.

*Mixojapyx saussurei* (Humbert)

*Japyx saussurii* Humbert, 1868:351–354, pl. 22(fig. 1–5); Brauer, 1869:558; Packard, 1871:409; Packard, 1873:46; Packard, 1874a:623; Packard, 1874b:501, 502; Grassi, 1886:1–2, 3, 12; Packard, 1886:382–383; Parona, 1888:78, 79, 80, 83; MacGillivray, 1891:269; Parona, 1892:128; MacGillivray, 1893b:219; Schäffer, 1897:32; Swenk, 1903:130, 131, fig.

*Japyx saussurii*: Wood-Mason, 1876:511.

*Japyx saussurei*: Skorikow, 1900:324; Kirby, 1904:57; Verhoeff, 1904:89; Silvestri, 1912:204, 208–210, fig. III–IV (redescription); Rapp, 1946:705; Silvestri, 1948f:297, 298; Silvestri, 1949:62, 68; Paclt, 1957:68.

*Japyx saussurei*: Karsch, 1887:154; Oudemans, 1891:78–79; Paclt, 1957:67.

*Mixojapyx saussurei*: Silvestri, 1933a:136–138, 140, fig. VI–VII (n. comb., redescription); Rapp, 1946:705; Silvestri, 1948f:298, 300; Silvestri, 1949:68; Paclt, 1957:68–69.

*Metajapyx saussurei*: Paclt, 1957:68–69 (n. comb.).

**Type-locality.**—Santa Cruz, Moyoapam, near Orizaba, Veracruz, Mexico (MHNG).

**Other records.**—Mexico: Guerrero: Chilapa. Veracruz: Córdoba; Coscoma-tepec de Bravo; Fortín de las Flores; Jalapa; San Francisco.

**Comment.**—Silvestri, (1948f) indicated that a study of variation from various parts of the range of this species might allow subdivision of it into subspecies. Packard (1886) reported that specimens were collected in rich, black soil under fallen banana trunks and loose rocks in the shade of coffee trees.

*Mixojapyx tridenticulatus* (Fox)

*Japyx tridenticulatus* Fox, 1941:29, 30, fig. 3; Silvestri, 1949:64; Paclt, 1957:69.

*Mixojapyx tridenticulatus*: Silvestri, 1948b:131–132, 134 (n. comb.).

*Metajapyx tridenticulatus*: Paclt, 1957:68 (n. comb.).

**Type-locality.**—Union County, Illinois (USNM No. 54835).

**Other record.**—Texas: Uvalde County: Uvalde.

**Comment.**—This species was described from two adults. The holotype was found in peach orchard soil.

*Mixojapyx tridenticulatus* (Fox) var. *superior* Silvestri

*Mixojapyx tridenticulatus* (Fox) var. *superior* Silvestri, 1948b:118, 131–132, fig. VIII(1–10); Paclt, 1957:69.

*Metajapyx tridenticulatus superior*: Paclt, 1957:69 (n. comb., n. status).

**Type-locality.**—Indiana (?IEAUN).

**Comment.**—This variety is known only from two females. Further study is needed to clarify its status.

Genus *Neojapyx* Silvestri

*Neojapyx* Silvestri, 1933b:120.

**Type-species.**—*Neojapyx guianae* Silvestri, 1933b.

**Comment.**—This genus is known from Puerto Rico, British Guiana, Ecuador, and Venezuela.

*Neojapyx insulanus* Silvestri

*Neojapyx insulanus* Silvestri, 1948a:71, 72, fig. LVII; Silvestri, 1949:68; Fox, 1957:36, 37; Paclt, 1957:60; Pagés, 1982:155.

*Japyx insulanus*: Paclt, 1957:60 (n. comb.).

**Type-locality.**—Isla Culebra, Puerto Rico (?IEAUN).

**Comment.**—This species is known only from the holotype.

Genus *Occasjapyx* Silvestri

*Occasjapyx* Silvestri, 1948b:118–119; Smith, 1959c:363.

**Type-species.**—*Japyx americanus* MacGillivray, 1893a.

**Comment.**—This genus is known only from the four species listed here. It ranges from southern Canada to California.

*Occasjapyx americanus* (MacGillivray)

*Japyx americanus* MacGillivray, 1893a:174; Skorikow, 1900:324; Swenk, 1903:131; Kirby, 1904:57; Bouvier, 1905:31; Essig, 1926:56; Silvestri, 1948b:119; Silvestri, 1949:54; Paclt, 1957:78; Essig, 1958:56; Smith, 1959c:363.

*Japyx americana*: MacGillivray, 1893b:219; Schäffer, 1897:32.

*Japyx americanus*: Essig, 1942:75; Paclt, 1957:78.

*Occasjapyx americanus*: Silvestri, 1948b:118, 119–122, fig. I(1–14) (n. comb., redescription); Silvestri, 1949:54, 69; Pagés, 1951:67; Paclt, 1957:78; Smith, 1959c:363; Pagés, 1980a:638.

**Type-locality.**—Olympia, Thurston County, Washington (type-depository unknown).

**Other record.**—“Canada occidentali” (Silvestri, 1948b).

**Comment.**—This species was described from a single specimen; the redescription by Silvestri (1948b) was based on specimens from western Canada.

*Occasjapyx californicus* Silvestri

*Occasjapyx californicus* Silvestri, 1948b:118, 122–125, fig. II(1–7), III, IV(1–8); Silvestri, 1949:69; Pagés, 1951:67; Paclt, 1957:79; Paclt, 1958:87; Smith, 1959c:363–364, 365, 366, 367, fig. 1, 8, 10, 13, 16 (redescription); Pagés, 1980a:638.

**Type-locality.**—California (?IEAUN).

**Other localities.**—California: Marin County: Mill Valley; Mendocino County.

**Comment.**—This species was described on the basis of three specimens from an undesignated locality in California. An immature specimen from Mill Valley was tentatively identified as this species (Silvestri, 1948b). The redescription by Smith (1959c) was based on 12 specimens collected in Mendocino County in soil and humus.

*Occasjapyx kofoidi* (Silvestri)

*Japyx kofoidi* Silvestri, 1928a:335–340, fig. 1–3; Silvestri, 1934:386; Wolf, 1934–1938:vol. II:487, vol. III:140; Jeannel, 1943:143; Silvestri, 1949:59, 69; Paclt, 1957:79; Smith, 1959c:363; Vandel, 1964:205; Vandel, 1965:171.

*Occasjapyx kofoidi*: Silvestri, 1948b:124 (n. comb.); Silvestri, 1949:59, 69; Pagés, 1951:25; Paclt, 1957:79; Paclt, 1958:87; Pagés, 1964:192, 196.

*Occasjapyx hofoidi*: Silvestri, 1949:69 (lapsus calami).

**Type-locality.**—Potter Creek Cave, Shasta County, California (CAS No. 2473).

**Comment.**—This species, described on the basis of three specimens, shows no particular adaptations for a cavernicole existence.

*Occasjapyx sierrensis* Smith

*Occasjapyx sierrensis* Smith, 1959c:363, 364, 365, 366, 367, fig. 2, 4, 7, 9, 11, 17, 19.

**Type-locality.**—4 mi. W Newcastle, Placer County, California (CAS).

**Other records.**—California: El Dorado County: 3 mi. N Nashville; Placer County: Folsom Lake.

**Comment.**—This species has been collected under oak trees and 2 to 3 inches deep in loam soil.

**SUBFAMILY EVALLJAPYGINAE**

Genus *Evalljapyx* Silvestri

*Evalljapyx* Silvestri, 1911:75–76.

**Type-species.**—*Evalljapyx sonoranus* Silvestri, 1911 (= *Japyx hubbardi* Cook, 1899).

**Comment.**—The genus *Evalljapyx* includes a somewhat diverse group of species known from California, Nevada, and Arizona in the western United States, southern Mexico, Guatemala, Costa Rica, Cuba, and Jamaica. An undescribed species is known from Texas. A thorough review of the genus may indicate it should be split into two or more genera.

*Evalljapyx* sp.

*Evalljapyx* sp.: Reddell, 1966:27; Kunath and Smith, 1968:80; Reddell, 1970:48.

**Record.**—Texas: Val Verde County: Emerald Sink.

**Comment.**—This apparently undescribed species was collected in the Bat Room Passage in total darkness. It shows no signs of adaptation for a cavernicole existence.

*Evalljapyx adonis* Smith

*Evalljapyx adonis* Smith, 1960a:139, 140, 141, 142, 143, fig. 3, 14.

**Type-locality.**—10 mi. E Cottonwood Creek Bridge, Kern River, Kern County, California (CAS).

**Comment.**—This species is known only from a male and female.

*Evalljapyx aguayoi* Silvestri

*Evalljapyx aguayoi* Silvestri, 1929a:276–278, fig. XIII(1–8); Silvestri, 1949:43; Paclt, 1957:83.

**Type-locality.**—Santiago de las Vegas, La Habana Province, Cuba (?IEAUN).

**Comment.**—This species, known only from the holotype, was collected in forest humus.

*Evalljapyx anombris* Smith

*Evalljapyx anombris* Smith, 1960a:138, 139, 140, 141, 142, 143, fig. 1–2, 8, 10, 16.

**Type-locality.**—Corral Hollow, near Livermore, Alameda County, California (CAS).

**Other records.**—California: Contra Costa County; San Joaquin County; Stanislaus County.

**Comment.**—This species, which is very closely related to *E. ombris* Smith, has been collected only in “open grassland in semi-arid region of low annual rainfall and no summer rain” (Smith, 1960a). All specimens were taken from under stones.

*Evalljapyx bolivari* Silvestri

*Evalljapyx bolivari* Silvestri, 1948f:306–307, fig. VI(1–9); Silvestri, 1949:43; Paclt, 1957:83.

**Type-locality.**—Sierra de la Laguna, Baja California Sur, Mexico (?IEAUN).

**Comment.**—This species is known only from the holotype.

*Evalljapyx boneti* Silvestri

*Evalljapyx boneti* Silvestri, 1948f:304–306, fig. V(1–8); Silvestri, 1949:43; Paclt, 1957:83.

**Type-locality.**—Llano Grande, Puebla, Mexico (?IEAUN).

**Other records.**—Mexico: Baja California Sur: Miraflores. México: Salazar. Morelos: Coajomulco. San Luis Potosí: El Pujal. Veracruz: Riachuelos.

**Comment.**—A reexamination of specimens from throughout the range of this species may reveal a complex of species.

*Evalljapyx brevipalpus* Silvestri

*Evalljapyx brevipalpus* Silvestri, 1911:76, 79–80, fig. VII(1–9); Silvestri, 1912:210; Silvestri, 1948f:307; Silvestri, 1949:43; Paclt, 1957:83.

**Type-locality.**—Jalapa, Veracruz, Mexico (?IEAUN).

**Comment.**—This species was collected in humus and under stones.

*Evalljapyx bruneri* Silvestri

*Evalljapyx bruneri* Silvestri, 1929a:274-276, 278, fig. XI(1-9), XII; Ewing and Fox, 1942:292; Silvestri, 1949:43; Paclt, 1957:83.

**Type-locality.**—Matanzas, Matanzas Province, Cuba (?IEAUN).

**Comment.**—This species, known only from the holotype female, was collected in forest humus.

*Evalljapyx costaricanus* Silvestri

*Evalljapyx costaricanus* Silvestri, 1948a:77, 78, 80, fig. LXI; Silvestri, 1949:43; Paclt, 1957:83.

**Type-locality.**—San Isidro (Apaicán), Costa Rica (?IEAUN).

**Comment.**—This species is known only from the holotype female.

*Evalljapyx crassicauda* Silvestri

*Evalljapyx crassicauda* Silvestri, 1929a:270-272, fig. VII(1-13), VIII; Ewing and Fox, 1942:293; Paclt, 1957:83.

**Type-locality.**—Guaro, Oriente Province, Cuba (?IEAUN).

**Other record.**—Cuba: Oriente Province: Puerto Boniato, near Santiago de Cuba.

**Comment.**—This species was collected in humus in woods.

*Evalljapyx cubanus* Silvestri

*Evalljapyx cubanus* Silvestri, 1929a:272-274, 276, fig. IX(1-11), X; Silvestri, 1948e:221; Silvestri, 1949:43; Paclt, 1957:83.

**Type-locality.**—Guayabal, Oriente Province, Cuba (?IEAUN).

**Comment.**—This species, known from the holotype female and three juveniles, was collected in forest humus.

*Evalljapyx darlingtoni* Silvestri

*Evalljapyx darlingtoni* Silvestri, 1948e: 209, 219-221, 228, 229, fig. 5, pl. 19 (fig. 1); Silvestri, 1949:43, 44; Paclt, 1957:83.

**Type-locality.**—Main Range, Blue Mountains, Jamaica (MCZ).

**Comment.**—This species is known only from the holotype.

*Evalljapyx decorus* Smith

*Evalljapyx decorus* Smith, 1960b:2, 3, 4, 5, 6, fig. 1, 7, 12.

**Type-locality.**—Stevens Creek, Santa Clara County, California (CAS).

**Comment.**—This species, known only from three specimens, was collected in damp humus.

*Evalljapyx dispar* Silvestri

*Evalljapyx dispar* Silvestri, 1948e:209, 217-219, 226, 227, fig. 4, pl. 18 (fig. 2); Silvestri, 1949:43; Paclt, 1957:83; Smith, 1959d:267.

*Evalljapyx propinquus* Silvestri (part): Silvestri, 1911:78 (specimen from Monterey, California); Silvestri, 1948e:217, 219; Paclt, 1957:83.

**Type-locality.**—La Playa Canyon, Santa Cruz Island, California (MCZ).

**Other record.**—California: Monterey County: Monterey.

**Comment.**—This species is known only from the holotype and one specimen from Monterey, originally reported by Silvestri (1911) as *E. propinquus*.

*Evalljapyx diversipleura* Silvestri

*Evalljapyx diversipleura* Silvestri, 1911:76, 78–79, fig. VI(1–6); Essig, 1926:57; Silvestri, 1949:43; Paclt, 1957:83; Essig, 1958:57; Smith, 1959d:268, 269, 271, 273, 274, fig. 5, 8, 11, 18–19 (redescription).

*Evalljapyx diversiplura*: Smith, 1959d:267 (lapsus calami).

**Type-locality.**—MacCloud, Siskiyou County, California (?IEAUN).

**Other records.**—California: Del Norte County: 2 mi. NE Patrick Creek Post Office; Humboldt County: Prairie Creek State Park.

**Comment.**—This species has been collected in fir and elm humus and in redwood humus.

*Evalljapyx dolichodduus* Silvestri

*Evalljapyx dolichodduus* Silvestri, 1911:76, 85–86, fig. XI(1–9), XII; Silvestri, 1912:211; Silvestri, 1948f:304, 306; Paclt, 1957:83–84.

*Evalljapyx dolichodduus*: Silvestri, 1933a:140 (lapsus calami); Paclt, 1957:83.

*Evalljapyx dolichodduus*: Silvestri, 1949:43 (lapsus calami).

**Type-locality.**—Córdoba, Orizaba, Jalapa, Veracruz, Mexico (?IEAUN).

**Other records.**—Mexico: Baja California Sur: Miraflores. Distrito Federal: Desierto de los Leones. Guerrero: Chilapa; Malinaltepec. Hidalgo: Atotonilco El Chico. Morelos: Zempoala. Puebla: Hueytemalco. Veracruz: Huatusco.

**Comment.**—This species has been collected in humus. Silvestri (1948f) suggests that a study of a large number of specimens from various localities might allow the species to be divided into subspecies. It is not known which of the three Veracruz cities is the type-locality.

*Evalljapyx duricauda* Ewing and Fox

*Evalljapyx duricauda* Ewing and Fox, 1942:291–292, pl. 33(fig. 1); Silvestri, 1949:43; Paclt, 1957:84.

**Type-locality.**—San José de Pinula, Guatemala, Guatemala (USNM No. 55213).

**Comment.**—This species is known only from the holotype.

*Evalljapyx euryhebdomus* Silvestri

*Evalljapyx euryhebdomus* Silvestri, 1911:76, 82–83, fig. IX (1–13); Silvestri, 1912:210; Silvestri, 1948f:308; Silvestri, 1949:43, 44; Paclt, 1957:84.

*Evalljapyx euryhebdomus*: Silvestri, 1949:43, 44 (lapsus calami).

**Type-locality.**—Jalapa, Veracruz, Mexico (?IEAUN).

**Comment.**—This species is known only from the holotype.

*Evalljapyx facetus* Smith

*Evalljapyx facetus* Smith, 1959d:269, 271, 272, 274, fig. 4, 7, 10, 16–17; Smith, 1960b:6; Smith, 1961:438, 439, 440, fig. 1–5, 7–9.

**Type-locality.**—4 mi. W Newcastle, Placer County, California (CAS).

**Other records.**—California: Lake County; Napa County; Santa Clara County; Sonoma County; Yolo County: Davis.



**Comment.**—The type-specimens were collected in damp humus and surface soil under oaks. Egg-clusters were collected “in moist clay-adobe soil at a depth of 6 to 12 inches during May, at Davis, California” (Smith, 1961). The postembryonic development of this species was studied by Smith (1961).

*Evalljapyx furciger* Silvestri

*Evalljapyx furciger* Silvestri, 1911:76, 81–82, fig. VIII (1–9); Silvestri, 1912:210; Silvestri, 1948f:308, 310; Silvestri, 1949:44; Paclt, 1957:84.

*Evalljapyx furgices*: Silvestri, 1949:44 (lapsus calami).

**Type-locality.**—Córdoba, Veracruz, Mexico (?IEAUN).

**Comment.**—This species is known only from the holotype.

*Evalljapyx helferi* Smith

*Evalljapyx helferi* Smith, 1959d:267, 268, 269, 270, 271, 272, 273, 274, fig. 1–2, 6, 9, 13–14, 21.

**Type-locality.**—Mendocino County, California (CAS).

**Comment.**—This species, which is known from about 1500 specimens, has been collected in redwood humus.

*Evalljapyx heterurus* Silvestri

*Evalljapyx heterurus* Silvestri, 1911:76, 83–85, fig. X(1–11); Silvestri, 1912:211; Silvestri, 1948f:308; Silvestri, 1949:44; Paclt, 1957:84.

**Type-locality.**—Córdoba, Veracruz, Mexico (?IEAUN).

**Comment.**—This species, known from four specimens, was collected in humus.

*Evalljapyx hubbardi* (Cook)

*Japyx hubbardi* Cook, 1899:225, 226, 227, fig. 2a–2b; Swenk, 1903:130; Kirby, 1904:57; Essig, 1926:56; Silvestri, 1947:214; Silvestri, 1949:44; Paclt, 1957:84; Essig, 1958:56.

*Evalljapyx hubbardi*: Paclt, 1957:83, 84 (n. comb.); Valentine and Glorioso, 1978:196.

*Evalljapyx sonoranus* Silvestri, 1911:76, 77–78, 80, fig. III(6–7), IV(1–7); Essig, 1926:56–57; Rapp, 1946:704; Saunders, 1946:95; Silvestri, 1948e:209, 214–217, 226, 227, fig. 3, pl. 18(fig. 1) (redescription; ?syn. *Japyx hubbardi*); Silvestri, 1949:44; Paclt, 1957:83, 84 (syn. of *Japyx hubbardi*); Essig, 1958:56–57; Smith, 1959d:267; Smith, 1960a:137, 139, 140, 141, 143, fig. 4, 7, 12, 15 (redescription); Valentine and Glorioso, 1978:196.

*Evalljapyx sonorano*: Silvestri, 1911:79 (lapsus calami).

*Japyx*: Cook and Loomis, 1928:10.

**Type-localities.**—Of *Japyx hubbardi*: Chiricahua Mountains, Cochise County, Arizona (USNM); of *Evalljapyx sonoranus*: Tucson, Pima County, Arizona (?IEAUN).

**Other records.**—Arizona: Oracle Springs; Santa Catalina Mountains; Cochise County: Chiricahua National Monument; Rustlers Park, Chiricahua Mountains; 2 mi. above (?W) Southwestern Research Station, Portal; Southwestern Research Station, Chiricahua Mountains; Pima County: Mt. Lemmon; Pinal

County: Superior; 9 mi. W Superior. Canada: British Columbia: Brentwood, Vancouver Island.

**Comment.**—The record of this species for Canada (Saunders, 1946) is almost certainly based on a misidentification. Cook (1899) states that the type of *Japyx hubbardi* is in the United States National Museum, but Mrs. Mignon Davis (pers. comm.) was unable to locate this material in that museum. This species has been collected from under stones in shaded areas, and in damp humus.

*Evalljapyx leechi* Smith

*Evalljapyx leechi* Smith, 1960b:1-2, 3, 5, 6, fig. 2, 5-6, 11.

**Type-locality.**—Lemon Cove, Tulare County, California (CAS).

**Comment.**—This species, known from seven specimens, was collected under stones on a grassy hillside.

*Evalljapyx macswaini* Smith

*Evalljapyx macswaini* Smith, 1960a:139, 140, 141, 142, 143, fig. 5, 9, 11, 18.

**Type-locality.**—Kyle Canyon, Charleston Mountains, Clark County, Nevada (CAS).

**Comment.**—The remains of an insect (possibly *Anapothrips* sp.) are present in the gut of one specimen.

*Evalljapyx manni* Ewing and Fox

*Evalljapyx manni* Ewing and Fox, 1942:292-293, pl. 33(fig. 3); Silvestri, 1949:44; Paclt, 1957:84.

**Type-locality.**—Estrella Valley, Costa Rica (USNM No. 55214).

**Comment.**—This species is known only from the holotype.

*Evalljapyx mckenziei* Smith

*Evalljapyx mckenziei* Smith, 1960b:3, 4, 5, 6, fig. 3-4, 8.

**Type-locality.**—5 mi. S Gorman, Los Angeles County, California (CAS).

**Comment.**—This species, known only from a male and female, was collected from soil under chaparral.

*Evalljapyx newelli* Smith

*Evalljapyx newelli* Smith, 1960a:139, 140, 141, 142, 143, fig. 6, 13.

**Type-locality.**—Mount San Jacinto, Riverside County, California (CAS).

**Other record.**—California: Riverside County: Strawberry Creek, Mount San Jacinto.

**Comment.**—This species was collected in sagebrush (*Artemesia* sp.) litter and in willow litter.

*Evalljapyx ombris* Smith

*Evalljapyx ombris* Smith, 1960a:138, 140, 141, 143, fig. 17.

**Type-locality.**—6 mi. SE Half Moon Bay, San Mateo County, California (CAS).

**Other records.**—California: Monterey County: Point Cypress; Santa Cruz County.

**Comment.**—This species has been collected in redwood and fern litter.

*Evalljapyx propinquus* Silvestri

*Evalljapyx propinquus* Silvestri, 1911:76, 78, fig. V(1-4) (part, holotype only); Gardner, 1914:86, 92, fig. 6; Essig, 1926:57; Fox, 1941:29; Silvestri, 1948e:217, 219; Silvestri, 1949:44; Paclt, 1957:84; Essig, 1958:57; Smith, 1959d:267.

**Type-locality.**—Los Angeles, Los Angeles County, California (?IEAUN).

**Other records.**—California: Blanchard Park; Live Oak Canyon; Palmer's Canyon; Los Angeles County: Lancaster; San Dimas Canyon; San Bernardino County: Cucamonga Canyon; San Antonio Canyon; South Hills.

**Comment.**—This species has been collected in soil with sagebrush (*Artemisia* sp.); from damp, decaying vegetation; and under leaves, sticks, and rocks.

*Evalljapyx raneyi* Smith

*Evalljapyx raneyi* Smith, 1959d:269, 271, 272-273, 274, fig. 3, 12, 15, 20.

**Type-locality.**—Monte Vela Jamul, San Diego County, California (CAS).

**Comment.**—This species, known only from two males, was collected 4 to 8 centimeters deep under *Quercus agrifolia* Neé.

*Evalljapyx subinermis* Silvestri

*Evalljapyx subinermis* Silvestri, 1929a:278-280, fig. XIV(1-10), XV; Silvestri, 1949:44; Paclt, 1957:84.

**Type-locality.**—Puerto Boniato, Santiago de Cuba, Oriente Province, Cuba (?IEAUN).

**Comment.**—This species, known only from two specimens, was collected in forest humus.

*Evalljapyx vicinior* Silvestri

*Evalljapyx vicinior* Silvestri, 1948f:308-310, fig. VII (1-12); Silvestri, 1949:44; Paclt, 1957:84; Paclt, 1977:125.

**Type-locality.**—Isla de Cozumel, Quintana Roo, Mexico (?IEAUN).

**Other record.**—Mexico: Quintana Roo: Solferino.

**Comment.**—Nothing is known of the habitat of this species.

## FAMILY PARAJAPYGIDAE

Genus *Miojapyx* Ewing

*Miojapyx* Ewing, 1941:71; Pagés, 1952c:67.

**Type-species.**—*Miojapyx americanus* Ewing, 1941.

**Comment.**—The taxonomic placement of this genus is very uncertain. I follow Pagés (1952c) in tentatively placing it in the family Parajapygidae. Its eventual disposition must await a restudy of the type and only species in the genus, *M. americanus*.

*Miojapyx* sp. nr. *americanus* Ewing

*Miojapyx* sp. nr. *americanus* Ewing: Pearse, 1946:148.

**Record.**—North Carolina: Durham County: Duke Forest.

**Comment.**—This material was collected from soil and litter in pine-oak forest.

*Miojapyx americanus* Ewing

*Miojapyx americanus* Ewing, 1941:71–72, 73, 74, 75, fig. 4–6; Rapp, 1946:705; Silvestri, 1948c:210; Silvestri, 1949:67; Pagés, 1952c:67; Paclt, 1957:91.

**Type-locality.**—Saluda County, South Carolina (USNM No. 54395).

**Comment.**—This species, known only from the holotype, was collected in peach orchard soil.

Genus *Parajapyx* Silvestri

*Parajapyx* Silvestri, 1903:6; Pagés, 1952c:64–65.

*Hemijapyx* Ewing, 1941:69–70; Pagés, 1952c:66–67 (syn. *Parajapyx*).

**Type-species.** Of *Parajapyx*: *Japyx isabellae* Grassi, 1886; of *Hemijapyx*: *Hemijapyx unidentatus* Ewing, 1941.

**Comment.**—The genus *Parajapyx* includes only the two subgenera listed here. This genus is world-wide in distribution and is apparently frequently distributed by commerce.

Subgenus *Parajapyx* Silvestri

*Parajapyx* (*Parajapyx*): Pagés, 1952c:64–65.

**Comment.**—This subgenus is probably world-wide in distribution.

*Parajapyx* sp.

*Parajapyx* sp.: Pearse, 1946:148.

**Record.**—North Carolina: Durham County: Duke Forest.

**Comment.**—This material was collected from soil and litter; its identity is not known.

*Parajapyx* (*Parajapyx*) *alienus* Pagés

*Parajapyx* (*Parajapyx*) *alienus* Pagés, 1982:155, 156, 161–165, fig. 12–21.

**Type-locality.**—Sainte-Lucie: Soufrière, Plaisance (MHNG).

**Comment.**—This species, known only from the holotype female, was collected by Berlese extraction of “samples from virgin forest; litter with underlying soil from various sites in the forest.”

*Parajapyx* (*Parajapyx*) *bonetianus* Silvestri

*Parajapyx bonetianus* Silvestri, 1948f:314–316, 317, fig. X(1–6); Silvestri, 1949:40; Pagés, 1954:241; Paclt, 1957:88.

*Parajapyx* (*Parajapyx*) *bonetianus*: Pagés, 1952c:64; Pagés, 1953b:138; Pagés, 1975a:340, 346, 350; Pagés, 1977:814.

**Type-locality.**—Cayo Centro, Quintana Roo, Mexico (?IEAUN).

**Comment.**—This species, known only from the holotype, was collected under rotting leaves.

*Parajapyx* (*Parajapyx*) *botosaneanui* Pagés

*Parajapyx* (*Parajapyx*) *botosaneanui* Pagés, 1975a:339–352, fig. 1–24; Pagés, 1977:814; Pagés, 1982:155, 156, 161, 162, 163, 165, fig. 11.

**Type-locality.**—Playa Siboney, 20 km SE Santiago de Cuba, Oriente Province, Cuba (type-depository unknown).

**Other records.**—Cuba: Oriente Province: Playa Baconao, 60 km SE Santiago de Cuba; Playa Juragua, 20 km SE Santiago de Cuba; Sierra Maestra. Sainte-Lucie: Castries, Marigot Harbour, Des Roseaux Hotel and environs.

**Comment.**—This species was collected from sandy beaches in Cuba and from Berlese extraction of litter and soil in a “somewhat degraded forest” in Sainte-Lucie.

*Parajapyx (Parajapyx) calvinianus* Silvestri

*Parajapyx calvinianus* Silvestri, 1929a:280–281, fig. XVI(1–11); Silvestri, 1948a:82; Silvestri, 1949:40; Paclt, 1957:88; Pagés, 1975b:524, 525.

*Parajapyx (Parajapyx) calvinianus*: Pagés, 1952c:64; Pagés, 1975a:339.

**Type-locality.**—Guaro, Oriente Province, Cuba (?IEAUN).

**Comment.**—This species, known only from one adult and one juvenile, was collected in forest humus.

*Parajapyx (Parajapyx) genavensium* Pagés

*Parajapyx (Parajapyx) genavensium* Pagés, 1977:807, 811–814, fig. 11–18.

**Type-locality.**—Tikal, Guatemala (MHNG).

**Comment.**—This species, known only by three males, was collected from soil.

*Parajapyx (Parajapyx) intermedius* Silvestri

*Parajapyx intermedius* Silvestri, 1948f:316–317, fig. XI(1–7); Silvestri, 1949:41; Pagés, 1952a:140; Paclt, 1957:89.

*Parajapyx (Parajapyx) intermedius*: Pagés, 1952c:64; Pagés, 1953b:138.

**Type-locality.**—El Pujal, San Luis Potosí, Mexico (?IEAUN).

**Comment.**—This species, known only from the holotype, was collected in forest humus.

*Parajapyx (Parajapyx) isabellae* (Grassi)

*Japyx isabellae* Grassi, 1886:11, tab. 2, fig. 18–19.

*Parajapyx isabellae*: Silvestri, 1903:6 (n. comb.); Silvestri, 1928b:49, 78, 79–80, fig. XX–XXI; Williams, 1941:75; Paclt, 1957:9, 10, 89; Smith, 1960c:261; Smith, 1961:438, 439, 440, fig. 6, 10.

*Parajapyx (Parajapyx) isabellae*: Pagés, 1952c:64; Pagés, 1975b:524.

*Japyx minimus* Swenk, 1903:131–132, fig.; Silvestri, 1905a:785; Kuwayama, 1922:9; Zimmerman, 1948:41; Muma, 1952:3; Chandler, 1957:113–114; Paclt, 1957:89.

*Parajapyx minimus*: Silvestri, 1905a:785 (n. comb.); Silvestri, 1928b:79; Pearse, 1946:138, 139, 148; Pagés, 1952c:64; Paclt, 1957:89; Rogers, 1959:464, 468.

*Japyx* sp., prob. *minimus*: Chandler, 1957:114.

**Type-localities.**—Of *Japyx isabellae*: Catania, Italy; of *Japyx minimus*: Malcoln (Lancaster County), Crab Orchard (Gage County), and Adams (Gage County), Nebraska (UN).

**Other records.**—California: Grant; Yolo County: Davis. Hawaii: Hawaii; Kauai; Maui; Oahu; Indiana: Ripley County: Friendship; Tippecanoe County: 5 mi. NW of Lafayette, West Lafayette, 0.5 mi. W of West Lafayette. Missouri: Stoddard County. New York: Fort Lee. North Carolina: Durham County: Duke Forest; Oklahoma: McClain County: SW of Norman along State

Highway 9, 5 mi. from south end of bridge over Canadian River. Panama: Canal Zone: Barro Colorado Island.

**Comment.**—The synonymy for this cosmopolitan species includes only primary references and references to this species in North America. Swenk (1903) does not indicate which locality is the type-locality. This species was collected from among the roots of wheat growing in damp soil in Nebraska; in soil in lowlands in Hawaii; in peach orchard soil in Missouri; in moist clay adobe soil at a depth of two feet in a barley field near Davis, California; and in the soil of pine-oak forest in North Carolina. Smith (1961) found three egg masses at Davis and studied the postembryonic development of the species. Zimmerman (1948) reports it to be harmful to the root cortex of plants. Chandler (1957) reported a few specimens of "*P. minimus*" from the nest tunnels of the burrowing halictine bee *Halictus ligatus* Say at West Lafayette, Indiana; it was speculated that the parajapygids were scavengers in the empty brood cells or a predator on mites and other small arthropods inhabiting the nests. The same author also reports two specimens of "*P. minimus*" from a nest of the acrobat ant *Crematogaster lineolata* Say in the soil of a railroad embankment about one-half mile west of West Lafayette, and three specimens from the nest of the digger bee *Melissodes bimaculata* Lepeletier. Chandler (1957) cites an unpublished thesis by J.M. Macklin, in which he estimates 171 to 512 specimens of "*Japyx* sp." in a red clover field five miles northwest of Lafayette.

*Parajapyx (Parajapyx) isabellae* (Grassi) var. *aztecus* Silvestri

*Parajapyx isabellae* (Grassi) var. *azteca* Silvestri, 1948f:317, 318, fig. XII (1-7).

*Parajapyx isabellae* (Grassi) var. *azteca*: Silvestri, 1948f:318 (lapsus calami); Silvestri, 1949:42 (lapsus calami); Paclt, 1957:89.

*Parajapyx (Parajapyx) isabellae* (Grassi) var. *ozteca*: Pagés, 1952a:140 (lapsus calami).

*Parajapyx (Parajapyx) isabellae* (Grassi) var. *azteca*: Pagés, 1952c:64 (lapsus calami); Paclt, 1957:89.

*Parajapyx isabellae aztecus*: Paclt, 1957:89 (emend. ending, n. status).

**Type-locality.**—Miraflores, Baja California Sur, Mexico (?IEAUN).

**Other records.**—Mexico: Morelos: Puente Ixtla. Veracruz: Nautla.

**Comment.**—This "variety" was collected from garden humus.

*Parajapyx (Parajapyx) schusteri* Nosek

*Parajapyx (Parajapyx) schusteri* Nosek, 1981:327-332, fig. 1-5.

**Type-locality.**—Bermudas, Burt Island.

**Other records.**—Bermuda: N of Lodge Point; Whalebone Bay.

**Comment.**—This species is known from 15 specimens.

*Parajapyx (Parajapyx) strinatii* Pagés

*Parajapyx (Parajapyx) strinatii* Pagés, 1975b:519-525, fig. 1-11; Pagés, 1976:685; Pagés, 1982:165.

**Type-locality.**—Road from Cobán to Lanquín, Alta Verapaz, Guatemala (MHNG).

**Comment.**—This species was recovered by Berlese extraction of coniferous forest litter.

*Parajapyx (Parajapyx) tristanianus* Silvestri

*Parajapyx tristanianus* Silvestri, 1929b:68–69, fig. IV–V; Silvestri, 1949:42; Paclt, 1957:90.

*Parajapyx (Parajapyx) tristanianus*: Pagés, 1952c:64.

Type-locality.—Reventazón, Costa Rica (ZIM).

Comment.—This species, known only from the holotype, was collected in humus.

*Parajapyx (Parajapyx) sp. nr. unidentatus* (Ewing)

*Hemijapyx sp. nr. unidentatus* Ewing: Pearce, 1946:148.

Record.—North Carolina: Durham County: Duke Forest.

Comment.—This species was collected from soil in pine-oak forest.

*Parajapyx (Parajapyx) unidentatus* (Ewing)

*Hemijapyx unidentatus* Ewing, 1941:70–71, 73, 74, fig. 1–3; Rapp, 1946:704; Silvestri, 1948c:213; Silvestri, 1949:50, 51; Pagés, 1952c:66, 67; Paclt, 1957:88, 90.

*Parajapyx (Parajapyx) unidentatus*: Pagés, 1952c:64 (n. comb.).

*Parajapyx unidentatus*: Paclt, 1957:90.

Type-locality.—Escambia County, Alabama (USNM No. 54394).

Comment.—This species, known only from two specimens, was collected in peach orchard soil. Pagés (1952c) indicates that the specimens are probably anomalous.

Subgenus *Grassjapyx* Pagés

*Parajapyx (Grassjapyx)* Pagés, 1952c:64–65.

Type-species.—*Parajapyx grassianus* Silvestri, 1911.

Comment.—This subgenus is probably world-wide in distribution.

*Parajapyx (Grassjapyx) sp., bahianus-brasilianus* group

*Parajapyx (Grassjapyx) sp., bahianus-brasilianus* group: Fox, 1957:35, 36, 37, fig. 1; Pagés, 1982:155.

Record.—Puerto Rico: Bayamón District: West shore of Laguna La Torrecilla at the International Airport, Isla Verde.

Comment.—Three specimens of this undetermined species were recovered from samples of soil taken at a depth of about one inch.

*Parajapyx (Grassjapyx) grassianus* Silvestri

*Parajapyx grassianus* Silvestri, 1911:87, fig. XIII(1–4); Silvestri, 1912:211; Silvestri, 1929a:281; Silvestri, 1929d:221, 223; Silvestri, 1930b:226; Fox, 1941:31; Silvestri, 1948a:4, 70; Silvestri, 1948c:209–210; Silvestri, 1948f:313–314, 320, fig. IX(1–10); Silvestri, 1949:41; Pagés, 1951:35; Paclt, 1957:88, 89; Pagés, 1975b:524.

*Parajapyx (Grassjapyx) grassianus*: Pagés, 1952c:60, 64; Pagés, 1953a:171; Pagés, 1975b:525.

Type-locality.—Córdoba, Veracruz, Mexico (IEAUN).

Other records.—Mexico: Quintana Roo: El Meco; Xcalak. San Luis Potosí: El Meco. Veracruz: Jalapa.

Comment.—This species has been collected under decomposing leaves in a *cocotal*, in soil, and under rocks.



*Parajapyx (Grassjapyx) grassianus* Silvestri, forma anomala vel mutans  
*Parajapyx grassianus* Silvestri, forma anomala vel mutans (?Gen. *Hemijapyx*  
 Ewing): Silvestri, 1948c:212–213, fig. III(1–5); Silvestri, 1949:41.  
*Parajapyx (Grassjapyx) grassianus* Silvestri, forma anomala vel mutans: Pagés,  
 1952c:62, 66.

**Record.**—Florida: Alachua County: Newman's Lake.

**Comment.**—Several specimens of this form were collected in a decayed tree trunk in association with *P. (G.) grassianus* var. *maiusculella* Silvestri and *P. (G.) grassianus* var. *robustior* Silvestri.

*Parajapyx (Grassjapyx) grassianus* Silvestri var. *maiusculella* Silvestri  
*Parajapyx grassianus* Silvestri var. *maiusculella* Silvestri, 1948c: 210–211, fig.  
 II(6–9); Silvestri, 1949:41; Paclt, 1957:89; Pagés, 1975b:524.  
*Parajapyx (Grassjapyx) grassianus* Silvestri var. *maiusculella*: Pagés, 1952c: 64.  
*Parajapyx grassianus majusculellus*: Paclt, 1957:89 (emended ending, n. status).

**Type-locality.**—Newman's Lake, Alachua County, Florida (IEAUN).

**Other record.**—Florida: Alachua County: Gainesville.

**Comment.**—The type-specimen was collected in a rotten tree trunk in association with *P. (G.) grassianus*, forma anomala vel mutans, and *P. (G.) grassianus* var. *robustior*. The specimens from Gainesville were collected in humus in a ditch.

*Parajapyx (Grassjapyx) grassianus* Silvestri var. *robustior* Silvestri  
*Parajapyx grassianus* Silvestri var. *robustior* Silvestri, 1948c:210, 211, fig. II  
 (1–5); Silvestri, 1949:41; Paclt, 1957:89; Pagés, 1975b:524.  
*Parajapyx (Grassjapyx) grassianus* Silvestri var. *robustior*: Pagés, 1952c:64;  
 Pagés, 1953a:171.  
*Parajapyx grassianus robustior*: Paclt, 1957:89 (n. status).

**Type-locality.**—Newman's Lake, Alachua County, Florida (IEAUN).

**Comment.**—This variety was collected in a rotten tree trunk with specimens of *P. (G.) grassianus* var. *maiusculella* and *P. (G.) grassianus* forma anomala vel mutans.

*Parajapyx (Grassjapyx) mexicanus* Silvestri

*Parajapyx mexicanus* Silvestri, 1948f:318–320, fig. XIII(1–7); Silvestri, 1949:  
 42; Pagés, 1951:31; Pagés, 1952c:69; Paclt, 1957:89; Pagés, 1959:8;  
 Reddell, 1971:49; Pagés, 1975b:524; Reddell, 1977:233; Reddell, 1981:  
 203.

*Parajapyx (Grassjapyx) mexicanus*: Pagés, 1952c:65.

**Type-locality.**—Solferino, Quintana Roo, Mexico (?IEAUN).

**Other records.**—Mexico: Guerrero: Mezcala. Quintana Roo: Puerto Morelos; Selva de Dzinché. Yucatán: Cueva de Carroza, Hoctún.

**Comment.**—No information is available on the habitat of this species.

*Parajapyx (Grassjapyx) russionus* Silvestri

*Parajapyx russionus* Silvestri, 1948a:79, 80, 82, fig. LXII; Silvestri, 1949:41;  
 Paclt, 1957:90; Pagés, 1975b:524, 525; Pagés, 1982:155.

*Parajapyx (Grassjapyx) russionus*: Pagés, 1952c:65, 82.

**Type-locality.**—Moca, Espaillat Province, Dominican Republic (?IEAUN).

Comment.—This species, known only from the holotype, was collected in humus.

*Parajapyx (Grassjapyx) scalpellus* Fox

*Parajapyx scalpellus* Fox, 1941:30, 31, fig. 5; Pearse, 1946:148; Silvestri, 1949:42; Paclt, 1957:90.

*Parajapyx (Grassjapyx) scalpellus*: Pagés, 1952c:65.

Type-locality.—Upson County, Georgia (USNM No. 54838).

Other records.—North Carolina: Durham County: Duke Forest.

Comment.—This species was collected in peach orchard soil in Georgia and in soil in a pine-oak forest in North Carolina.

## LOCALITY LIST

### CANADA

“Canada occidental”: *Occasjapyx americanus*.

British Columbia: *Evalljapyx hubbardi* (?erroneous determination).

### UNITED STATES

Alabama: “*Japyx*” *bidens*, *Metajapyx propinquus*, *M. steevesi*, *Parajapyx (P.) unidentatus*.

Arizona: *Onychojapyx schmidti*, *Evalljapyx hubbardi*.

Arkansas: *Catajapyx ewingi*.

California: *Nanojapyx coalingae*, *N. gentilei*, *N. hamoni*, *N. pagesi*, *N. pricei*, *Hecajapyx bucketti*, *Hecajapyx vulgaris*, *Holjapyx calaverasae*, *Holjapyx conspersus*, *Holjapyx diversiunguis*, *Holjapyx humidus*, *Holjapyx hyadis*, *Holjapyx imbutus*, *Holjapyx insiccatus*, *Holjapyx irroratus*, *Holjapyx madidus*, *Holjapyx schusteri*, “*Japyx*” sp., “*Japyx*” sp. 3, *Occasjapyx californicus*, *O. kofoidi*, *O. sierrensis*, *Evalljapyx adonis*, *E. anombris*, *E. decorus*, *E. dispar*, *E. diversipleura*, *E. facetus*, *E. helferi*, *E. leechi*, *E. mckenziei*, *E. newelli*, *E. ombris*, *E. propinquus*, *E. raneyi*, *Parajapyx (P.) isabellae*.

District of Columbia: *Metajapyx confectus*, *M. subterraneus*.

Florida: *Parajapyx (Grassjapyx) grassianus* (forma anomala vel mutans), *P. (G.) grassianus* var. *maiusculella*, *P. (G.) grassianus* var. *robustior*.

Georgia: “*Japyx*” *turneri*, *Metajapyx multidens*, *M. steevesi*, *Parajapyx (Grassjapyx) scalpellus*.

Hawaii: *Indjapyx sharpi*, *Parajapyx (P.) isabellae*.

Idaho: Undetermined genus and species.

Illinois: *Metajapyx illinoiensis*, *Mixojapyx tridenticulatus*.

Indiana: *Metajapyx subterraneus*, *Mixojapyx tridenticulatus* var. *superior*, *Parajapyx (P.) isabellae*.

Kentucky: *Metajapyx subterraneus*.

Louisiana: “*Japyx*” sp. 2.

Maryland: *Metajapyx subterraneus*.

Michigan: “*Japyx*” sp. 4.

Mississippi: *Metajapyx steevesi*.

Missouri: *Eojapyx pedis*, *Metajapyx subterraneus*, *Parajapyx (P.) isabellae*.

- Nebraska: *Parajapyx (P.) isabellae*.  
 Nevada: *Evalljapyx macswaini*.  
 New York: *Parajapyx (P.) isabellae*.  
 North Carolina: "*Japyx*" spp., *Metajapyx confectus*, *M. folsomi*, *M. propinquus*,  
*M. steevesi*, *M. subterraneus*, *Miojapyx* sp. nr. *americanus*, *Parajapyx (P.)*  
*isabellae*, *P. (P.)* sp. nr. *unidentatus*, *P. (Grassjapyx) scalpellus*.  
 Ohio: *Metajapyx* sp. 2; *Metajapyx subterraneus*.  
 Oklahoma: Undetermined genus and species 4, *Parajapyx (P.) isabellae*.  
 Pennsylvania: *Metajapyx subterraneus*.  
 South Carolina: "*Japyx*" *turneri*, *Metajapyx steevesi*, *Miojapyx americanus*.  
 Tennessee: *Metajapyx folsomi*, *M. multidens*, *M. propinquus*, *M. remingtoni*,  
*M. steevesi*.  
 Texas: Undescribed genus and species, "*Japyx*" *texanus*, *Mixojapyx impar*,  
*Mixojapyx tridenticulatus*, *Evalljapyx* sp.  
 Virginia: *Metajapyx steevesi*, *M. subterraneus*.  
 Washington: *Occasjapyx americanus*.

#### MEXICO

- Baja California Sur: *Ctenjapyx boneti*, *Evalljapyx bolivari*, *E. boneti*, *E.*  
*dolichodduus*, *Parajapyx (P.) isabellae* var. *aztecus*.  
 Distrito Federal: *Allojapyx allodontus*, *Evalljapyx dolichodduus*.  
 Guerrero: *Allojapyx allodontus*, *Mixojapyx dampfi*, *M. saussurei*, *Evalljapyx*  
*dolichodduus*, *Parajapyx (Grassjapyx) mexicanus*.  
 Hidalgo: *Evalljapyx dolichodduus*.  
 México: *Evalljapyx boneti*.  
 Michoacán: *Allojapyx allodontus*.  
 Morelos: *Allojapyx allodontus*, *Evalljapyx boneti*, *E. dolichodduus*, *Parajapyx*  
*(P.) isabellae* var. *aztecus*.  
 Oaxaca: *Ctenjapyx parkeri*.  
 Puebla: *Evalljapyx boneti*, *E. dolichodduus*.  
 Quintana Roo: *Mixojapyx notabilis*, *Evalljapyx vicinior*, *Parajapyx (P.) bonet-*  
*ianus*, *P. (Grassjapyx) grassianus*, *P. (G.) mexicanus*.  
 San Luis Potosí: Japyginae. Undetermined genus and species, *Allojapyx*  
*allodontus*, *Metajapyx* sp. 1, *Mixojapyx* sp., *Evalljapyx boneti*, *Parajapyx*  
*(P.) intermedius*, *P. (Grassjapyx) grassianus*.  
 Veracruz: *Allojapyx allodontus*, *Mixojapyx conspicuus*, *M. saussurei*, *Evall-*  
*japyx boneti*, *E. brevipalpus*, *E. dolichodduus*, *E. euryhebdomus*, *E. furciger*,  
*E. heterurus*, *Parajapyx (P.) isabellae* var. *aztecus*, *P. (Grassjapyx) grassianus*.  
 Yucatán: "*Japyx*" sp. 1, *Parajapyx (Grassjapyx) mexicanus*.

#### CENTRAL AMERICA

- Costa Rica: Undetermined genus and species 3, *Centrijapyx tristani*, *Evall-*  
*japyx costaricanus*, *E. manni*, *Parajapyx (P.) tristianianus*.  
 Guatemala: *Centrijapyx tristani*, "*Japyx*" *goliath*, *Metajapyx schwarzi*,  
*Mixojapyx barberi*, *Mixojapyx cooki*, *Mixojapyx dechambrieri*, *Evall-*  
*japyx duricauda*, *Parajapyx (P.) genavensium*, *P. (P.) strinatii*.  
 Honduras: *Metajapyx schwarzi*.  
 Panama: Undetermined genus and species 2, *Centrijapyx tristani*, *Parajapyx*  
*(P.) isabellae*.

## WEST INDIES

- Burt Island, Bermuda: *Parajapyx (P.) schusteri*.  
 Cuba: "*Japyx*" *molineti*, "*J.*" *vivaldii*, *Evalljapyx aguayoi*, *E. bruneri*,  
*E. crassicauda*, *E. cubanus*, *E. subinermis*, *Parajapyx (P.) botosaneanui*,  
*P. (P.) calvinianus*.  
 Dominican Republic: *Parajapyx (Grassjapyx) russianus*.  
 Jamaica: *Evalljapyx darlingtoni*.  
 Puerto Rico: "*Japyx*" sp 5, *Parajapyx (Grassjapyx) sp. bahianus-brasilianus*  
 group; Isla Culebra: *Neojapyx insulanus*.  
 Santa Lucia: *Centrijapyx mahunkorum*, *Parajapyx (P.) alienus*.

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