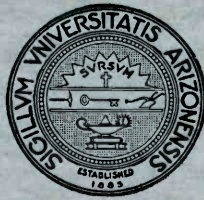


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**Distribution and Host Plants of
LEAF-CUTTER BEES IN ARIZONA**



**Agricultural Experiment Station
The University of Arizona
Tucson, Arizona**

THE DISTRIBUTION AND HOST PLANTS OF LEAF-CUTTER BEES IN ARIZONA

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Leaf-cutter bees, members of the genus *Megachile*, family Megachilidae, are useful pollinators of alfalfa and other crops but may cause damage to ornamental plants by cutting circular and oval pieces from the leaves. These pieces are used as linings and caps for cells which are constructed in a variety of locations. Some species nest in the soil, others nest in tunnels of rotting wood, while still others use borings or cavities in wood or in plant stems. One group of *Megachile* species, the subgenus *Chelostomoides*, has recently been transferred to the genus *Chalicodoma* (Michener, 1962). The species of this genus do not cut leaves but use resin to construct their cells.

The adults of both *Megachile* and *Chalicodoma* are non-metallic, usually robust, black bees, with the pollen-collecting scopa on the venter of the abdomen. The front tarsi in the males are often much dilated and modified. Identifications of all of the specimens discussed in the following paper were made by T. B. Mitchell, whose invaluable assistance is gratefully acknowledged.

All of the 60 species of *Megachile* and 15 species of *Chalicodoma* at present known from the State are listed below, in the taxonomic sequence followed by Michener (1951). The distribution in other areas of the United States was obtained from Michener (1951) and from Mitchell (1962). The Arizona records, with the number of separate collections following the first mention of the State in parenthesis, are based on specimens in collections at the University of Arizona, the University of California at Berkeley, Davis, and Riverside, and the University of Kansas. Distribution within the State is based on a division as follows: Mohave County, northwestern; Coconino County, northcentral; Navajo and Apache Counties north of Snowflake and St. Johns, northeastern; southern Navajo and Apache Counties, eastern Gila County, Graham and Greenlee Counties, north of the Gila Mts., eastern; southern Graham and Greenlee Counties, the Sta. Catalina Mts. of Pima County, and Cochise County, southeastern; Santa Cruz and Pima Counties, southcentral; Pinal, Gila, Maricopa, and Yavapai Counties, central; and Yuma County, southwestern.

Individual localities within the State have been grouped on a geographical basis, so that nearby localities are near each other in the list. Several abbreviations have been used in recording the localities. "Ft. Valley Expt. For. HQ" stands for the headquarters area of the Fort Valley Experimental Forest, approximately 7 miles northwest of Flagstaff. "Hk Hwy. mi.—" indicates a mile post on the Hitchcock Highway on the south slope of the Santa Catalina Mts. Milepost 0, at the bottom, is at 2800 ft. elevation. The road climbs almost steadily for 20 miles. Elevations in even thousands and the approximate location they are reached on the road are as follows: 4000 ft. (mi. 6), 5000 ft. (mi. 8), 6000 ft. (mi. 12), 7000 ft. (mi. 16), 8000 ft. (mi. 20-25). The end of the road about 26 miles from the base, is in the upper part of Sabino Creek, at the mouth of Marshall Gulch, at

about 7500 ft. elevation. There is a change in vegetation from desert to Douglas fir first, partly dependent on the elevation, but partly on the slope and other factors. Whitaker and Niering (1964) provide an excellent summary of the vegetation of the south slope of this range. "S.W. Res. Sta." stands for the Southwestern Research Station of the American Museum of Natural History, near Portal. Some of the early collectors indicated only the mountain range as the locality so this has been abbreviated as "Mts." following the name of the mountains. Where there are no specific localities on a mountain range, a general collecting area has sometimes been used such as "SE" for the southeastern portion, or the altitude such as "7500'".

Seasonal distribution is expressed in terms of the number of collections made of the stated months. These numbers in parenthesis do not refer to the number of specimens collected but to separate collections made at different localities and on different dates. The date records are followed by a listing of the flower records, nesting records, and references to papers on the biology of the species.

Genus MEGACHILE Latreille

Subgenus *Litomegachile* Mitchell

Megachile (Litomegachile) brevis brevis Say

"This is one of the most widely occurring species of bees in North America, ranging from the Atlantic to the Pacific, both in the United States and in southern Canada, throughout the season," according to Mitchell (1962): Arizona (28): mainly northcentral and eastern.

YAVAPAI: 25 mi. S.W. Prescott, Granite Dells, Chino Val. COCONINO: Oak Creek Cn., 15 mi. N. Sedona, 24 mi. S. Flagstaff. Flagstaff, E. Flagstaff, San Francisco Mts. NAVAJO: Carrizo, 4 mi. N. White River. APACHE: White Mts. PIMA: Organ Pipe Cactus Nat. Mon. April (3), May (1), June (14), July (6), August (3), and September (1).

FLOWER RECORDS: *Gaillardia*, *Marrubium*, *Melilotus*, *Phacelia*, and *Senecio*. Mitchell (1962) gives 85 flower records for this species.

BIOLOGY: Bohart (1958), Donahue (1954), Franklin (1951), Hixon (1955), Linsley (1946), Michener (1953), Parker (1946), Pengelly (1958), Rau (1922-1934), Rockwood (1951), and Stevens (1949).

Megachile (Litomegachile) brevis onobrychidis Cockerell

Known from Nebraska and Texas, west to Idaho, British Columbia, California, and Arizona (9): widely scattered at single locations in the southwest, southcentral, southeastern valleys, and northeast.

YUMA: Yuma. PIMA: Tucson. COCONINO: Oak Creek Cn. NAVAJO: Painted Desert. APACHE: Chinle. GREENLEE: Duncan. April (2), May (1), June (5), and July (1).

FLOWER RECORDS: *Cercidium* and *Prosopis*. Linsley (1946) collected, this species from alfalfa. NESTING MATERIAL: Grape leaves.

Megachile (Litomegachile) coquilletti Cockerell

Distributed from Idaho, Utah, west to British Columbia and southern California; Arizona (10): widely scattered in northcentral, central, southcentral, eastern, and in the southeastern valleys.

COCONINO: Grand Canyon, Grand Canyon mile 52 (Nankoweap), Oak Creek Cn. NAVAJO: White River. PINAL: 8 mi. S. Toltec. PIMA: Tucson. GRAHAM: Thatcher. *Cochise*: 5 mi. S. E. Apache. May (1), June (5), July (3), and August (1).

FLOWER RECORDS: *Baccharis* and *Cercidium*. Additional records from

Mitchell (1935) include *Cleome* and *Eriogonum*, and from Linsley (1946) alfalfa.

Megachile (*Litomegachile*) *gentilis* Cresson

Known from Texas, New Mexico, Idaho, Oregon, Nevada, California, Hawaii, and Arizona (137): southwest, central, southcentral, and the southeastern valleys.

YUMA: Yuma. MARICOPA: Litchfield Park, Phoenix, Mesa, Tempe, Chandler. PINAL: Maricopa, 11 mi. S. W. Eloy, Sacaton, Superior, Red Rock, 2 mi. N. Florence, 3 mi. W. Oracle, 2 mi. E. Oracle. PIMA: Sta. Catalina Mts.: Sabino Cn., Hk. Hy. mi. 3, 4, 5, Molino Basin, "Mts."; Tanque Verde; Redington; Tucson; 10 mi. N. Tucson; Marana; Avra Val.; 20 mi. W. Tucson; 35 mi. S. W. Tucson; Baboquivari Mts.: Brown Cn., "Mts."; Sahuarita; Continental; Sta. Rita Mts.: Madera Cn., "Mts.". SANTA CRUZ: Arivaca, Sycamore Cn. nr. Ruby, Amado, Harshaw, 6 mi. S. E. Patagonia, 10 mi. S. W. Patagonia, Patagonia, Lochiel. COCHISE: Huachuca Mts.: Hicksville, Ramsey Cn., "N. E."; Douglas; Elfrida; Pearce; 13 mi. S. W. Willcox; 6 mi. N. Kansas Settlement; 30 mi. E. Kansas Settlement; Bowie; 1 mi. S. W. Portal; 5 mi. W. Portal; S. W. Res. Sta.; Douglas. GRAHAM: Bonita, Safford, Pinalaño Mts.: 3500-4500'; Rio Aravaipa 2500'. NAVAJO: Carrizo Cr., White River. COCONINO: Oak Creek Cn. YAVAPAI: 5 mi. S. Jerome. April (15), May (19), June (35), July (27), August (26), September (9), and October (5).

FLOWER RECORDS: *Acacia*, *Amorpha*, *Asclepias*, *Aster*, *Baccharis*, *Cercidium*, *Condalia*, *Croton*, *Dalea*, *Echinocactus*, *Eriogonum*, *Haplopappus*, *Helianthus*, *Heterotheca*, *Larrea*, *Lepidium*, *Lippia*, *Lotus*, *Marrubium*, *Medicago*, *Opuntia*, *Phacelia*, *Prosopis*, *Sapindus*, *Senecio*, *Vauquelinia*, *Verbesina*, *Wislizenia*, alfalfa and birdsfoot trefoil.

NESTING RECORDS: Cutting leaves of *Amaranthus*, *Boerhaavia*, *Fraxinus*, and grape-holly. Nests found in an ear of corn and in a hole in a peach. Bechtel (1958) reported nests in stems of *Sambucus*.

PARASITES: *Coelioxys novomexicana* Cockerell (Bechtel 1958).

Megachile (*Litomegachile*) *lippiae* Cockerell (= *texana lippiae* Cockerell)

Known from Montana, Nebraska, Texas, west to Utah, California, and Arizona (110): widely distributed in northcentral, northeast, east, southeastern valleys, southcentral, central and southwest.

COCONINO: Grand Canyon, N. Flagstaff, Ft. Valley Expt. For. Hq., E. Flagstaff. NAVAJO: Joseph City, 4 mi. N. White River, Ft. Apache. APACHE: Chinle. GRAHAM: Pinalaño Mts.: 5000-6000'; Rio Aravaipa. YAVAPAI: 6 mi. S. W. Mingus Mt. GILA: Payson. YUMA: Yuma, Roll. MARICOPA: Phoenix. PINAL: Superior. PIMA: Sta. Catalina Mts.: Sabino Cn., Hk. Hy. mi. 4, 5, 15, Mud Spring; Tucson; Tucson, Pantano Wash; Continental; Sta. Rita Mts.: Madera Cn.; Three Points (Robles Jn.); Baboquivari Mts.: Brown Cn.; Quinlan Mts.: nr. Kitt Peak; Coyote Mts. SANTA CRUZ: 10 mi. S. W. Patagonia, Patagonia, Canelo. COCHISE: 20 mi. E. Benson; 30 mi. E. Pearce; Dos Cabezas, Portal; 5 mi. W. Portal; S. W. Res. Sta.; Cochise; Tombstone; Elfrida; 6 mi. E. Douglas; Douglas; 5 mi. S. E. Apache; Huachuca Mts.: Ramsey Cn., 6 mi. W. Montezuma Pass. March (1), April (12), May (27), June (19), July (19), August (20), and September (8).

FLOWER RECORDS: *Acacia*, *Agave*, *Amorpha*, *Asclepias*, *Baccharis*, *Cercidium*, *Cirsium*, *Curcubita*, *Erigeron*, *Haplopappus*, *Helenium*, *Helianthus*, *Hoffmanseggia*, *Larrea*, *Lotus*, *Marrubium*, *Medicago*, *Melilotus*, *Mortonia*, *Nama*, *Nolina*, *Opuntia*, *Petalostemum*, *Prosopis*, *Sapindus*, *Sphaeralcea*, *Verbesina*, *Wislizenia*, and birdsfoot trefoil. Mitchell (1935) also listed *Hyptis*, white aster, white hollyhock and privet. NESTING MATERIAL: Cutting rose leaf.

Megachile (*Litomegachile*) *mendica* Cresson

"This is a widely distributed species in the United States, occurring from

coast to coast," according to Mitchell (1962); Arizona (15): scattered in north-west, southcentral and southeastern.

MOHAVE: Grand Canyon mi. 116.5 (Elves Chasm). PIMA: Sta. Catalina Mts.: Bear Wallow; Quinlan Mts.: Kitt Peak. GRAHAM: Fort Grant, Rio Aravaipa, Pinalaño Mts. June (4), July (2), and August (2).

FLOWER RECORDS: *Marrubium*, *Melilotus*, *Phacelia*, and *Robinia*. Mitchell (1962) lists 91 plant genera. NESTING RECORD: Reared from rose cane (Krombein 1958). BIOLOGY: Rau (1922).

Megachile (Litomegachile) mendica snowi Mitchell (= *snowi* Mitchell)

Known from Colorado, New Mexico, and Arizona (57): northcentral, eastern, southeastern mountains, and southcentral. COCONINO: Sedona; 10 mi. N. Sedona; 15 mi. N. Sedona; Oak Creek Cn.: 5600', 6000'; 25 mi. S. Flagstaff; Flagstaff; E. Flagstaff; 7 mi. E. Ash Fork. NAVAJO: 4 mi. N. Whiteriver, Pinetop. YAVAPAI: Granite Dells. PIMA: Sta. Catalina Mts.: Bear Wallow, Hk. Hy. mi. 19, 22, 23, 26, Mud Springs; Tucson; Sta. Rita Mts.: Madera Cn. 6000'. GRAHAM: Pinalaño Mts.: Wet Cn., 6000', 7500'. COCHISE: Chiricahua Mts.: 6500', S. W. Res. Sta.: Portal; 5 mi. W. Portal; Elfrida; Huachuca Mts.: Ramsey Cn. SANTA CRUZ: Patagonia. May (4), June (13), July (23), August (14), and September (3).

FLOWER RECORDS: *Asclepias*, *Ceanothus*, *Chilopsis*, *Cleome*, *Eriogonum*, *Geranium*, *Helenium*, *Heliopsis*, *Heterotheca*, *Lupinus*, *Marrubium*, *Melilotus*, *Robinia*, *Rudbeckia*, *Verbesina*, *Viguiera*, and yellow composite. Mitchell (1935) listed *Gilia* and privet.

Megachile (Litomegachile) texana Cresson (= *texana cleomis* Cockerell)

"This is another widely distributed species, ranging from the Atlantic to the Pacific in the United States and southern Canada", according to Mitchell (1962); Arizona (82): distributed throughout all areas except the deserts of the central portion of the state.

MOHAVE: 23 mi. E. Kingman, Hualapai Mt. Pk. 5300'. YAVAPAI: 4 mi. E. Jerome, Granite Dells, Camp Wood, Prescott. COCONINO: Grand Canyon, Cameron, San Francisco Mts., at base Humphreys Pk. 9500', Flagstaff, Ash Fork, Oak Creek Cn., Sedona. NAVAJO: Carrizo Cr., Whiteriver. APACHE: White Mts., 18 mi. W. Springerville. GRAHAM: Pinalaño Mts.: Graham Mt.; Fort Grant. GILA: San Carlos, 38 mi. N. E. Globe, Salt R. Cn. COCHISE: Chiricahua Mts.: Cave Cr., 5 mi. W. Portal, S. W. Res. Sta., "Mts."; San Bernardino Ranch; Douglas; 6 mi. E. Douglas; 5 mi. E. Lowell; Huachuca Mts.; Ramsey Cn., "Mts."; Tombstone. PIMA: Sta. Catalina Mts.: Sabino Cn., Hk. Hy. mi. 11, "Mts."; Tucson; Sta. Rita Mts.: Miller Cn., "Mts.". YUMA: Bill Williams R. June (26), July (25), August (20), and September (5).

FLOWER RECORDS: *Asclepias*, *Amorpha*, *Berberis*, *Cirsium*, *Euphorbia*, *Franseria*, *Haplopappus*, *Larrea*, *Lotus*, *Marrubium*, *Melilotus*, *Nolina*, *Opuntia*, *Pentstemon*, *Phacelia*, *Rhamnus*, *Sapindus*, and *Solidago*. Additional host records are given by Mitchell (1962): *Acerates*, *Azelia*, *Aster*, *Baptisia*, *Blephilia*, *Crotalaria*, *Cryptantha*, *Dianthera*, *Elephantopus*, *Eupatorium*, *Galactia*, *Helianthus*, *Helenium*, *Liatris*, *Medicago*, *Melilotus*, *Nepeta*, *Oxydendrum*, *Petalostemon* (= *Kubnistera*), *Phaseolus*, *Psoralea*, *Pycnanthemum*, *Pyrrhopappus*, *Rhus*, *Rubus*, *Serinia*, *Silphium*, *Stachys*, *Strophostyles*, *Tephrosia*, *Trifolium*, *Verbena*, and *Vicia*. NESTING RECORD: In soil (Krombein 1958). BIOLOGY: Franklin (1951), Krombein (1953), Pengelly (1958), and Rau (1922) as *M. generosa* Cresson.

Subgenus *Cressoniella* Mitchell

Megachile (Cressoniella) zapoteca Cresson

Known from Arizona (18): southeastern mountains. GRAHAM: Fort Grant. COCHISE: Chiricahua Mts.: Cave Cr. 5500', S. W. Res. Sta., 7000-8000', Rustler

Pk.; Huachuca Mts.: Ramsey Cn., Reef, Palmerlee. PIMA: Sta. Catalina Mts.; Sta. Rita Mts.: Madera Cn. June (2), July (6), August (3), and September (2). FLOWER RECORDS: *Asclepias*, *Helenium*, *Helianthus*, *Melilotus*, *Monarda*, and sweet pea.

Subgenus *Megachile* Latreille

Megachile (Megachile) centuncularis (Linnaeus)

Mitchell (1962) gives the distribution of this species as "a holarctic species, its range extending from the Pacific to the Atlantic in Canada and the northern half of the United States." Arizona (1): southeastern. PIMA: Sta. Catalina Mts.: Hk. Hy. mi. 5. April (1). FLOWER RECORDS: *Fendlera*. Mitchell (1962) gives 13 other genera, including alfalfa. BIOLOGY: Medler (1959), Michelbacher and Hurd (1954), and Pengelly (1958).

Megachile (Megachile) montivaga Cresson

Distributed from Nova Scotia to North Carolina, west to British Columbia, California, and Mexico; Arizona (37): northcentral, central, southcentral, and southeastern valleys and mountains.

COCONINO: Schultes Pass 10 mi. N. Flagstaff, San Francisco Mts., 6 mi. W. Flagstaff, Flagstaff, 7 mi. S. Flagstaff, Navajo Mt. 6500', House Rock Val. YAVAPAI: Weaver Mts. YUMA: Bill Williams Fork, Roll. PINAL: Superior, 2 mi. E. Oracle, Eloy. PIMA: Tucson; Sta. Catalina Mts.: Molino Basin, "Mts.". SANTA CRUZ: 7.5 mi. W. Arivaca, Arivaca, 6 mi. E. Nogales, 2 mi. W. Sonoita, Canelo. COCHISE: Huachuca Mts.; Fry; Willcox; Chiricahua Mts.: Portal, 5 mi. W. Portal, S. W. Res. Sta., 8000', 8700', Rustler Pk.; Douglas. April (3), May (4), June (5), July (13), August (7), and September (3).

FLOWER RECORDS: *Aster*, Canada thistle, *Chilopsis*, *Cirsium* (purple thistle), *Helenium*, *Marrubium*, *Phacelia*, and *Senecio*. Other hosts listed by Mitchell (1962) include: *Argemone*, *Asclepias*, *Blephilia*, *Campanula*, *Centaurea*, *Cleome*, *Coreopsis*, *Dianthera*, *Echinacea* (= *Brauneria*), *Geranium*, *Gutierrezia*, *Hedonia*, *Helianthus*, *Lactuca*, *Medicago*, *Monarda*, *Oenothera*, *Opuntia*, *Parthenium*, *Pentstemon*, *Rosa*, *Rudbeckia*, *Scrophularia*, *Silphium*, *Verbena*, *Verbesina*, and *Veronia*.

NESTING RECORD: Cutting flower petals of hollyhock. BIOLOGY: Rau (1934) and Stevens (1949).

Megachile (Megachile) relativa Cresson

Mitchell (1962) lists the distribution as "Mackenzie to Newfoundland, south to California, Illinois, Tennessee and Georgia"; Arizona (15): northcentral, north-eastern, and southeastern mountains.

COCONINO: San Francisco Mts., at base of Humphrey's Peak 9500', Flagstaff, Oak Creek Cn. APACHE: White Mts. COCHISE: Chiricahua Mts. June (6), July (3), and August (6).

FLOWER RECORDS: *Amorpha*, *Houstonia*, *Iris*, *Mertensia*, *Phacelia*, and *Senecio*. In addition, Mitchell (1962) lists: *Aster*, *Baptisia*, *Brassica*, *Chrysanthemum*, *Epilobium*, *Geranium*, *Melilotus*, *Physalis*, *Ranunculus*, *Rhodora*, *Rosa*, *Rubus*, *Rudbeckia*, *Solidago*, *Trifolium*, and *Zizia*. BIOLOGY: Medler and Koerber (1958).

Subgenus *Eutricharaea* Thomson

Megachile (Eutricharaea) concinna Smith

Mitchell (1952) reported that "although *concinna* was described from the West Indies, it belongs to an Old World group and probably was introduced from Africa during the early part of the nineteenth century. It appeared in the United States after World War II, and is now distributed from Florida and

Alabama to Pennsylvania and Ohio in the East, and established as far west as California"; Arizona (57): southwestern, central, and southcentral.

YUMA: Martinez Lake, Yuma, Roll. MARICOPA: Glendale, Sunnyslope, Mesa, Chandler, Gilbert, 6 mi. E. Mesa, Laveen. PINAL: Eloy. PIMA: Marana, Tucson. SANTA CRUZ: Patagonia. COCHISE: Bowie. April (6), May (9), June (11), July (8), August (11), September (6), October (5), and November (1).

FLOWER RECORDS: *Acacia*, *Aster*, *Baccharis*, *Heliotropium*, *Lepidium*, *Lippia*, *Lotus*, *Medicago*, *Prosopis*, *Senecio*, *Tamarix*, bushy *Vernonia*, berseem clover, citrus flowers, and sweet potato. Mitchell (1962) gives the additional records of *Asclepias*, *Bidens*, *Melilotus*, and *Polygonum*. NESTING MATERIALS: *Bougainvillea*, *Medicago*, and periwinkle. BIOLOGY: Butler and Wargo (1963).

It may be of historical interest to note that the first collection record of this species in Arizona was made by the author on July 19, 1953 on alfalfa at Tucson. Five collections were made in 1954 and nine in 1955.

Subgenus *Delomegachile* Viereck

Megachile (*Delomegachile*) *frigida frigida* Smith (= *monardarum* Cockrell)

Known from Alaska to Newfoundland, south to Pennsylvania, Michigan, Nebraska, and in the mountains to New Mexico, central California, and Arizona (31): northcentral, eastern, and at high elevations in southeastern.

COCONINO: San Francisco Mts., 8 mi. N. Flagstaff, 6 mi. W. Flagstaff, Flagstaff, Oak Creek Cn., Sedona. APACHE: McNary, White Mts., GRAHAM: Pinalaño Mts.: 8000', 8500', Treasure Pk. 8900', Hospital Flat 9000'. COCHISE: Chiricahua Mts. May (2), June (14), July (4), August (6), and September (3).

FLOWER RECORDS: *Iris*, *Marrubium*, *Medicago*, *Pentstemon*, *Phacelia*, *Polemonium*, and *Robinia*. Mitchell (1962) adds: *Apocynum*, *Astragalus*, *Campanula*, *Epilobium*, *Malvastrum*, *Melilotus*, *Monarda*, *Rosa*, *Trifolium*, *Verbena*, and *Vicia*. NESTING RECORD: In decaying poplar (Krombein 1958). BIOLOGY: Hobbs (1957; Hobbs et al. 1961), Pengelly (1958), and Stephen (1955 and 1956).

Megachile (*Delomegachile*) *gemula* Cresson

Distributed from Mackenzie to Nova Scotia, south to Georgia, California and Arizona (1): southeastern. PIMA: Sta. Catalina Mts. FLOWER RECORDS: Mitchell (1962) lists 19 genera.

Megachile (*Delomegachile*) *gemula cressonii* Dalla Torre

Known from Washington, Nevada and Arizona (1): southeastern. PIMA: Sta. Catalina Mts. June (1). The males of *gemula cressonii* cannot be separated from those of *gemula*.

Megachile (*Delomegachile*) *melanophaea melanophaea* Smith

Distributed from Mackenzie to Newfoundland, south to Pennsylvania, Colorado, California, and Arizona (19): eastern and southeastern at high elevations. COCONINO: Oak Creek Cn. APACHE: 5 mi. S. McNary, Greer, 5 mi. W. Alpine, White Mts. GRAHAM: Pinalaño Mts.: Hospital Flat, Treasure Pk. COCHISE: Chiricahua Mts.: 8000', "Mts.". PIMA: Sta. Catalina Mts.: mile 22, 23, 24, 26, 9150', Bear Wallow, "Mts.". June (12), July (4), and August (1).

FLOWER RECORDS: *Nolina*, *Robinia*, and *Sisymbrium*. Mitchell (1962) lists: *Agastache*, *Apocynum*, *Astragalus*, *Azalea*, *Campanula*, *Cypripedium*, *Epilobium*, *Helianthus*, *Medicago*, *Phacelia*, *Psoralea*, *Ranunculus*, *Raphanus*, *Rhodora*, *Rosa*, *Rubus*, *Rudbeckia*, *Symphoricarpos*, *Taraxacum*, and *Vicia*. BIOLOGY: Pengelly (1958). PARASITE: Stevens (1949) reported rearing a specimen of *Coelioxys rufitarsis* Smith.

Megachile (Delomegachile) melanophaea robweri Cockerell (= *robweri* Cockerell)

Known from Colorado, Utah, and Arizona (18): northcentral, eastern, and southeastern at high elevations. COCONINO: San Francisco Mts., Oak Creek Cn. APACHE: 5 mi. S. McNary, White Mts. GRAHAM: Pinalaño Mts.: Treasure Pk. 8900', Hospital Flat, 9000', Soldier Cr. 9400'. COCHISE: Chiricahua Mts. PIMA: Sta. Catalina Mts.: Hk. Hy. mi. 22, 23, 24, 25, 26, 27. May (2), June (10), July (2), and August (3).

FLOWER RECORDS: *Cirsium*, *Erysimum*, *Lupinus*, *Nolina*, *Robinia*, *Sisymbrium*, and *Trifolium*. NESTING MATERIAL: *Symphoricarpos* leaves.

Subgenus *Phaenosarus* Mitchell

Megachile (Phaenosarus) augustini Cockerell (= *subfortis* Mitchell)

Known from Colorado, New Mexico, Utah, and Arizona (33): Eastern, central, southcentral and southeastern valleys and mountains. APACHE: 32 mi. and 15 mi. W. Springerville. NAVAJO: Joseph City. COCONINO: Sedona, Oak Creek Cn. YAVAPAI: Kirkland Jn., 9.2 mi. W. and 3 mi. W. Prescott, Prescott. GILA: Payson. MARICOPA: Phoenix. PIMA: Sta. Catalina Mts.: Sabino Cn.; Sta. Rita Mts.: Bog Spr.; Baboquivari Mts.: Schaeffer Cn. and above. SANTA CRUZ: Atascosa Mts. COCHISE: Skeleton Cn. 6 mi. S. E. Apache; Huachuca Mts.: Hicksville, Palmerlee, 4 mi. E. Montezuma Pass; Chiricahua Mts.: S. W. Res. Sta., 2.5 mi. N. E. Portal, 5 mi. W. Portal, Cave Cr., 4500-6000', 7000-8000'; Douglas. GRAHAM: Pinalaño Mts.: 5000-6000', 7500'. August (16), September (15), and October (2).

FLOWER RECORDS: *Baileya*, *Helianthus*, *Heterotheca*, *Verbesina*, *Viguiera*, and *Zexmenia*.

Subgenus *Derotropis* Mitchell

Megachile (Derotropis) xerophila Cockerell

Known from the deserts of southern California and Arizona (8): southwest and southcentral. YUMA: Dateland, 10 mi. E. Aztec. MARICOPA: Sentinel, W. Theba. PIMA: Tucson. SANTA CRUZ: 6 mi. N. Patagonia. March (1), April (5), and May (1). FLOWER RECORDS: *Baileya* and *Geraea*. Mitchell (1936a) lists *Chaenactis* and *Helianthus*.

Megachile (Derotropis) yumensis Mitchell

Known only from Arizona (1): central. MARICOPA: Wickenburg. April.

Subgenus *Xeromegachile* Mitchell

Megachile (Xeromegachile) bobartii Mitchell

Known from California, Mexico, and Arizona (12): central and southcentral. GILA: Gila R. nr. Christmas. PIMA: Tucson; Tucson, Campbell Ave. Ext.; Sta. Catalina Mts.: Sabino Cn., 6000'. April (5), and May (7). FLOWER RECORDS: *Cercidium* and *Prosopis*.

Megachile (Xeromegachile) casadae Cockerell

Known from South Dakota, Nebraska, Oklahoma, Texas, Wyoming, Colorado, New Mexico, Utah, and Arizona (6): central and eastern. YAVAPAI: 4 mi. S. Jerome. COCONINO: Oak Creek Cn. NAVAJO: Carrizo. GRAHAM: Pinalaño Mts.: Marijilda Cn. PINAL: Oracle. April (2), May (2), June (1), and July (1).

FLOWER RECORDS: *Opuntia*; Mitchell (1936b) lists *Helianthus* and *Populus*.

Megachile (Xeromegachile) fucata Mitchell

Known from Colorado, New Mexico, Utah, California deserts, and Arizona (3): southwestern and southcentral. YUMA: Wellton. PIMA: 44 mi. W. Sells, Tucson. April (2). Mitchell (1936b) lists *Larrea*.

Megachile (Xeromegachile) bistrata Mitchell

Known from Arizona (7): central, southcentral, and southeastern valleys. PINAL: 32 mi. E. Gila Bend. PIMA: Tucson; Sta. Catalina Mts.: Sabino Cn., Hk. Hy. mi. 0, "Mts.". COCHISE: 24-25 mi. E. Douglas. March (1), April (5), May (1). FLOWER RECORDS: *Baileya*, *Cercidium*, *Larrea*, and *Prosopis*.

Megachile (Xeromegachile) instita Mitchell

Known from New Mexico and Arizona (5): central and southcentral. PINAL: Ray. PIMA: Tucson; Sta. Catalina Mts.: Upper Sabino Cn.; Sta. Rita Mts.: Madera Cn. April (2), May (3). FLOWER RECORDS: *Acacia*, *Cercidium*, *Cirsium*, and *Prosopis*.

Megachile (Xeromegachile) inyoensis Mitchell

Known from California and Arizona (2): southcentral. PIMA: Tucson Campbell Ave. Ext.; Sta. Catalina Mts.: Sabino Cn. May (2). FLOWER RECORDS: *Encelia*.

Megachile (Xeromegachile) legalis Cresson (♀ = *couleena* Mitchell)

Known from Washington, Oregon, Colorado, Nevada, eastern California, and Arizona (1): northcentral. COCONINO: Flagstaff. June. FLOWER RECORD: *Senecio*. Mitchell (1944) lists *Cirsium* and *Iris*.

Megachile (Xeromegachile) manifesta Cresson

Known from Alberta, Montana, North Dakota to New Mexico, southern California, and Arizona (18): Northcentral, eastern, southcentral, and southeastern lowlands.

COCONINO: 4 mi. N. Flagstaff, 7 mi. S. Flagstaff, 15 mi. and 10 mi. N. Sedona, Oak Creek Cn., Sedona. GILA: E. Verde R. 4500'. APACHE: Springerville. PIMA: Sta. Rita Mts. SANTA CRUZ: W. slope Patagonia Mts. COCHISE: Huachuca Mts.: Ramsey Cn.; Chiricahua Mts.: S. W. Res. Sta., 1 mi. S. W. Portal, "Mts."; Douglas; Skeleton Cn. 6 mi. S. E. Apache. June (1), July (0), August (4), September (13).

FLOWER RECORDS: *Aster*, *Grindelia*, *Haplopappus*, *Helianthus*, *Viguiera*, and yellow composite. Mitchell (1936b) lists *Cleome* and *Gutierrezia*.

Megachile (Xeromegachile) maurata Mitchell (probably ♂ of *M. (Derotropis) subanograe* Mitchell)

Known from Wyoming, eastern California, and Arizona (1): southwestern. PIMA: Organ Pipe Cactus Nat. Mon. April. Mitchell (1944) lists *Sphaeralcea*.

Megachile (Xeromegachile) mojavensis Mitchell

Known from southern and eastern California deserts and Arizona (9): central, eastern, southcentral, and southeastern at the lower elevations. PINAL: Superior. PIMA: 10 mi. N. Tucson; Tucson, Campbell Ave. Ext.; Tucson, Pima Cn.; Sta. Catalina Mts.: Sabino Cn., Hk. Hy. mi. 2; Quinlan Mts.: entr. to Kitt Pk. COCHISE: 25 mi. N. E. Douglas. APACHE: 11 mi. E. McNary. April (4), May (4), June (1). FLOWER RECORDS: *Aster*, *Chaenactis*, *Encelia*, and *Phacelia*.

Megachile (Xeromegachile) mucrota Cockerell (♀ = *nebraskana* Mitchell)

Known from Nebraska, Kansas, Colorado, Texas, and Arizona (1): southeastern. COCHISE: Pearce. July. FLOWER RECORDS: *Helianthus*. Mitchell (1936b) lists *Eustoma* and bluebell.

Megachile (Xeromegachile) palmensis Mitchell

Known from southern California and Arizona (4): southern part of central. PINAL: N. W. Stanfield, Superior, Oracle. March (1), April (2), May (1). FLOWER RECORDS: *Encelia* and *Cirsium*. Mitchell (1944) lists *Sphaeralcea*.

Megachile (Xeromegachile) parallela reta Mitchell

Known only from Arizona (1): southcentral. PIMA: Tucson. May. FLOWER RECORDS: *Helianthus*; Mitchell (1937a) lists *Ericameria*.

Megachile (Xeromegachile) pseudonigra Mitchell

Known from Oregon, California, and Arizona (1): southeastern. PIMA: Sta. Catalina Mts. June.

Megachile (Xeromegachile) redlandica Mitchell

Known only from Arizona (2): southcentral. PIMA: Tucson. April (1), May (1). FLOWER RECORDS: *Eschscholtzia* and *Prosopis*. Mitchell (1936b) lists *Encelia*.

Megachile (Xeromegachile) soledadensis Cockerell

Known from Texas, New Mexico, southern California and Arizona (21): southwestern, central, southcentral, and southeastern valleys. YUMA: 30 mi. N. Yuma. MARICOPA: 6 mi. W. Wickenburg. GILA: Payson PINAL: Picacho Pass. PIMA: Pepper Sauce Cn.; Tucson, Campbell Ave. Ext. SANTA CRUZ: Sonoita, 25 mi. E. and 19 mi. E. Sonoita. COCHISE: Dos Cabezas, Cochise, Chiricahua Mts., S. W. Res. Sta., Portal, 1 mi. S. W. Portal, Skeleton Cn., Douglas, 6 mi. E. Douglas. May (1), August (11), September (9).

FLOWER RECORDS: *Baccharis*, *Baileya*, *Bebbia*, *Chrysothamnus*, *Encelia*, *Haplopappus*, *Heterotheca*, *Hymenobrix*, and *Viguiera*. Mitchell (1944) lists *Verbesina*.

Megachile (Xeromegachile) stoddardensis Mitchell

Known from Arizona (1): southeastern. COCHISE: nr. Paradise. April.

Megachile (Xeromegachile) subnigra angelica Mitchell

Known from Oregon, western portions of California, and Arizona (14): eastern, southeastern at lower elevations, southcentral, central, and southwestern. APACHE: Alpine, 11 mi. E. McNary. NAVAJO: Forestdale. GRAHAM: Pinalaño Mts.: Marijilda Cn. PINAL: Superior, 5 mi. S. Ray. PIMA: Sta. Catalina Mts.: Sabino Cn., Hk. Hy. mi. 2, Molino Basin; 10 mi. and 24 mi. N. Tucson; Tucson; Quinlan Mts.: Kitt Peak. YUMA: Wellton. April (8), May (2), June (3).

FLOWER RECORDS: *Aster*, *Encelia*, *Haplopappus*, and yellow composite. Mitchell (1936b) records *Bebbia*.

Megachile (Xeromegachile) subparallela Mitchell

Known only from Arizona (9): southcentral and southeastern in the valleys. SANTA CRUZ: 10 mi. E. Nogales, W. slope Patagonia Mts. COCHISE: 5 mi. W. Portal, S. W. Res. Sta., Skeleton Cn. 6 mi. E. Apache. August (2), September (7). FLOWER RECORDS: *Eriogonum*, *Haplopappus*, and *Heterotheca*. NESTING RECORD: Nesting in the ground under *Brayulinea densa* using whole leaves of *Desmodium* for its cells.

Megachile (Xeromegachile) wheeleri Mitchell

Known from Saskatchewan, North Dakota, Colorado to British Columbia, and the mountains of California; Arizona (1). COCHISE: Skeleton Cn. 6 mi. S. E. Apache. September.

Subgenus *Argyropile* Mitchell

Megachile (Argyropile) nebraskana Mitchell

Known from Nebraska, Kansas, Texas, Wyoming, Colorado, New Mexico, Utah, and Arizona (1): southeastern valley. COCHISE: San Simon. July. FLOWER RECORDS: Mitchell (1937a) lists *Helianthus*, *Monarda* and *Ratibida*.

Megachile (Argyropile) parallela parallela Smith (= *parallela facunda* Cresson)

Known from North Dakota, Indiana, North Carolina, Florida, and British Columbia to Mexico; Arizona (98): southwestern, central, southcentral and southeastern at the lower elevations. YUMA: Yuma, Gila Val., Roll. MARICOPA: Marinette, Glendale, W. Phoenix, 6 mi. N. and 12 mi. N. Phoenix, Phoenix, Tempe, Chandler. YAVAPAI: Prescott. PINAL: Casa Grande, Eloy, Picacho, 5 mi. S. Ray. PIMA: Tucson; Sta. Catalina Mts.: Pepper Sauce Cn., Hk. Hy. mi. 5.5, "Mts."; 12 mi. S. Tucson; Sta. Rita Rng. Res.; Sta. Rita Mts.: mi. 0-2 Mt. Wrightson Trail, Bogs Springs, Madera Cn.; Baboquivari Mts. SANTA CRUZ: Ruby, 2 mi. N. Sonoita, Sonoita, 10 mi. E. Sonoita, Canelo, 4 mi. E. and 9 mi. E. Lochiel. COCHISE: 7 mi. W. Benson; Huachuca Mts.: 4 mi. E. Montezuma Pass, "S. E.", mouth of Carr Cn., Hicksville, Ramsey Cn.; 7 mi. E. Tombstone; Pearce; Elfrida; 12 mi. and 10 mi. W. Bisbee; 10 mi. W. Douglas; Douglas; 6 mi. E. Douglas; 8 mi. N.E. Douglas; 2 mi. S. Chiricahua; Skeleton Cn. 6 mi. S. E. Apache; 5 mi. S. Apache; Apache; 5 mi. W. Portal; 1 mi. S. W. Portal; Portal; 6 mi. S. E. San Simon; San Simon. GRAHAM: Pinalaño Mts.: 3500-4500', 5000', "Mts.". YAVAPAI: 15 mi. S. Sedona. COCONINO: Oak Creek Cn. April (3), May (8), June (9), July (14), August (27), September (24), October (12), and November (1).

FLOWER RECORDS: *Aster*, *Baccharis*, *Encelia*, *Haplopappus*, *Helianthus*, *Heterotheca*, *Senecio*, *Verbesina*, *Viguiera*, *Xanthocephalum*, and *Zexmenia*. Additional records from Mitchell (1962) include: *Boltonia*, *Ceanothus*, *Cephalanthus*, *Cirsium*, *Coreopsis*, *Gaillardia*, *Gilia*, *Helianthus*, *Heliopsis*, *Hypericum*, *Medicago*, *Melilotus*, *Petalostemum*, *Phaseolus*, *Ratibida* (= *Lepachys*), *Rudbeckia*, *Silphium*, and *Verbena*. Kearney (1923) observed the bees on *Gossypium* (cotton). NESTING MATERIAL: Fischer (1951) reported these bees using leafcuttings of *Trifolium* and *Spiraea*; nesting in the ground.

BIOLOGY: Fischer (1951).

Megachile (Argyropile) rossi Mitchell

Known only from Arizona (16): central, southcentral, and southeastern valleys and mountains. COCONINO: 10 mi. N. Sedona, Sedona. PINAL: Superior. PIMA: Tucson; Tucson, Cambell Ave. Ext.; Tucson, Pima Cn.; Sta. Catalina Mts.: Sabino Cn., Hk. Hy. mi. 5, "Mts."; Sta. Rita Mts. SANTA CRUZ: Canelo. COCHISE: Chiricahua Mts.: S. W. Res. Sta., 5000'; 6 mi. E. Douglas. May (2), June (1), July (0), August (2), September (6), October (4), and November (1).

FLOWER RECORDS: *Aster*, *Bidens*, *Cercidium*, *Encelia*, *Verbesina*, *Viguiera*, and yellow composite.

Megachile (Argyropile) sabinensis Mitchell (= *pararubi* Mitchell)

Known from Texas and Arizona (22): southwestern, central, eastern, southcentral, and the southeastern valleys. YUMA: 30 mi. W. Yuma. PINAL: Superior. PIMA: Sta. Catalina Mts.: Sabino Cn. COCHISE: 4 mi. N and 12 mi. N. Ft. Huachuca; Turner; 10 mi. W. Bisbee, 18 mi. E., 10 mi. E., 6 mi. E. Douglas; 6 mi. S. E. Apache, Skeleton Cn.; Chiricahua Mts.: Texas Cn. 5000-6000', 1 mi. S. W. Portal, 1 mi. N. E. and 14 mi. N. E. Portal. GILA: E. end Roosevelt L. NAVAJO: Shumway. May (1), June (1), July (1), August (10), and September (9).

FLOWER RECORDS: *Aster*, *Baileya*, *Eriogonum*, *Haplopappus*, and *Helianthus*.

Megachile (Argyropile) townsendiana Cockerell

Known from North Carolina, Georgia, and Florida, westward to Texas, Colorado, and Lower California; Arizona (24): southwestern, central, southcentral, and southeastern at the lower elevations. YUMA: Roll, Dateland. MARI-

COPA: Sentinel, Phoenix. PINAL: Eloy, 10 mi. S. Eloy, 10 mi. W. Eloy, Superior. GILA: Mogollon Rim 6500'. PIMA: 19 mi. S. Tucson, Continental. COCHISE: Tombstone, Elfrida, Willcox, San Simon, 5 mi. W. Portal, 2.5 mi. N. E. Portal, Portal, 6 mi. E. Douglas. GREENLEE: Duncan. June (2), July (7), August (10), September (3), October (1), and November (1).

FLOWER RECORDS: *Baileya*, *Hoffmanseggia*, *Medicago*, *Prosopis*, and *Verbesina*. Mitchell (1962) lists *Actinella*, *Chrysopsis*, *Helianthus*, *Melanthera*. NESTING RECORD: A bee was observed nesting in sandy ground.

Subgenus *Xanthosarus* Robertson

Megachile (*Xanthosarus*) *armata* Smith (incl. *comata* Cresson)

Known from Arizona (21): mainly northcentral but also eastern and southeastern mountains. COCONINO: Grand Canyon, San Francisco Mts., Flagstaff, 6 mi. W. Flagstaff, Ft. Valley Expt. For., Mormon Lake 7000', Oak Creek Cn. YAVAPAI: Prescott. GILA: Mogollon Rim 6500'. APACHE: White Mts. Diamond Ranch. PIMA: Sta. Catalina Mts.: Mud Spr., Mt. Lemmon 9150'. June (4), July (5), August (9), September (1).

FLOWER RECORDS: *Asclepias*, black-eyed susan, *Lotus*, *Marrubium*, *Phacelia*, and *Senecio*. Mitchell (1936a) lists *Gilia*.

Megachile (*Xanthosarus*) *cochisiana* Mitchell (incl. *pallidiana* Mitchell)

Known from New Mexico, Nevada, southern and eastern California, and Arizona (6): extreme southwestern and extreme southeastern. YUMA: Yuma. COCHISE: Douglas, Hereford. May (1), June (4), and August (1).

FLOWER RECORDS: *Cercidium* and *Medicago*. NESTING MATERIAL: Grape leaves.

Megachile (*Xanthosarus*) *dentitarsus* Sladen

Known from Washington, Montana, North Dakota, South Dakota, Wyoming, Nebraska, Colorado, Utah, New Mexico, and Arizona (4): southwest and central. YUMA: Yuma. COCONINO: Granite Dells. June (3), and August (1).

FLOWER RECORDS: *Medicago*. Mitchell (1936a) lists: *Aster*, *Cleome*, *Grindelia*, *Gutierrezia*, *Helianthus*, *Melilotus*, *Solidago*, *Trifolium*, and *Verbena*. NESTING RECORDS: Cutting grape leaves and flying around chinaberry tree.

Megachile (*Xanthosarus*) *peribirta* Cockerell

Ranges from British Columbia to Mexico, east to Nebraska and Texas, according to Mitchell (1962): Arizona (4): northcentral and eastern. COCONINO: Navajo Mt. 6500', San Francisco Mts. NAVAJO: Whiteriver. APACHE: White Mts. June (3) and July (1).

FLOWER RECORDS: *Phacelia* and *Robinia*. Mitchell (1962) gives: *Aster*, *Cirsium*, *Cleome*, *Epilobium*, *Eriogonum*, *Helianthus*, *Melilotus*, and *Trifolium*. BIOLOGY: Linsley (1946).

Subgenus *Pseudocentron* Mitchell

Megachile (*Pseudocentron*) *sidalceae* Mitchell

Known from Texas, New Mexico, southern California, Mexico and Arizona (268); the most abundant Arizona species: northwest, southwest, central, south-central, and southeast in the valleys. MOHAVE: 23 mi. E. Kingman, Red Lake. YUMA: Yuma, Wellton, Roll, Tacna, Mohawk, Bill Williams Fork. MARICOPA: 10 mi. E. Sentinel, Theba, 17 mi. W. Gila Bend, Phoenix, Tempe, 20 mi. E. Mesa, Chandler. GILA: Salt River Cn. Bridge, E. end Roosevelt L., San Carlos, Winkelman, Globe, PINAL: 10 mi. W. Stanfield, Superstition Mts., 4 mi. E. Florence Jn., Superior, Florence, 20 mi. N. Oracle Jn., 3 mi. W. Oracle, 2 mi. E. Oracle, mth. Aravaipa Cn. nr. Mammoth, 10 mi. S. Toltec, 11 mi. E. and 10 mi. S. Eloy, 11

mi. S. W. and 8 mi. S. W. Eloy, Picacho Peak, Picacho, Red Rock. PIMA: 3 mi. W. Marana; Marana; Cortaro; Avra Valley; Tucson; 10 mi. E. Tucson, 10 mi. N. Tucson, 20 mi. W. Tucson, 8 mi. S., 10 mi. S., 13 mi. S., and 18 mi. S. Tucson; Sta. Catalina Mts.: Sabino Cn., Pepper Sauce Cn., Hk. Hy. mi. 0; Redington; Tanque Verde; Saguaro Nat. Mon.; Sahuarita; Continental; Sta. Rita Rng. Res.; Sta. Rita Mts.: Madera Cn.; Tucson Mts.; Robles Jn. (3-Points); Quinlan Mts.: Kitt Peak; Arivaca; 7.5 mi. W. Arivaca; Organ Pipe Cactus Nat. Mon. SANTA CRUZ: Amado, Sycamore Cn. nr. Ruby, Nogales, 10 mi. S. W. Patagonia, 6 mi. S. E. Patagonia, 5 mi. W. Patagonia, Patagonia, Gardner Cn., Sonoita, 25 mi. E. Sonoita, Canelo. COCHISE: Dry Cn.; S. E. Whetstone Mts.; 5 mi. W. Benson; Benson; 11 mi. E. and 20 mi. E. Benson; St. David; Tombstone; Texas Cn.; Dragoon; W. side Willcox Playa; Huachuca Mts.: "N. E. end", Ramsey Cn., Palmerlee, Petersen's Ranch, "S. E. end"; Kansas Settlement; Bonita; Willcox; Pearce; Elfrida; 6 mi. E. Douglas; Douglas; 5 mi. S. E. Apache; S. W. Res. Sta.; Bowie; San Simon. GRAHAM: Safford, 15 mi. S. Safford, Indian Hot Springs, Thatcher. GREENLEE: Duncan. YAVAPAI: 8 mi. N. E. Cottonwood, S. W. Mingus Mt., 3 mi. W. Sta. Maria R., Sta. Maria R., Congress. APACHE: White Mts. COCONINO: San Francisco Mts. March (1), April (10), May (33), June (71), July (89), August (49), September (13), and October (2).

FLOWER RECORDS: *Acacia*, *Aloysia*, *Asclepias*, *Baccharis*, *Cephalanthus*, *Cercidium*, *Cleome*, *Condalia*, *Croton*, *Encelia*, *Eriogonum*, *Ferocactus* (barrel cactus), *Franseria*, *Funastrum*, *Gutierrezia*, *Haplopappus*, *Helianthus*, *Hoffmannseggia*, *Hymenothrix*, *Kallstroemia*, *Larrea*, *Lepidium*, *Lotus* (birdsfoot trefoil), *Medicago*, *Melilotus*, *Mimosa*, *Mortonia*, *Olneya*, *Opuntia* (cholla), *Pectis*, *Prosopis*, *Psilostrophe*, *Salix*, *Salsola*, *Sapindus*, *Senecio*, *Tamarix*, *Verbesina*, and *Wislizenia*. Mitchell (1937a) lists *Isocoma* (= *Haplopappus*).

NESTING MATERIALS: *Amaranthus*, *Boerhaavia*, *Fraxinus*, alfalfa, china-berry, cotton, cottonwood, rose, and umbrella tree.

Subgenus *Acentron* Mitchell

Megachile (*Acentron*) *albitarsis* Cresson

"Michigan and Indiana to North Carolina and Florida, west through Texas to Mexico", according to Mitchell (1962); Arizona (1): central. PINAL: Florence. July (1). FLOWER RECORDS: Mitchell (1962) lists 25 plant genera.

Subgenus *Sayapis* Titus

Megachile (*Sayapis*) *fidelis* Cresson

Known from South Dakota, Montana, Idaho, Oregon, California, and Arizona (37): northcentral and the southeastern mountains. COCONINO: San Francisco Mts., Humphrey's Peak at base 9500', Schultes Pass 8000' 10 mi. N. Flagstaff, 4 mi. N. Flagstaff, Flagstaff, 7 mi. S. Flagstaff, 15 mi. N. Sedona, Oak Creek Cn. 6000', Sedona. PIMA: Sta. Catalina Mts.: Mt. Lemmon, "Mts." COCHISE: Chiricahua Mts.: S. W. Res. Sta., 5 mi. W. Portal, 7600', Onion Saddle, 8500', Rustlers Pk. GRAHAM: Pinaleno Mts. 9000'. June (1), July (10), August (19), September (7).

FLOWER RECORDS: *Aster*, *Chrysopsis*, *Cirsium*, *Grindelia*, *Helenium*, *Helianthus*, *Heliopsis*, *Heterotheca*, *Monarda*, *Phacelia*, *Senecio*, and *Viguiera*. Mitchell (1937b) lists: *Cleome*, *Cosmos*, *Daucus*, *Erigeron*, *Eriogonum*, *Gutierrezia*, *Helenium*, *Rudbeckia*, *Solidago*, and *Verbena*. NESTING SITE: Mitchell (1937b) reported this species nesting in a hole in a small log.

Megachile (*Sayapis*) *frugalis frugalis* Cresson

"Pennsylvania and New Jersey to Florida, west to California and Mexico", according to Mitchell (1962); Arizona (8): central, southcentral, and south-western. YUMA: Bill Williams Fork. GILA: 5 mi. N. Seneca (Salt River Cn.),

Globe. PINAL: Superior. PIMA: Tucson, Sta. Catalina Mts., Sta. Rita Mts. YUMA: Yuma, Bill Williams Fork. May (2), June (3), October (1).

FLOWER RECORDS: *Helianthus*. Mitchell (1937b) lists *Eriogonum*, *Marrubium*, *Opuntia* and *Tepbrosia*.

Megachile (Sayapis) frugalis pseudofrugalis Mitchell

Known from California and Arizona (91): southwest, southcentral, central, and northcentral. YUMA: Yuma, Yuma Test Center, Palm Cn. MARICOPA: Phoenix, Bartlett Dam. COCONINO: Grand Canyon mile 72 (Unkar Rapids) and 87.6 (Bright Angel Cr.), Sedona. YAVAPAI: Granite Dells. GILA: 10 mi. S. Payson, Salt River Cn., Gila R. 3 mi. S. W. Christmas. PINAL: 4 mi. E. Florence Jn., Florence Jn., Superior. PIMA: Sta. Catalina Mts.: Sabino Cn., Hk. Hy. mi. 0, 5, and 6, "Mts."; Tucson; San Xavier Mission; Baboquivari Mts.: Brown Cn. SANTA CRUZ: Sycamore Cn. nr. Ruby, Nogales. COCHISE: Benson, Chiricahua Mts. April (4), May (37), June (22), July (16), August (10), and September (2).

FLOWER RECORDS: *Aster*, *Bebbia*, *Cercidium*, *Chilopsis*, *Cissus*, *Cleome*, *Hyptis*, *Prosopis*, *Sapindus*, and *Verbesina*. Mitchell (1937b) gives additional records of *Croton*, *Eriogonum*, and *Lotus*.

Megachile (Sayapis) inimica inimica Cresson

Distributed from Florida to Texas; Arizona (10): central and southcentral mountains. COCONINO: Oak Creek Cn. 6000'. YAVAPAI: nr. Jerome 5400'. PIMA: Sta. Catalina Mts.: Pepper Sauce Cn. COCHISE: Chiricahua Mts.; 5 mi. W. Portal, S. W. Res. Sta., 6500', Rustler Pk.; Huachuca Mts.: Carr Cn. July (2), August (5), and September (3).

FLOWER RECORDS: *Helenium*, *Heliopsis*, *Heterotheca*, *Melilotus*, and *Sphaeralcea*. Additional records given by Mitchell (1962) include: *Achyranthes*, *Avicennia*, *Bidens*, *Borrchia*, *Coccoloba*, *Crotalaria*, *Laciniaria*, *Ocimum*, *Salva*, *Vitex*, and *Ximensia*. NESTING RECORD: Mitchell (1937b) reported this species nesting in "worm holes" in mesquite fence posts and trees with leaf-cutting from *Monisia*.

Megachile (Sayapis) inimica sayi Cresson

Distributed from "Pennsylvania to Florida, west to California and Mexico", according to Mitchell (1962); Arizona (64): mainly southcentral and the southeastern mountains. COCONINO: Oak Creek Cn. 6000'. GILA: Payson, Sierra Ancha Expt. Sta. GRAHAM: Pinalaño Mts.' 3500-4500', 5000', 7000', 7300', Wet Cn., "Mts." COCHISE: 5 mi. W. and 7 mi. W. Benson; Chiricahua Mts.: Portal, 5 mi. W. Portal, 5 mi. N. W. of S. W. Res. Sta., 7000-8000', 4 mi. W. and 9.3 mi. W. Onion Saddle, Rustler Pk., Cave Creek; Huachuca Mts.: Ramsey Cn., Palmerlee, Carr Cn., Montezuma Pass, 4 mi. E. Montezuma Pass; Douglas. SANTA CRUZ: W. slope Patagonia Mts., 10 mi. S. W. Patagonia, 9 mi. E. Lochiel, Canelo, 2.5 mi. W. Peña Blanca, 5 mi. W. Peña Blanca, Sycamore Cn. nr. Ruby. PIMA: Sta. Catalina Mts.; Sta. Rita Mts.: Madera Cn., Bog Spr., Florida Cn., "Mts." PINAL: Sacaton. July (8), August (36), and September (20).

FLOWER RECORDS: *Aster*, *Haplopappus*, *Helenium*, *Helianthus*, *Heterotheca*, *Kallstroemia*, *Marrubium*, *Lotus*, *Melilotus*, *Pentstemon*, *Senecio*, *Solidago*, *Verbesina*, *Vicia*, *Viguiera*, and *Zexmenia*. Mitchell (1962) includes: *Arctium*, *Bidens*, *Blephilia*, *Brauneria*, *Cephalanthus*, *Chrysopsis*, *Cleome*, *Coreopsis*, *Gilia*, *Heliopsis*, *Lepachys*, *Liatris*, *Lythrum*, *Melilotus*, *Petalostemum*, *Pycnanthemum*, *Rudbeckia*, *Silphium*, *Strophostyles*, *Teucrium*, *Verbena*, and *Vernonia*.

Megachile (Sayapis) mellitarsis Cresson

Known from Washington, Oregon, California, Nevada, Colorado, New Mexico, and Arizona (4): northcentral and central. COCONINO: Flagstaff, San Francisco Mts. PINAL: 5 mi. S. Ray. April (1) and June (3). FLOWER RECORDS:

Encelia and *Phacelia*. Mitchell (1937b) lists *Aster* and *Eriogonum*.

Megachile (*Sayapis*) *newberryae* Cockerell (incl. *howardi* Cockerell)

Known from New Mexico, California and Arizona (83): southwestern, central, southcentral, and the southeastern valleys. YUMA: McAllister Wash nr. Martinez Lake, Yuma, E. Mohawk, Palm Cn., Quartzite. MARICOPA: 7 mi. W. Gila Bend, 29 mi. S. Gila Bend, 10.6 mi. E. Gila Bend, Gillespie Dam, Phoenix, Maricopa Mts. YAVAPAI: 12 mi. S. Jerome. PINAL: Maricopa, Apache Jn., Florence, Superior, Ray, 27 mi. N. Oracle Jn., Picacho. GILA: 12 mi. S. Payson, Gila R. nr. Christmas, 5 mi. N. Seneca 4000'. PIMA: Sta. Catalina Mts.: Sabino Cn., Hk. Hy. 3000'; 10 mi. N. Tucson; Tucson; Tucson, Campbell Ave. Ext.; Tucson, Pima Cn.; Tanque Verde; Redington; Saguaro Nat. Mon.; 5 mi. W. Tucson; Tucson Mts.; Organ Pipe Cactus Nat. Mon.: Alamo Cn.; Sta. Rita Rng. Res.; Sahuarita; Continental. SANTA CRUZ: Sycamore Cn. nr. Ruby, Patagonia. COCHISE: Benson, Douglas, Bowie. April (27), May (42), June (9), July (2), and August (3).

FLOWER RECORDS: *Acacia*, *Asclepias*, *Aster*, *Cercidium*, *Encelia*, *Funastrum*, *Helenium*, *Olmeya*, *Opuntia*, *Pittosporum*, *Prosopis*, *Senecio*, and *Verbesina*. NESTING: Cutting leaves of *Celtis*; nesting in holes in *Prosopis*.

Megachile (*Sayapis*) *policaris* Say

Distributed from Georgia and Florida, west to California and Mexico; Arizona (115): northwestern, southwestern, central, eastern, southcentral, and the southeastern valleys and mountains. COCONINO: Oak Creek Cn., Sedona. YAVAPAI: Clemenceau, Chino Val. GILA: Mogollon Rim 6500', 5 mi. N. Seneca 4000', Sierra Ancha, Globe. NAVAJO: W. Whiteriver. GREENLEE: Duncan. GRAHAM: Pinaleno Mts.: Mt. Graham. COCHISE: Chiricahua Mts.: 8000', S. W. Res. Sta., 3.5 mi. S. W. Portal, 5 mi. W. Portal; E. Tombstone; Tombstone; Dragoon Mts.: Cochise Stronghold; 5 mi. W. Hereford; 8 mi. N. E. Douglas; 10 mi. E. Douglas; Douglas; Huachuca Mts.: "S. E.", 4 mi. E. Montezuma Pass, Hicksville, rd. to Petersen's Ranch, mouth Carr Cn., Ramsey Cn.; 12 mi. N. Ft. Huachuca; 5 mi. W. Benson; Benson; Dry Cn. S. E. Whetstone Mts. SANTA CRUZ: Canelo, Patagonia Mts., 6 mi. S. E. Patagonia, Patagonia, Peña Blanca, 5 mi. W. Peña Blanca, Sycamore Cn. nr. Ruby. PIMA: Palo Alto; Continental; Sta. Rita Mts.: Madera Cn.; Tucson; 10 mi. W. Tucson; 10 mi. N. Tucson; Sta. Catalina Mts.: Sabino Cn., Hk. Hy. mi. 5, Molino Basin, Pepper Sauce Cn., "Mts."; Baboquivari Mts.: Elkhorn Ranch on S. slope of N. end; 7.5 mi. W. Arivaca; Organ Pipe Cactus Nat. Mon. PINAL: Superior, Florence, Red Rock, Casa Grande, 3 mi. W. Oracle, 2 mi. E. Oracle. MARICOPA: Phoenix, Tempe. YUMA: Yuma, Roll, Bill Williams Fork. MOHAVE: 20 mi. N. E. Kingman. March (1), April (7), May (8), June (18), July (18), August (41), September (15), October (6), and November (2); the longest flight period for any of the Arizona *Megachile*.

FLOWER RECORDS: *Acacia*, *Asclepias*, *Aster*, *Baccharis*, *Baileya*, *Chrysothamnus*, *Condalia*, *Croton*, *Encelia*, *Eriogonum*, *Haplopappus*, *Helianthus*, *Larrea*, *Melilotus*, *Opuntia*, *Petalostemum*, *Salsola*, *Senecio*, *Tamarix*, *Verbesina*, and *Viguiera*. Additional records are given by Mitchell (1962) as: *Amorpha*, *Brauneria*, *Coreopsis*, *Erigeron*, *Oenothera*, *Salvia*, *Silphium*, *Verbena*, and *Verbesina*.

Megachile (*Sayapis*) *pugnata pomonae* Cockerell

Known from Nevada, California, and Arizona (1): northcentral. COCONINO: 7 mi. S. Flagstaff. September. FLOWER RECORDS: *Cirsium*; Stevens (1949) lists the following plants: *Arctium*, *Dicentra*, Jerusalem artichoke, purple cone-flower, yellow Cruciferae.

Megachile (*Sayapis*) *pugnata pugnata* Say

Distributed from Quebec and the New England States to the Pacific Coast, south to Georgia, Texas, and Arizona (9): northcentral and northeastern. COCO-

NINO: Humphrey's Peak, San Francisco Mts., Schultes Pass 10 mi. N. Flagstaff, Flagstaff, Oak Creek Cn. APACHE: White Mts. June (4), July (1), August (1), and September (1).

FLOWER RECORDS: *Marrubium* and *Phacelia*. Mitchell (1962) lists 23 additional genera.

Genus CHALICODOMA Lepeletier

Chalicodoma (*Chelostomoides*) *adelphodonta* (Cockerell) (incl. ♀ *tucsonensis* (Mitchell))

Known from Arizona (10): southcentral. PINAL: 3 mi. W. Oracle. PIMA: Continental, Sta. Rita Mts.: Florida Cn., Madera Cn. SANTA CRUZ: Ruby, Sycamore Cn. nr. Ruby, 5.5 mi. W. Peña Blanca, 7 mi. S. Duquesne. COCHISE: 2 mi. N. Cochise. June (1), August (8), and September (1).

FLOWER RECORDS: *Allionia* and *Kallstroemia*.

Chalicodoma (*Chelostomoides*) *angelarum* (Cockerell)

Known from Washington, Oregon, California, Nevada, and Arizona (5): northcentral, southeastern. COCONINO: San Francisco Mts. GRAHAM: Pinalaño Mts.: 5000-6000'. APACHE: White Mts. COCHISE: Huachuca Mts., S. W. Res. Sta. June (2), July (1), and August (2).

FLOWER RECORDS: *Franseria*, *Melilotus*, and *Phacelia*. Mitchell (1937c) lists: *Aster*, *Cordylanthus*, *Encelia*, *Eriogonum*, *Lotus*, *Lupinus*, *Penstemon*, *Rudbeckia*, *Verbena*, and *Vitex*. PARASITES: Linsley (1944) reported *Sapyga fulvicornis* Cresson (= *Sapyga angustata* Cresson).

Chalicodoma (*Chelostomoides*) *browni* (Mitchell) (incl. ♀ *felipiana* (Mitchell))

Known from southern California and Arizona (16): MOHAVE: 23 mi. E. Kingman. YUMA: Yuma, Palm Cn. MARICOPA: Gillespie Dam. PINAL: 13 mi. S. E. Oracle 4500'. GILA: 5 mi. N. Seneca 4000', Salt River Cn., 18 mi. S. E. Globe. COCONINO: Sedona, Oak Creek Cn. NAVAJO: Carrizo Cr. PINAL: 3 mi. W. Oracle. PIMA: Sta. Rita Mts. COCHISE: Hauchuca Mts.: Ramsey Cn.; Douglas. May (3), June (11), and July (2).

FLOWER RECORDS: *Asclepias*, *Canotia*, *Opuntia*, *Prosopis*, and *Sapindus*. Timberlake (1957) gives *Frankenia*.

Chalicodoma (*Chelostomoides*) *chilopsidis* (Cockerell) (incl. *longula* (Fox) and *pratti* (Cockerell))

Known from Texas, New Mexico, California, Mexico, and Arizona (125), the most abundant Arizona *Chalicodoma*: western, central, southcentral, and the southeastern valleys. YUMA: McAllister Wash nr. Martinez L., Yuma, 19 mi. E. Yuma, Wellton, Bill Williams Fork. MARICOPA: 10 mi. S. Gila Bend, 6.3 mi. E. and 10.6 mi. E. Gila Bend, Buckeye, Maricopa Mts., Glendale, Phoenix, Tempe, Chandler. GILA: Ray, mth. Aravaipa Cr. nr. Mammoth, 10 mi. S. Payson, 12 mi. S. Payson, Gila R. nr. Christmas. PINAL: Superior. Apache Jn., Florence, Coolidge, 27 mi. N. Oracle Jn., Picacho, 3 mi. W. Oracle, Oracle. PIMA: 3 mi. W. Marana: Cortaro; 10 mi. N. Tucson; Tucson, Campbell Ave. Ext.; Tucson; Tucson, "A" Mt.; Tanque Verde; Redington; Sta. Catalina Mts.: Sabino Cn., Hk. Hy. mi. 0, 2, 4, 6; Organ Pipe Nat. Mon.; Sahuarita; Continental; Sta. Rita Rng. Res.; Sta. Rita Mts.; 15 mi. S. Robles Jn. (Three Points); Papago Ind. Res. SANTA CRUZ: 19 mi. N. W. Nogales, Nogales, Patagonia. COCHISE: Kansas Settlement. GRAHAM: Safford. March (7). April (28), May (57). June (30), July (2), and August (1).

FLOWER RECORDS: *Acacia*, *Cercidium*, *Chilopsis*, *Cirsium*, *Dalea*, *Encelia*, *Helianthus*, *Heliotropium*, *Hoffmanseggia*, *Larrea*, *Marrubium*, *Medicago*, *Mimosa*,

Olneya, *Prosopis*, *Sapindus*, *Senecio*, *Vauquelinia*, and *Verbesina*. Mitchell (1956) lists *Melilotus*. NESTING: "Plugging a nail hole with a wax", "nesting in nail hole in door frame", and "flying around trunk of a dead mesquite".

Chalicodoma (*Chelostomoides*) *davisoni* (Cockerell)

Known from California and Arizona (5): central, southcentral, and southeastern. MARICOPA: 12 mi. N. Phoenix, Chandler. PIMA: Sta. Catalina Mts.: N. slope Mt. Lemmon; Sta. Rita Mts.: Lower Madera Cn. COCHISE: Portal. June (2), July (2), and August (1).

FLOWER RECORDS: *Senecio*. Mitchell (1937c) gives *Dicentra* and Krombein (1958) gives *Pentstemon*.

Chalicodoma (*Chelostomoides*) *dischorina* (Cockerell)

Known from California, Baja California, and Arizona (50): central and southcentral. YUMA: Yuma, 11 mi. E. Aztec. MARICOPA: Gila Bend, E. Gila Bend. PINAL: Superior, mth. Aravaipa Cn. nr. Mammoth, Ray, Gila R. Cn. nr. Christmas, Coolidge, Picacho, N. Oracle Jn., Oracle. PIMA: 10 mi. N. Tucson; Tucson, Campbell Ave. Ext.; Tanque Verde; Sta. Catalina Mts.: Sabino Cn., Hk. Hy. mi. 0, 4, 3000'; Sta. Rita Rng. Res.; Suhuarita; Continental; 15 mi. S. Robles Jn. (Three Points); W. Papago Ind. Res.; 13 mi. N. Ajo; Organ Pipe Cactus Nat. Mon. April (28), May (19), and June (3).

FLOWER RECORDS: *Acacia*, *Baileya*, *Cercidium*, *Courseia*, *Encelia*, *Larrea*, *Lepidium*, *Prosopis*, and *Senecio*. Krombein (1958) lists *Medicago* and *Melilotus*.

Chalicodoma (*Chelostomoides*) *exilis exilis* (Cresson)

Known from Texas, New Mexico, and Arizona (8): northcentral, southcentral, and southeastern. COCONINO: Oak Creek Cn. PIMA: Sta. Catalina Mts.: Sabino Cn. SANTA CRUZ: Nogales, Patagonia. COCHISE: Huachuca Mts.: Ramsey Cn.; Chiricahua Mts.; S. W. Res. Sta., Cave Creek, Rustler Pk. July (4), August (3), and September (1).

FLOWER RECORDS: *Dalea* and *Melilotus*. Mitchell (1937c) lists *Baptisia*, *Coreopsis*, *Lespedeza*, *Polygala*, and *Tephrosia*.

Chalicodoma (*Chelostomoides*) *exilis parexilis* (Mitchell)

Known from Maryland and Indiana to Florida, and west to Arizona (24): southcentral and the southeastern mountains. COCONINO: Sedona, Oak Creek Cn. NAVAJO: Whiteriver. GRAHAM: Pinaleño Mts.: 6000', 7000', 9000'. COCHISE: Huachuca Mts.: Ramsey Cn.; Chiricahua Mts.; S. W. Res. Sta.; 5 mi. S. Apache. SANTA CRUZ: 10 mi. S. Patagonia, 6 mi. S. E. Patagonia, Harshaw. PIMA: Sta. Rita Mts.; Sta. Catalina Mts.: Molino Basin, Hk. Hy. mi. 19. June (3), July (9), August (10), and September (2).

FLOWER RECORDS: *Baccharis*, *Ceanothus*, *Chilopsis*, *Condalia*, *Crotalaria*, *Melilotus*, *Mentha*, *Monarda*, and *Vicia*. Mitchell (1962) lists: *Asclepias*, *Baptisia*, *Erigeron*, *Hydrolea*, *Ilex*, *Oenothera*, *Phaseolus*, *Rhus*, *Tephrosia*, *Trifolium*, and *Vaccinium*.

Chalicodoma (*Chelostomoides*) *lobatifrons* (Cockerell)

Southern California, Mexico, Arizona (12): generally southcentral. PIMA: Tucson Mts.; Tucson; Tucson, Campbell Ave. Ext.; Sta. Catalina Mts.: Upper Sabino; Continental. MARICOPA: Bartlett Dam, Sentinel. MOHAVE: Grand Canyon mi. 179.2 (Lava Falls). May (7), June (1), July (3), and August (1).

FLOWER RECORDS: *Cercidium*, *Prosopis*, and *Wislizenia*. Mitchell (1937c) lists *Eriogonum* and *Olneya*.

Chalicodoma (*Chelostomoides*) *manni* (Mitchell)

Known from Arizona (1). COCHISE: Huachuca Mts.: Ramsey Cn.

Chalicodoma (Chelostomoides) occidentalis (Fox)

Known from Texas, New Mexico, California, Mexico, and Arizona (48): southwestern, central, southcentral, and the southeastern valleys. YUMA: Yuma. MARICOPA: 12 mi. N. and 6 mi. N. Phoenix, Tempe, Chandler. GILA: 10 mi. S. Payson. PINAL: Superior, Olberg. PIMA: Tucson; Sta. Catalina Mts.: Sabino Cn., Molino Basin; Continental; Sta. Rita Mts.: Madera Cn. SANTA CRUZ: Nogales, Sycamore Cn. nr. Ruby. COCHISE: Benson, Tombstone, W. Dos Cabezas. GRAHAM: Pinalaño Mts.: 5000-6000'; Stockton Pass; Safford; Solomon; 7 mi. W. Calva Jn. COCONINO: Sedona. April (3), May (13), June (14), July (12), August (6), September (3), October (2), and November (1).

FLOWER RECORDS: *Caleopsis*, *Cercidium*, *Chilopsis*, *Cleome*, *Helianthus*, *Larrea*, *Lotus* (birds-foot trefoil), *Marrubium*, *Medicago*, *Prosopis*, *Ruellia*, *Senecio*, *Verbesina*, *Vernonia*, (bushy), and pepper tree. Mitchell (1937) adds *Phacelia* and (1936) *Nolina* and *Tamarix*. NESTING SITES: "Using a hole in a brick wall", "in dead wood of a pepper tree", and in a trap nest in wood with 3/16" diameter hole. Mitchell (1956) reported a nest in an adobe wall.

Chalicodoma (Chelostomoides) odontostoma (Cockerell) (incl. *duplexa* (Mitchell))

Known from California, Mexico, and Arizona (54): mainly southwestern, central, and southcentral. YUMA: Yuma, 19 mi. S. Quartzsite, Roll, E. Mohawk, 10 mi. E. Aztec. MARICOPA: 12 mi. W. Theba, 29 Mi. E. Gila Bend, Gillespie Dam. PINAL: Superior, Florence, Coolidge, Picacho. GILA: 12 mi. S. Payson, mth. Aravaipa Cn. nr. Mammoth. PIMA: Cortaro; Tucson Mts.; N. Tucson; Tucson; Tanque Verde; Sta. Catalina Mts.: Sabino Cn., Hk. Hy. mi. 0; Sahuarita; Continental; Sta. Rita Rng. Res.; Sta. Rita Mts.; W. side Papago Res.; Organ Pipe Cactus Nat. Mon. SANTA CRUZ: 12 mi. S. Tubac, Sycamore Cn. nr. Ruby, Nogales, Patagonia. COCHISE: Tombstone, Douglas. April (25), May (19), and June (10).

FLOWER RECORDS: *Acacia*, *Asclepias*, *Baileya*, *Cercidium*, *Helianthus*, *Heliotropium*, *Lepidium*, *Medicago*, *Prosopis*, *Senecio*, and *Verbesina*. Mitchell (1956) lists *Melilotus*.

Chalicodoma (Chelostomoides) spinotulata (Mitchell)

Known from New Mexico, southern California, and Arizona (22): northcentral, eastern, and southcentral. COCONINO: Oak Creek Cn., Sedona. YAVAPAI: 5 mi. S. and 15 mi. S. Sedona. NAVAJO: Carrizo Cr., Ft. Apache. GILA: Salt River Cn., 5 mi. N. Seneca 4000'. PINAL: 3 mi. W. Oracle. PIMA: 10 mi. N. Tucson; Tucson; San Xavier Mission; 18 mi. S. Tucson; Sta. Rita Mts.: Madera Cn.; Sta. Catalina Mts.: Sabino Cn., Upper Sabino Cn., Hk. Hy. mi. 5, 26. April (1), May (3), June (9), July (4), August (2), September (2), and October (1).

FLOWER RECORDS: *Allionia*, *Asclepias*, *Cercidium*, cane cactus, *Eriodictyon*, *Geranium*, *Marrubium*, *Senecio*, and *Sapindus*. Mitchell (1937c) adds *Cordylanthus*, *Eriogonum*, *Lotus*, *Phacelia*, and (1956) adds *Cryptantha* and *Robinia*.

Chalicodoma (Chelostomoides) subexilis (Cockerell)

Known from Nebraska, Colorado, Utah, Nevada, New Mexico, California, and Arizona (55): northcentral and the southeastern mountains. COCONINO: Schultes Pass 8000' 10 mi. N. Flagstaff; San Francisco Mts., Ash Fork, 6 mi. W. Flagstaff, Lake Mary 7 mi. S. E. Flagstaff, Oak Creek Cn., Sedona. YAVAPAI: Prescott. YUMA: Bill Williams Fork. PIMA: Sta. Catalina Mts.: Hk. Hy. mi. 10, 19, 23, 26, Bear Wallow, Mt. Lemmon, "Mts."; Sta. Rita Mts. COCHISE: Huachuca Mts.: Ramsey Cn., 6500', "top"; Chiricahua Mts.: Turkey Cr. 6000', 7000', 7800', 8000', Onion Saddle, Rustlers Park, Fly's Peak 8500-9700', "Mts.", Cave Creek Cn., S. W. Res. Sta. GRAHAM: Pinalaño Mts. 5500', 7000', 8500'. APACHE: White

Mts. April (1), June (7), July (23), August (20), September (4), and October (1).

FLOWER RECORDS: *Amorpha*, *Geranium*, *Lotus*, *Marrubium*, *Melilotus*, *Monarda*, *Phacelia*, *Phaseolus*, *Salvia*, *Trifolium*, *Verbesina*, and *Vicia*. Mitchell (1937c) lists *Helianthus*, *Opuntia*, and *Psoralea*, and (1956) lists sweet pea and red clover. PARASITES: Hicks (1927) records *Coelioxys gilensis* Cockerell and Hurd (1958) gives *Dioxys pomonae pomonae* Cockerell.

Chalicodoma (*Chelostomoides*) *subspinotulata* (Mitchell)

Known from Arizona (2): southcentral. PIMA: Coyote Mts. 3500', Sta. Catalina Mts. May (1) and August (1).

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