

OBSERVATIONS ON THE BIOLOGY OF  
*PARACOTALPA PUNCTICOLLIS* LECONTE  
(COLEOPTERA: SCARABAEIDAE: RUTELINAE)

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ABSTRACT

Observations on the behavior, host plants, and predators of *Paracotalpa puncticollis* LeC. are recorded. The distribution and phenology of all known specimens are plotted.

INTRODUCTION

Specimens of *Paracotalpa puncticollis* LeConte (1863:78), one of the most striking beetles found in the southwestern U.S. are comparatively rare in collections. A survey of museum and private collections revealed a total of 808 specimens (68% from private collections), approximately 25% females and 75% males. Sixty percent of the reported specimens were taken at one locality, Seven Level Hill in Riverside County, California. The paucity of specimens in collections is probably the result of inadequate collecting, resulting from the meager knowledge of the species' biology.

Papers by LeConte (1863), Wickham (1905), Ohaus (1915), Saylor (1940), and Hardy (1971) deal primarily with classification of *Paracotalpa* and related genera, and give little ecological information. The following is an attempt to add to the knowledge of the biology of this species.

HABITAT AND HOST PLANT

*Paracotalpa puncticollis* is usually found in pinyon-juniper areas, and appears to be associated with plants of the genus *Juniperus* (Fig. 7). Observations of adults emerging from litter at the base of juniper may indicate that larvae feed on roots of this plant. Adults have been observed feeding on needles of juniper, and analysis of fecal material has confirmed this adult diet. Attempts to find larvae on roots of *Juniperus* were unsuccessful, and no information is available on the larvae. Attempts to induce oviposition in the laboratory were also unsuccessful, undoubtedly the result of failure to duplicate field conditions.

In California, this species is associated with *Juniperus californica* Carr., although in the eastern portions of the range, additional species (perhaps *J. monosperma* (Engelm.), *J. osteosperma* (Torr.) or *J. deppeana* Steud) are probably suitable hosts. In southern California, juniper is often found in areas receiving relatively little precipitation, often in the form of snow. Summers in these areas are hot and dry, and the trees are often exposed to severe wind action. Figure 5 shows a *Juniperus californica* in a typical habitat (Seven Level Hill, Riverside Co., California).

Robert Duff (1970 in litt.) has collected *P. puncticollis* on cheesebush (*Hymenoclea salsola* T. & G., Asteraceae), where he has observed these



beetles in copulation, but has observed no feeding. These plants are evidently a convenient landing spot for individuals moving down canyon. Duff also reports most collected or observed specimens landed in the same general area, and after mating flew back up the canyon toward higher elevations.

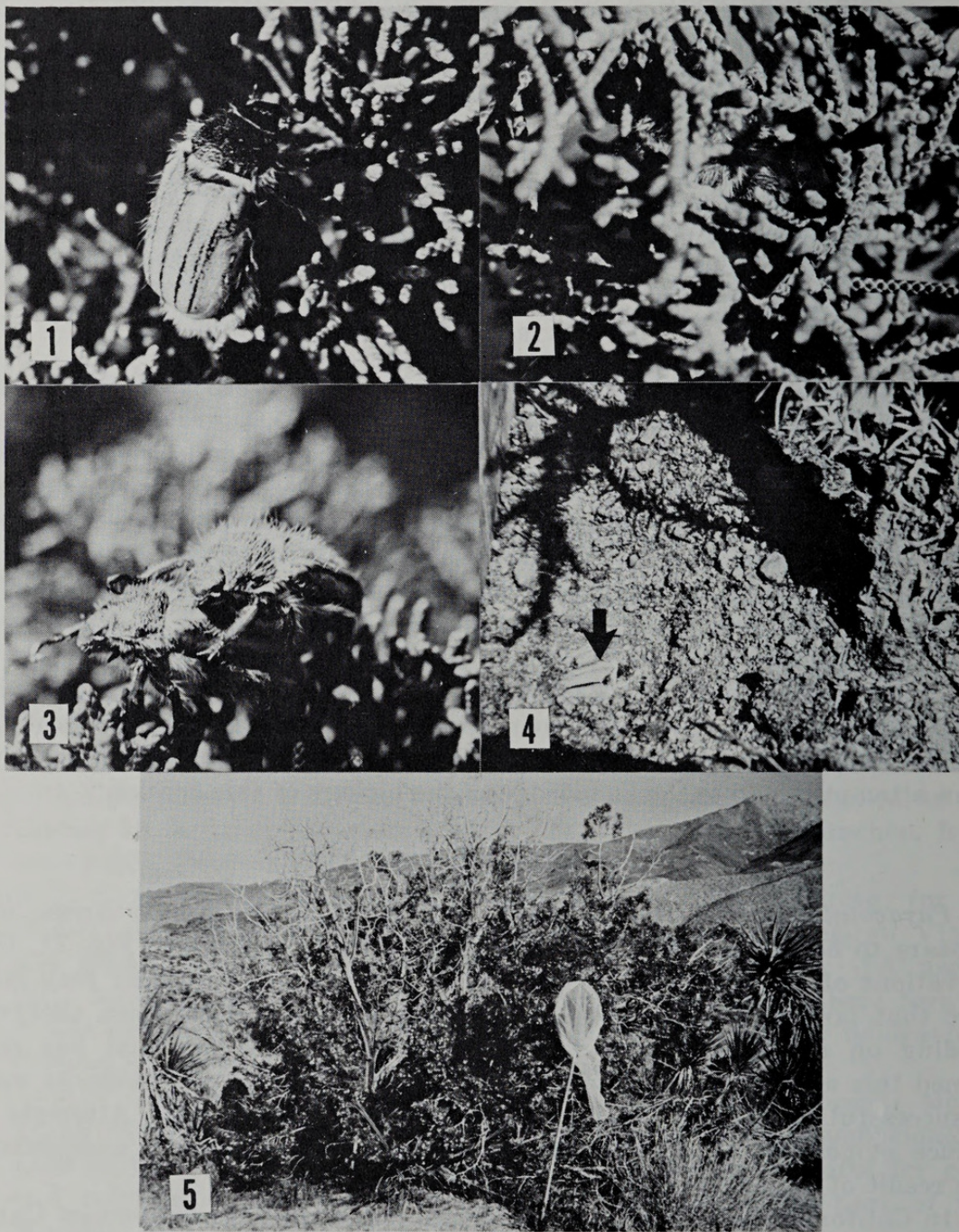


Figure 1. *Paracotalpa puncticollis* after flight to apical leaves from soil.

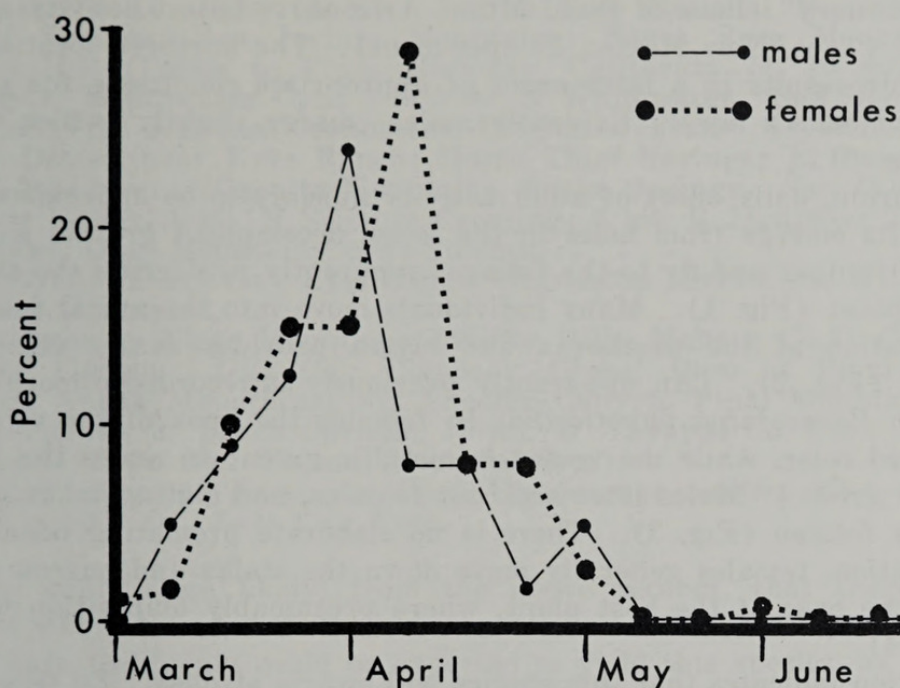
Figure 2. *P. puncticollis* hidden in apical foliage of *Juniperus californica*.

Figure 3. Mating pair of *P. puncticollis*. Note darker clypeus of female (see text).

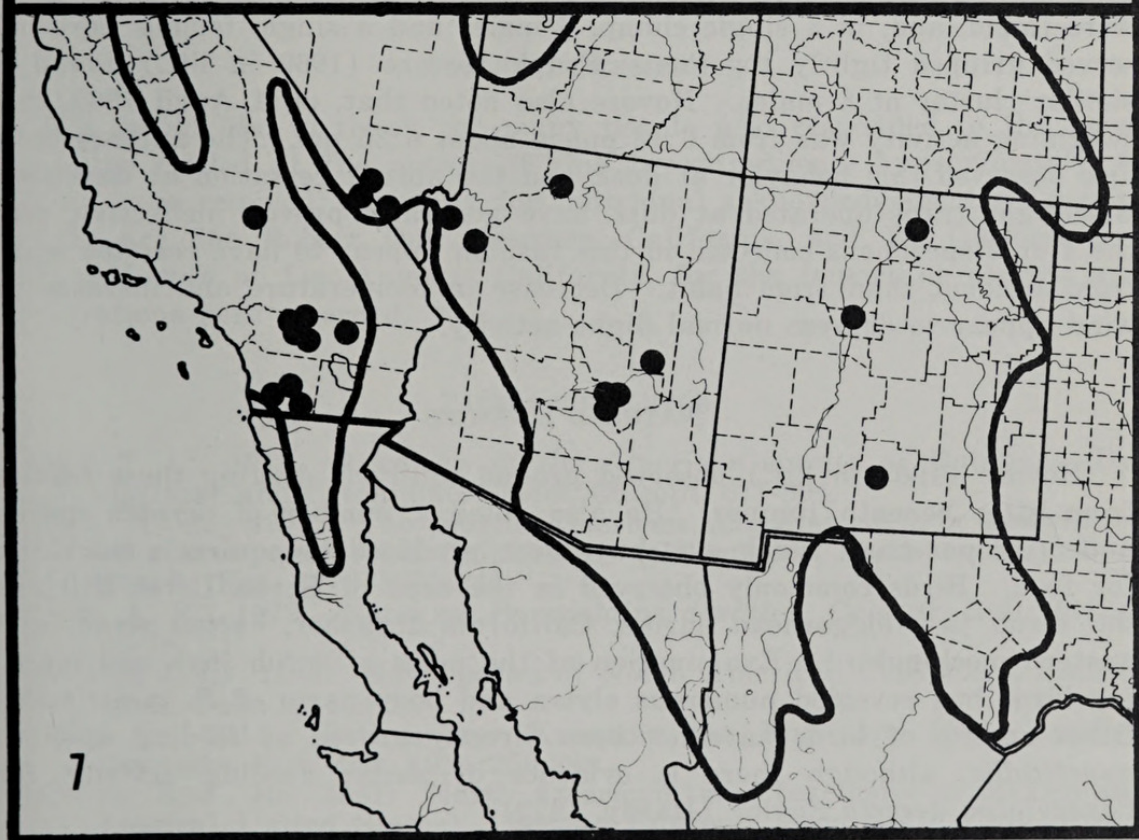
Figure 4. *P. puncticollis* in soil at base of juniper plant.

Figure 5. *Juniperus californica* at locale known as Seven Level Hill. Note poor condition of plant, dead limbs, and sparse foliage. Plant is one which has been an apparent favorite, many specimens collected from the foliage.





6



7

Figure 6. Seasonal activity of *P. puncticollis*. Percent is of the total of each sex. Plotted at weekly intervals, from March 1.

Figure 7. Known distribution of *P. puncticollis*. Heavy line represents the greatest distribution of plants of the genus *Juniperus* (see text).



## EMERGENCE AND BEHAVIOR

Earliest recorded adult occurrence is that of a single male specimen labelled "February" (Base of Pinal Mtns., Arizona). Latest activity noted was June 17 (Taos, New Mexico, 26 specimens). The northern location of Taos probably results in a later onset of appropriate conditions for adult activity (Humboldt's law). Evidently males emerge slightly earlier than females (Fig. 6).

In California, daily onset of adult activity appears to be approximately 3 pm. Adults emerge from holes in the loose, decomposed granite soil at the bases of juniper and fly to the foliage, apparently preferring the sunlit side of the plant (Fig. 1). Many individuals move into the apical foliage, where coloration of the prothorax and elytra provides nearly complete concealment (Fig. 2). [An apparently previously unrecorded dimorphism is present in *Paracotalpa puncticollis*: In females the apex of the clypeus is a brick red color, while the vertex is metallic green; in males the head is uniformly green.] Males later seek out females, and mating takes place on the outer foliage (Fig. 3). There is no elaborate premating behavior. After copulation, females generally move down the stalks and burrow into the soil at the base of the host plant, where presumably oviposition takes place (Fig. 4).

Observation indicates that this species will swarm at dusk. Ed Giesbert (1969 in litt.) observed adults emerging from litter at the bases of junipers and flying to other trees. After dark, females with several males were found, and, in a single clump, 6 males and a single female were observed gripped tightly together. Frank Hovore (1969 in litt.) found a similar cluster of 8 males. Hovore also noted that, on 1 April 1969, this swarming activity was from 6:13 pm to about 6:35 pm. The authors have also observed this behavior at dusk and the abrupt cessation at darkness. Blacklight traps operated at dusk have generally proved ineffective, and the 1 or 2 specimens collected in this fashion appear to have resulted more from accident than from habit. Decrease in temperature and increase in wind appear to depress normal flight activity.

## NATURAL ENEMIES

Hovore (1969 in litt.) observed ground squirrels digging these beetles from litter beneath juniper. He also noted a number of scratch marks under juniper trees which may have been produced by squirrels searching for food. Birds commonly observed in the area of Seven Level Hill are the scrub jay, loggerhead shrike, California thrasher, cactus wren, and western mockingbird. Examination of the nests of scrub jays and mockingbirds has revealed numerous elytra and body parts of *P. puncticollis*. Other species of birds have not been directly proved as feeding upon *P. puncticollis*, although there is evidence of shrike feeding activity for *Paracotalpa deserta* Saylor (Hardy, 1972).

## DISTRIBUTION

Since *Paracotalpa puncticollis* appears to be so directly associated with *Juniperus*, the distribution of the species has been plotted (Fig. 7) with



the greatest range of juniper (compiled from Preston 1961). Specific localities for the collection of *P. puncticollis* are as follows:

CALIFORNIA: *Riverside Co.*: Joshua Tree National Monument, Cottonwood Springs; San Jacinto Mountains; Santa Rosa Mountains, Seven Level Hill (Palms to Pines Highway, California 74, 10 mi. NW Palm Desert); Whitewater Cyn., 3 to 5 mi. N Whitewater. *San Bernardino Co.*: Joshua Tree National Monument, Covington Flats; Keystone Mtns.; Mojave Desert, near Keys Ranch; Horse Thief Springs; El Paso Mountains, near Randsburg; Granite Mountains, Snake Springs. *San Diego Co.*: San Felipe Valley, 1 mi. N Scissors Crossing; 5 mi. E Jacumba; Jacumba Hot Springs; Otay Mountains, near Summit.

NEVADA: *Clark Co.*: Kyle Ranch, Charleston Mountains; Willow Springs, Spring Mountains.

ARIZONA: White Mountains (White Hills, Mohave Co.?) *Coconino Co.*: Grand Canyon. *Gila Co.*: Claypool; Globe; Base of Pinal Mountains; Sierra Ancha Mountains; Six Shooter Canyon, Pinal Mountains. *Mohave Co.*: Vicinity of Peach Springs, 15 mi. W Yavapai Co. line. *Navajo Co.*: Carrizo. *Pima Co.*: Tucson (doubtful data).

NEW MEXICO: *Bernalillo Co.*: Albuquerque. *Otero Co.*: Alamogordo, 4400 to 5000 ft. *Taos Co.*: Taos.

It would seem likely, from the above records, that there are many areas where this species could be encountered. Areas of juniper in northern Baja California could be expected to yield this species, as would areas in Arizona, New Mexico, and possibly Utah, Colorado, Texas, and Mexico (northern Chihuahua and Sonora).

#### ACKNOWLEDGEMENTS

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