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Nota Científica
(*Short Communication*)

**PREDATORS OF *BOOPEDON NUBILUM* (SAY) SWARMS
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Rivera-García, E. 2011. Depredadores de enjambres de *Boopedon nubilum* (Say) (Orthoptera: Acrididae: Gomphocerinae), durante tres años secos en una pradera de pasto tobosa en Durango, México. *Acta Zoológica Mexicana* (n. s.), 27(3): 867-870.

RESUMEN. Los depredadores de saltamontes *Boopedon nubilum* fueron registrados de septiembre a octubre de 1998, 1999 y 2005 en la Reserva de la Biosfera de Mapimí. Esta especie tiende a formar grandes agregaciones que representan una fuente de alimento para muchas especies de vertebrados e invertebrados. La lista de depredadores de este saltamonte incluye cinco mamíferos, cinco reptiles, dos anfibios y 20 aves, mientras que los invertebrados incluyen seis insectos diurnos, seis arañas y cuatro artrópodos nocturnos.

Predation probe to be a strong selection pressure on herbivore insects (Mooney 2006, Mooney & Linhart 2006), such as grasshoppers (Otte & Joern 1975, Rees 1973); vertebrate predators are an important natural source to diminish their densities, with diverse implications on grasshopper behavior (McEwen *et al.* 2000), species composition, community structure, and specific modifications on strategies to avoid predation (Joern 1986, Fowler *et al.* 1991, Fuller & Joern 1996, Pitt 1999, Van Bael & Brown 2005, Branson 2005, Rivera-García & Cano-Santana 2009).

This report focuses on predators of *Boopedon nubilum* (Say) in a Chihuahuan Desert arid grassland (weather defined by T_{mean} 20 °C; rainfall 263 mm, and 2,796 mm evaporation), located in Mapimí Biosphere Reserve in Durango, México (26° 41' 01.65" north; 103° 44' 37.38" west, 1149 m altitude), described as a shrub steppe, dominated by *Pleuraphis mutica* (Buckl.) Benth enclose with *Bouteloua barbata* (Vasey); *B. curtipendula* (Michx.) Torr; *B. aristidoides* (HBK) Griseb; *Aristida* spp, *Eragrostis* spp, and *Chloris* sp. Add to shrubs and forbs like *Prosopis glandulosa*

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Torr and *Hoffmancegia densiflora* Gray, *Larrea tridentata* (DC) Cov, and *Kallstroemia grandiflora* Gray as well as *Ziziphus obtusifolia* (T. & G.) Gray, *Opuntia rastrojera* Weber, *Haplopappus heterophilus* (Gray) Blake, *Tidestromia gemmata* (I. M.) Johnst, *Sida leprosa* (Orth.) K. Schum and *Salsola kali* L.

B. nubilum can be found in grasslands from West Montana, USA to North of Mexico. In the study site this species is an important dimorphic medium size grasshopper (♂ 24-34 mm; ♀ 33-52 mm), with 1:1 sex ratio (Rivera-García & Cano-Santana 2009). Adult males are shining black, whereas commonly females are dark brown or pale brown, although some are black; female color proportion brown to black were 4:1 (N = 800), tend to form large aggregations when outbreaks occurs (Rivera-García 2009). Swarms were recorded in Mapimí arid grasslands during 1980, 1981, 1992, 1993, 1998, 1999 and 2005 (Rivera-García 1986, 2006). During 1998 and 1999 summers, Rivera-García & Cano-Santana (2009) observed and estimated *B. nubilum* population swarms from last nymph stage. The highest density was recorded for later authors in 1998 with $35.81 \pm e. d. 35.20 \text{ ind/m}^2$ (n = 70) and its wandering area was estimated 200 has. The weather during 1998 and 1999 was drier than the regional mean (T_{mean} 20.5, 20.1 °C; rainfall 157 and 177.2 mm, evaporation: 3, 285 and 3, 149 mm, respectively).

Observations on *B. nubilum* vertebrate predators were made every four days into the wandering area, during four hours at different times during a day by direct observations, between 08:00 to 20:00 hrs, in two blocks of four plots of 36×36 m each one, with approximately 50 m between them, and 500 m between blocks, from mid September to mid October during 1998, 1999, and 2005. The invertebrate predators observed preying on *B. nubilum* were separated from those collected at the work area using 20 pitfall traps by plot; reviewed every 12 hours by two periods of five days. All predator species were identified and catalogued in a database. The predators to *B. nubilum* were as follows:

Reptile. Five species were observed preying on *B. nubilum*: Collard lizard, *Crotaphytus collaris* (Say); Prairie lizard, *Sceloporus undulatus* (Latreille); Little striped whiptail, *Cnemidophorus inornatus* Baird; Western whiptail, *C. tigris* Baird & Girard; and Texas spotted whiptail, *C. gularis scalaris* Cope. The most common (considering the three years) were *Cnemidophorus inornatus*, *C. gularis scalaris*, and *C. tigris*.

Amphibians. Only two species were recorded, Great Plains toad, *Bufo cognatus* Say, and Couch's spadefoot, *Scaphiopus couchii* Baird; these species were not present in 2005.

Birds. This group was the most diverse, there were 20 species observed feeding *B. nubilum*: Grasshopper sparrow, *Ammodramus savaanarum* (Gmelin); Verdín, *Auriparus*

flaviceps (Sundevall); Cactus wren, *Camphylorhynchus brunneicapillus* (Lafresnaye); Canyon wren, *Catherpes mexicanus* (Swainson); Hermit warbler, *Dendroica occidentalis* (Towsend); Scott's oriole, *Icterus parisorum* Bonaparte; Loggerhead shrike, *Lanius ludovicianus* L.; Ash-throated flycatcher, *Myarchus cinarecens* (Lawrens); Blue-gray gnatcatcher, *Polioptila caerulea* L.; Vermilion flycatcher, *Pyrocephalus rubinus* (Boddaert); Rock wren, *Salpinctes obsoletus* (Say); Say's phoebe, *Sayornis saya* (Bonaparte); Bewick's wren, *Thryomanes bewickii* (Aubdubon); Curve-billed thrasher, *Toxostoma curvirostre* (Seainson); Cassin's kingbird, *Tyranus vociferans* Swainson; Greater roadrunner, *Geococcyx californianus* (Lesson); Swainson's hawk, *Buteo swainsonii* Bonaparte; Red-tailed hawk, *B. jamaicensis* (Gmelin); Common raven, *Corvus corax* L., and American kestrel, *Falco sparverius* L.

Mammals. In order to recognize these organisms as predators of *B. nubilum*, was necessary to use two methods; checking its scats there were found the following two records: Coyote, *Canis latrans* Say; Grey fox, *Urocyon cinereoargenteus* (Schreber); and by direct observations: hooded skunk, *Mephitis macroura* (Schreber); Mexican ground squirrel, *Spermophilus mexicanus* (Erxleben), and Spotted ground squirrel, *S. spilosoma* Bennett. The last ones are unusual grasshopper consumers.

Diurnal arthropods. Coleoptera: Ground beetle, *Pasimachus punctatus* Haldeman; Blister beetle, *Pyrota postica* Le Conte; Blister beetles, *Epicauta* spp. Diptera: Robber flies, *Efferia* spp. Mantodea: Mantid, *Stagmomantis limbata* (Hann). Hemiptera: Thread-legged bug, *Zelus socus* Uler. Aranea: Cross spider. *Araneus* sp.; Black and yellow garden spider, *Argiope aurantia* Lucas; Borrowing wolf spiders, *Gelycosa* spp.; Thin-legged wolf spiders, *Pardosa* spp., and two un-determined Trap-door spiders of the family Ctenisidae.

Nocturnal arthropods. Aranea: Tarantula, *Aphonopelma* sp. Scorpiones: Centruroides scorpion, *Centruroides elegans* (Thorell); Vaejovis scorpion, *Vaejovis coahuilae* Williams, and Black scorpion *V. mexicanus* Koch.

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