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**Burying Beetles (Coleoptera: Silphidae) from Western Jalisco, México:
Abundance and Phenology**

**INVESTIGACIÓN Y ESTUDIOS DE POSGRADO
Opción Seminario de Investigación**

**QUE PARA OBTENER EL TÍTULO DE:
LICENCIADO EN BIOLOGÍA**

**PRESENTA
ERNESTO LÓPEZ CONTRERAS**

LAS AGUJAS, ZAPOPAN, JALISCO. FEBRERO DE 2012



UNIVERSIDAD DE GUADALAJARA

CENTRO UNIVERSITARIO DE CIENCIAS BIOLÓGICAS Y AGROPECUARIAS

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Al mismo tiempo le informamos, que ha sido aceptado como director de dicho trabajo al Dr. José Luis Navarrete Heredia.

Sin más por el momento, aprovechamos para enviarle un cordial saludo.

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or de Tesis

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Burying Beetles (Coleoptera: Silphidae) from Western Jalisco, México: Abundance and Phenology

by

José Luis Navarrete-Heredia* & Ernesto López Contreras

ABSTRACT

In order to know the species of Silphidae (Coleoptera) in Western Jalisco, México a study was carried out from November, 2003 to December, 2004. Carrion traps baited with squid were used. Four species were collected, *Nicrophorus mexicanus*, *N. olidus*, *Thanatophilus truncatus*, and *Oxelytrum discicolle*. *Nicrophorus olidus* was the most common species; it was collected throughout the year at every single location. *Nicrophorus mexicanus* is more common at higher altitudes, while *N. olidus* is more abundant in lower locations. Male:female ratios for each species were: *O. discicolle* (0.34), *T. truncatus* (3), *N. mexicanus* (0.38), and *N. olidus* (0.94). *N. mexicanus* is bigger than *N. olidus* (mean: 15.04 mm and 13.43 mm, $p < 0.01$). *N. mexicanus* was more common in May and June; while *N. olidus* was more common from July to January. Species of Silphinae were less common. The least common species was *Thanatophilus truncatus* with only 4 specimens in one location.

Keywords: Carrion beetles, community assemblage, size

INTRODUCTION

Large carrion beetles or burying beetles (Coleoptera: Silphidae) are primarily associated with vertebrate carcasses that they use as their primary food source. Most of the species are carrion feeders both in larval and adult stage, although some will also prey on carrion-associated insects, such as maggots, or other carrion beetles (Sikes 2008). *Nicrophorus* species are subsocial insects, behavior assumed as the most primitive level of social interactions involving parents and offspring (Wilson 1971). Adults of this genus usually search for small carcasses of birds or rodents (mostly less than 100 g) to start

RESULTS AND DISCUSSION

Four species were collected in Western Jalisco: *Oxelytrum discicolle* (Brullé, 1840), *Thanatophilus truncatus* (Say, 1823) (Silphinae), *Nicrophorus mexicanus* Matthews, 1888 and, *N. olidus* Matthews, 1888 (Nicrophorinae).

One thousand one hundred forty-four specimens were collected. Nicrophorinae species were most abundant than Silphinae, a pattern usually found in inventories based on carrion traps samples. *Nicrophorus olidus* (Fig. 2) was the most abundant species (977 specimens) whereas *T. truncatus* (Fig. 3) was the scarcest (4). Silphinae are not rare in nature; they are less attracted to carrion traps, but more frequently found in large corpses (Villada 1901;



Fig. 1. Localities studied in Western Jalisco. 1. Ameca, 2. Mixtlán, 3. Atenguillo, 4. Cerro La Mona, 5. El Arajo.

Table 1. Abundance and distribution of burying beetles in sites studied.

	Ameca oak forest 1574m			Mixtlán oak-pine forest 1750m			Atenguillo oak-pine forest 1958m			Mora oak-pine forest 1433m			Atajo cirio forest 1441m					
	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C			
	<i>Thanatophilus truncatus</i>	0	0	0	2	2	2	0	0	0	0	0	0	0	0	0	0	0
<i>Oxytrum discicolle</i>	0	0	1	1	5	4	0	0	0	0	0	0	13	0	4	1	1	11
<i>Nicrophorus mexicanus</i>	0	0	0	37	55	28	0	0	1	1	1	0	1	0	0	0	0	0
<i>Nicrophorus olidus</i>	14	14	29	50	96	86	129	79	111	3	27	26	103	79	127			

Anderson 1982; Navarrete-Heredia 2009) or even in human dung (*T. truncatus*; Navarrete-Heredia pers. obs.). Abundance in oak or oak-pine forests below 1,600 m was smaller than in localities with similar vegetation type but with higher elevation (1,750 m). An exception was in El Atajo where abundance was higher than La Mora (locality at similar elevation but different vegetation type). *Nicrophorus olidus* and *N. mexicanus* (Fig. 4) were well represented in Mixtlán where the oak forest was less disturbed. Other localities were represented primarily by *N. olidus* (Table 1).

Nicrophorus olidus was collected primarily between July to January; *N. mexicanus* between May to February, *O. discicolle* (Fig. 5) between July to December and, *T. truncatus* primarily in September (Figs. 6-10, see appendix).

Of the specimens collected, fourteen were not sexed due to damage sustained to the abdomen. Among the sexed samples, the male: female ratios were: *O. discicolle* (0.34), *T. truncatus* (3), *N. mexicanus* (0.38) and, *N. olidus* (0.94).

Although measurements were taken for all species (Table 2), data were analyzed only for *Nicrophorus* species with more than 100 specimens. *Nicrophorus mexicanus* is larger than *N. olidus* (Mean: 15.04 mm and 13.43 mm). Size measurements were significantly different ($p < 0.01$).

Silphid assemblage in Western Jalisco is similar to recognized patterns from other Mexican localities (Navarrete-Heredia & Fierros-López 2000), except for the abundance that was less than other localities at high altitudes (Navarrete-Heredia, 1995; Fierros-López & Navarrete-Heredia 2001;

Table 2. Pronotum and elytra mean measurements by sex and by species. PL= pronotal length, PW= pronotum width, EL= elytra length and, EW= Elytra width. Data in mm.

Species (MALES)	n	PL	PW	EL	EW
<i>Oxelytrum discicolle</i>	10	4.200	6.340	11.700	4.300
<i>Thanatophilus truncatus</i>	3	4.200	6.133	9.000	4.000
<i>Nicrophorus mexicanus</i>	32	4.6875	6.031	10.594	4.00
<i>Nicrophorus olidus</i>	471	4.3597	4.9660	8.9204	3.5741
Species (FEMALES)					
<i>Oxelytrum discicolle</i>	29	4.0345	6.145	12.462	4.0621
<i>Thanatophilus truncatus</i>	1	4.400	6.600	10.000	4.400
<i>Nicrophorus mexicanus</i>	85	4.6259	5.6941	10.245	4.0047
<i>Nicrophorus olidus</i>	499	4.2970	4.9876	9.1707	3.6269

Arellano 1998). Excluding Baja California and the Yucatán Peninsula, *N. mexicanus*, *N. olidus*, *O. discicolle* and, *T. truncatus* are the commonest species found in carrion traps or corpses (for example, cow, horse, dog and others, including human corpses) (Navarrete-Heredia 2009; González-Estrada & Labrador-Chávez 2005; Fierros-López & Navarrete-Heredia 2001).

Coexistence of both *Nicrophorus* species can be explained by several factors as was stated by Navarrete-Heredia & Cortés-Aguilar (2006): phylogenetic relationships (not related), body size, phenology, altitudinal distribution and, vegetation type. *Nicrophorus mexicanus* and *N. olidus* are not phylogenetically related, they belong to different species groups: *Nicrophorus mexicanus* belongs to the *investigator* group and, *N. olidus* to the *orbicollis* group *sensu* Peck & Anderson (1985). *Nicrophorus mexicanus* is larger than *N. olidus*; *N. olidus* was collected primarily between July to January whereas *N. mexicanus* was collected primarily between May to February (Figs. 6-10) and, finally, *N. mexicanus* is more abundant at high altitudes where coniferous species and grasslands are more common.

For silphinae species, carrion traps are inappropriate methods for population data; they are found primarily in large carcasses and their presence in carrion traps is usually low. In this study we collected only four specimens of *T. truncatus*; whereas recent collection of adults in one cow corpse in an advanced decomposition stage provided 26 specimens (Navarrete-Heredia pers. obs.).

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APPENDIX: FIGURES 6-10

Ameca, BEp. 1574m asl

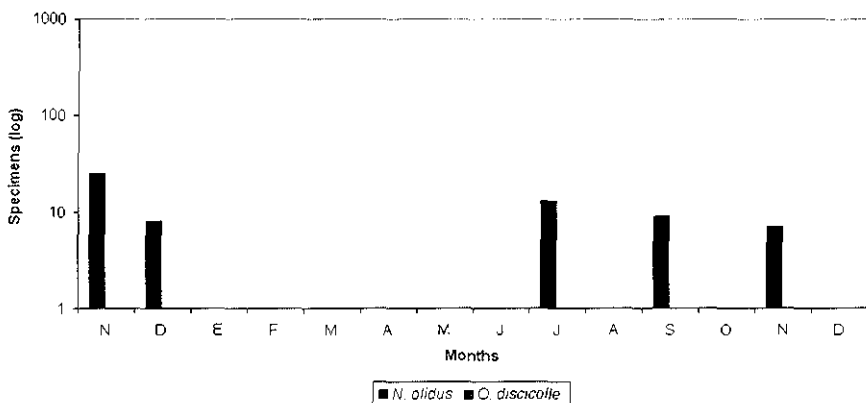


Fig. 6. Phenology of silphids in Ameca, Jalisco.

Mixtlán, BE. 1778 m asl

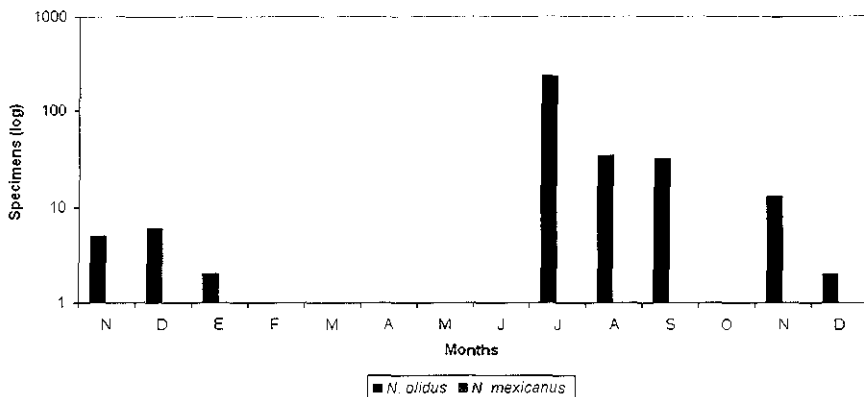


Fig. 7. Phenology of silphids in Mixtlán, Jalisco.

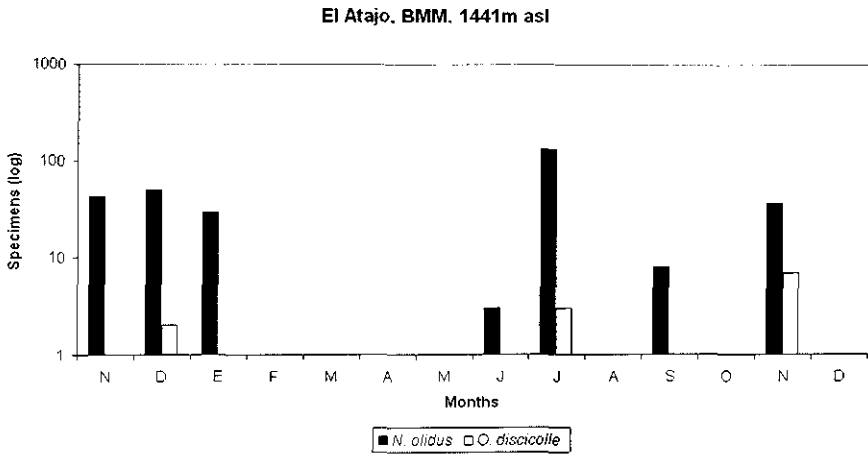


Fig. 10. Phenology of silphids in El Atajo.

