Observations of the wasp *Polistes major* (Hymenopera: Vespidae) in Baja California Sur, Mexico

Christopher K. Starr  
*Caura Village, Trinidad & Tobago*  
ckstarr@gmail.com

**Abstract**

The composition of five colonies of *Polistes major* is described from Baja California Sur state, Mexico in June 2016. Two of these had large nests and already were in or about to enter the reproductive phase of the colony cycle, while the others had nests of very few cells and were at a very early phase. These results suggest a bivoltine annual cycle in this population of *P. major*, with two generations in the year.

**Keywords**: bivoltinism, colony cycle, nesting, phenology, social wasp

**Introduction**

The social wasp *Polistes major* Palisot de Beauvois has a circum-caribbean distribution. It is present in the Greater Antilles and Florida and around the Gulf of Mexico to the island of Trinidad, as well as in parts of continental South America (Richards 1978:445-449). Despite this wide range and its abundance in some area, its biology has been very little studied. This justifies the following observations of its nesting and colony composition in Mexico.
*P. major* is a relatively large, robust member of a worldwide genus of almost 200 known species. These appear to have a relatively uniform colony cycle, passing through phases of foundation, growth, production of new reproductive (queens and males) and dissolution (Yamane 1996). Such a determinative cycle, therefore, has just one reproductive phase, regardless of region or type of seasonality. In regions with marked seasonality (including winter) there is usually only one colony cycle per year (univoltinism).

The colony cycle of social bees of the genus *Bombus* (bumble bees) typically follows this same pattern. However, there is indirect evidence that some North American (Skrym et al. 2012) and European species (Douglas 1973, Popatov 2018) often undergo a bivoltine cycle in the period of spring-summer-autumn.

**Methods**

During 7-10 June 2016 I observed five *P. major* colonies near La Paz (24°08’N 110°26’W) and in San Bartolo (23°45’N 109°51’W) in the state of Baja California Sur, México. The area has an arid subtropical climate, with the slight rainfall mainly in the months of July through September. The predominant vegetation is matorral (León-de-la-Luz et al. 2012).
*P. major* is clearly distinct from all other social wasps in the Baja California peninsula (Richards 1978, Snelling 1970). Specimens collected and identified from Baja California Sur by C.K. Starr will serve as vouchers. These are deposited in the Centro de Investigaciones Biológicas del Noroeste (CIBN) and the Museum of Zoology of the University of the West Indies (MZUWI).

**Results**

The brood composition of two colonies is shown in the table and diagrams. Although they were collected during daylight in the morning, the weather was cloudy and windy, so that it is unlikely that many adults were away from the nest. In addition, I visited the nest sites during the following two hours in order to collect any adult that had returned from foraging.

Three closed cells of Colony 1 (La Paz) had pupae, all female, while Colony 2 (San Bartolo) had four female and three male pupae. The two adult males in this colony had dark compound eyes, indicating recent immaturity, while all adult females of both colonies were mature. These details indicate that Colony 1 was probably at the point of initiating its reproductive phase (production of sexuals), while Colony 2 was already in that phase. In La Paz I also observed some few males flying at a distance from any nest.

Furthermore, I found three much smaller colonies at La Paz. Colonies 3 and 4 were incipient, respectively with two cells and one adult female (no. 3) and seven cells with and two females (no. 4). Neither of these nests had signs of present or past pupae. Colony 5, with six cells, had a newly emerged female (with dark eyes). I returned twice to this nest without finding any mature female, which probably indicates that the queen was lost.

Composition of two colonies of *Polistes major* in Baja California Sur, Mexico in the first half of June 2016. Eggs and stage-1 larvae are not readily distinguishable. Small larvae (stages 2-3) and large larvae (stages 4-5) are distinguishable by head width. For convenience all brood in closed cells are treated as pupae. The diagrammatic figure shows the distribution of brood in the combs.

<table>
<thead>
<tr>
<th>Colony no.</th>
<th>Adult females</th>
<th>Adult males</th>
<th>Eggs and larvae1</th>
<th>Small larvae</th>
<th>Large larvae</th>
<th>Pupae</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5</td>
<td>0</td>
<td>23</td>
<td>5</td>
<td>5</td>
<td>3</td>
<td>41</td>
</tr>
<tr>
<td>2</td>
<td>10</td>
<td>2</td>
<td>28</td>
<td>22</td>
<td>5</td>
<td>11</td>
<td>78</td>
</tr>
</tbody>
</table>
Diagrams of two active *Polistes major* nests in Baja California Sur, Mexico in the first half of June 2016. Further explanation in the text and table. The x in each comb marks the position of the petiole attachment.

**Discussion**

These few observations are consistent with the hypothesis that part of the population in this area goes through a bivoltine cycle, with two generations during the growing season. According to this interpretation, Colonies 1 and 2 were near the end of the first generation, while the others (in particular Colonies 3 and 4) were early in the second generation. Consistent with this hypothesis, in June 1989 I observed several colonies of *P. major* in good condition and already with males near Miami, Florida (25°47’N 80°13’W) (Starr 1990).

At present, bivoltinism is unknown as a regular phenomenon in any *Polistes*. That is, all studied populations in any part of the world show either a univoltine cycle (with a single generation per year) or no close connection with the seasons. Yamane (1996) analyzed the environmental conditions under which bivoltinism is most likely: an annual climate with a very long growing season and a short winter. *Polistes gigas* Kirby at the subtropical southern end of Taiwan seemed to him a good candidate for bivoltinims, but against his prediction this species follows a typical univoltine pattern (Yamane 1996).

**Acknowledgements**

This study was carried out in the Centro de Investigaciones Biológicas del Noroeste (CIBN). Collection of specimens was done under permit no. SGPA/DGVS/09769/15. Thanks to Carlos Palacios C. and Armando Falcón B. for field assistance and to Ryan S. Mohammed for graphic assistance.
Literature cited


