

Polistes lanio (Jack Spaniard)

Order: Hymenoptera (Ants, Wasps and Bees)

Class: Insecta (Insects)

Phylum: Arthropoda (Arthropods)



Fig. 1. Jack spaniard, *Polistes lanio*.

[<http://www.flickr.com/photos/marcosbio/5101068944/>, downloaded 12 November 2011]

TRAITS. The jack spaniard's morphology resembles that of a normal *Polistes* (paper) wasp. It is one of the largest wasps that belong to the family Vespidae. The morphology of the male *Polistes lanio* (jack spaniard) is similar to that of the female of this species with only a few different minor characteristics. With respect to structures, the antennae and the gaster; this being the enlarged, bulbous part of the posterior of the hymenopteran body are slightly different between the two sexes. That is, these structures of the males possess one more segment than the females. Other differences are observed in relation to the coloration of certain parts of this wasp. There exists a plate on the anterior median aspect of insects' heads called the clypeus and in the

jack spaniard, the males' clypeus are yellowish in colour and show pubescence while the females' are a reddish brown colour (Fig. 2). The females possess darker sclerotized mandibles than the males.

ECOLOGY. Found in habitats where there is an intermediate amount of vegetation in the nearby surroundings. This wasp is a neotropical paper wasp and is hence found in neotropical conditions. In countries such as Trinidad and Tobago; located in the Caribbean and some parts of Peru and Brazil; in South America. With respect to foraging behaviours, not much is known about this category; except for the fact that they forage in a very small range around their nest. In other words, they do not venture out far away from their colony. Also, the foraging behaviours of the queen of the jack spaniard colony is seen to be lower than that of the queens of other social wasps colonies, with *P. lanio* being 0.5% when compared to *M. ceberus styx* 10.2% (Giannotti, 1999).

SOCIAL ORGANISATION. This wasp belongs to the group classified as social insects. This type of group involves individuals of the same species coexisting and interacting with each other in ways such as mating, parental care, cooperation and even antagonism (Starr, 2011). There are particular features which relate to social wasp colonies, the first being a small colony size. Here, the maximum number of adult individuals range up to one hundred and only in very few cases the numbers of adults peak at one thousand. Another feature refers to functional monogyny where this is a feature where the nest has a single egg-laying queen. In these cases, fertile queens compete with each other until all but one are reduced to infertile queens of 'workerlike' status. In some cases, the colonies start off with one queen and hence it is monogynous in nature from the beginning (Starr, 1990). Also, when workers are born, the queen is seen to abort all colony maintaining activities. The jack spaniard is also described as primitively eusocial (Giannotti & Machado, 2004). Eusocial insects are normally called social insects and they share three diagnostic traits. These being; the overlap of adult generations, cooperative brood care and reproductive castes.

MALE BEHAVIOUR. In a study done by Edilberto Giannotti, sixteen colonies were observed in order to determine the male behaviours of the *P. lanio*. It is known that the male individuals of this species are born towards the end of the cycle. The males of the tropical *Polistes* species, such as the jack spaniard, are seen to be on the nest or associated with the nest all year round for mating and to carry out other duties for its colony as a social insect. When the males are born, they remain on the nest for approximately ten days; a very short period. In some cases, the males were seen on the nest for much longer, for example, 213 and 107 days, however, in these circumstances, they were not observed on the nest for consecutive days (Giannotti & Machado, 2004). When observing the male individuals of the jack spaniard, many different types of behaviours were observed. The results are listed as follows, from the activity taking up the smallest percentage of the males' time to that which took up the most time; fanning the nest (0.4%), returning to the nest without food (0.8%), giving chewed prey to the larvae (0.8%), larva-adult trophallaxis (0.8%), adult-adult trophallaxis (0.8%), checking cells (1.2%), self-grooming (1.2%), being dominated (1.6%), copulating on the nest (2.4%), flying out the nest (2.4%), giving alarm signals (4.8%) and remaining immobile on the nest (82.8%) (Giannotti & Machado, 2004). It can be seen that behaviours of males such as leaving and returning to and from the nest without and food would be considered as an attempt to learn to fly, or even a 'selfish fly' in order to feed themselves. Also, from the aforementioned results, it is seen most of

the behaviours listed are to the benefit of themselves, with the exception of activities such as feeding the larvae, fanning the nest and giving out alarm signals. When compared to the females who show a total of twenty eight activities, the males are seen to perform a great deal less than the females and remain immobile on the nest for most of the time.

NESTING BIOLOGY. The nest of social insects such as the jack spaniard serves as a nursery for brood rearing purposes as well as a point of reference for the colony life. The nests of *Polistes* wasps is usually made of chewed plant fibres obtained from weathered wood or paper from old nests, made into a single petiolate, unenveloped comb (Figs. 2-5). The *P. lanio* nests are very similar to that of the *P. versicolor* wasp; they only vary slightly in size with the mean side-to-side diameter of a *P. lanio* cell being 6.5mm and that of *P. versicolor* being 5.5mm. In Trinidad, these two types of wasps are seen to nest exclusively on man-made structures (Figs. 3-5), with the odd one case with a nest being found on vegetation. Areas in this study in Trinidad included Mt. Hope General Hospital, The University Field Station (of the University of the West Indies) and at St. Augustine. All of the nests observed were seen to be attached to eaves, either wooden or concrete (Kadir & Starr, 2006). Therefore, *P. lanio* is seen to nest in areas which contain fewer trees and more herbaceous vegetation. Also, areas where *P. lanio* are observed shows low levels of the occurrence of *P. versicolor* and this may suggest antagonistic behaviours of the *P. lanio* allowing them to gain the better sites for habitats through competition.

SEXUAL BEHAVIOUR. Copulation between male and female individuals occur generally on the nest area or in nesting sites and are seen to last between fifteen and eighty second (Giannotti & Machado, 2004). With respect to reproduction, eggs are laid in the cells of the nest and coated with an adhesive secretion which attaches them to the cell wall at a forty five degree angle. The egg of the *P. lanio* wasp is seen to be bigger than that of other social wasps, for example *Mischocyttarus cassununga* (Giannotti and Silva 1993). The characteristics of the larvae show that it is a soft-bodied, eucephalous individual which is protected by a well-sclerotized cephalic capsule which is pale brown in colour. The thoracic segments are white in colour and spiracles are observed on these segments. From the first instar (a stage between two successive molts), imaginal disks of the wings and legs are noticed. Measurements taken proved statistics given by Rodrigues (1968) are in fact true. These are that the width of the capsule of the first instar and the egg are approximately the same. Throughout the growth period, evident changes are mandibles going from having only one tooth in a particular instar, to having another subapical tooth in the subsequent instar. After the growth period, the mature larvae will spin a cocoon by moving itself around while moving backward into the cell while spinning (Chao and Herman, 1983). Then it attaches a silk thread to the rim of the cell in order to form a fringe to cap said cell thereby coating the inside of the cell with silk. A faecal mass is then passed which the larvae produced from accumulating it in the midgut during developmental stages; it settles towards the base of the cell. These faecal pellets are commonly used in studies to determine how many times a cell has been occupied. The stages that follow the larva include the pharate pupa which is waiting to emerge from the cocoon, the exarate pupa; where the wings and legs are free and the individual is able to move its abdomen and finally the last pupal stage where the wings are found to be totally extended and colouration as previously described is observed.

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Author: Kristie Lalla

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Fig. 2. Jack spaniard on paper nest.

[Original 2011]



Fig. 3. Jack spaniard nest seen on a wooden surface.

[Original 2011]



Fig. 4. Jack spaniard nest on a concrete wall

[Original 2011]



Fig. 5. Jack spaniard nest on a concrete surface with multiple wasps on the outer cells.

[Original 2011]

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