

# MORPHOLOGICAL COMPARISON OF THE *POECILOTHERIA* WITH NOTES ON THE FUTURE OF THE SYSTEMATICS OF THE GENUS

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**CANADA**

The ornamental tarantulas of India and Sri Lanka, genus *Poecilotheria*, have indeed captured the fascination of the majority of tarantula enthusiasts and many arachnologists due to the startling ventral banding and colouration that the 14 species display. To date these ventral markings remain the primary identifiers of each species, with recent species descriptions relying increasingly on minor alterations to said patterns (Smith, 2004; Nanayakkara *et al.*, 2012). Fortunately, these leg-banding patterns seem fairly conserved, showing little intra-specific variation between individuals as noted from captive stock. It is important to note, however, that the majority of these captive individuals are derived from a small sample of the wild populations, which may explain this lack of variation (Gabriel, 2012).

In attempts to discover a second character system, focus has shifted to the number and position of peg-like tubercles on the pro-lateral faces of both coxa composing the maxilla in order to delineate and group of the species within the genus (Smith, 2004). This taxonomic feature, which is one of the main synapomorphies, or defining characters, of the *Poecilotheria* is presumed to aid stridulation in addition to the dense adjacent

lyra composing the majority of the stridulation organ. Tubercle numbers from the left maxilla have been reported for type specimens of both past and recently described species, and since 1996, have become a standard taxonomic character (Charpentier, 1996a,b; Kirk, 1996; 2001; Smith, 2004; 2006, Nanayakkara *et al.*, 2012). Smith, in 2006, whilst describing *P. tigrinawesseli*, divided the *Poecilotheria* into 3 un-named subgroupings based on this character state. *Poecilotheria fasciata* (Latreille 1804), *P. hanumavilasumica* Smith, 2004, *P. striata* Pocock, 1895, *P. regalis* Pocock, 1899, *P. pedersenii* Kirk, 2001, and *P. ornata* Pocock, 1899 were grouped as closely related taxa displaying a maximum of 3 tubercles above the stridulating organ with the rare exception exceeding this number (Group 1). Concurrently *P. metallica* Pocock, 1899, *P. miranda* Pocock, 1895, *P. tigrinawesseli* Smith, 2006 and *P. formosa* Pocock, 1899 were grouped as having 3-8 tubercles with as low as 2 on the males (Group 2), while *P. rufilata* Pocock, 1899 and *P. subfusca* Pocock, 1895, in addition to both being montane species, were distinguished by the presence of 2-5 tubercles (Group 3) (Smith, 2006). *P. smithi* Kirk, 1996 was not mentioned and *P. rajaei* (Nanayakkara *et al.*, 2012) has just been described thus are not included. Unfortunately, no data or supporting evidence was provided to test the validity and robustness of these subgroupings.

Interestingly, in 2010, Ray Gabriel synonymised *P. nallamalaiensis* Rao *et al.*, 2006 with

*P. formosa* by providing compelling evidence from 17 specimens (type and non-type) that tubercle number and position can be incredibly variable in the latter species and included variants which would have been categorized as *P. nallamalaiensis*. Since the *P. formosa* description superseded *P. nallamalaiensis* and no type depository was maintained, nomen dubium was invoked and the latter became a junior synonym of *P. formosa*.

New evidence is here-in provided from 53 captive-bred specimens spanning all currently described *Poecilotheria* species which reveals the polymorphic nature of this character state. Specimens sold under the trade name *P. bara*, a species name synonymized with *P. subfusca* Kirk 1996 are also included in the analysis under the name *P. subfusca* (lowland). Specimens sold as *P. subfusca* are labelled *P. subfusca* (highland). Moulded exoskeletons from all specimens were dissected and dry mounted while the prolateral faces (L&R) of the maxilla from all specimens was imaged under a Hirox KH-7700 digital microscope and stored in ethanol at the Biodiversity Institute of Ontario, Canada. Cropped images of each specimen can be seen in **Fig 1**, while all data is recorded in Table 1. The dataset includes multiple sequential moults of the same individual in many instances, which indicates the variable nature of the number, positioning, and size of the tooth-like pegs throughout development and between individuals of the same species. Also included in Table 1 are the recorded tubercle counts from all type descriptions and other published accounts, along with measurements of carapace width and length to provide an indication of age.

In order to test the proposed sub-groupings of *Poecilotheria*, the data was partitioned according to Smith's hypothesis (Smith, 2006) and subject to one-way analysis of variance

(ANOVA) in SPSS version 20 (IBM, 2011). Additional unpaired t-tests were performed between the 3 partitions individually. The ANOVA demonstrated statistical difference between the groups ( $P < 0.005$ ,  $F = 16.12$   $df = 2$ ) with combined group means of 2.7, 2.9, and 1.8 tubercles respectively. Group A was found to have a significantly higher tubercle count than group C ( $P < 0.005$ ,  $T = 4.06$ ,  $DF = 210$ ) although group A was not found to be statistically different than group B ( $P = 0.45$ ,  $T = 0.31$ ,  $df = 163$ ). **Fig 2** displays the data in histogram and box plot formats indicating the variance in the data and deviation from Smith's hypothesis. **Fig 3** displays the compiled dataset indicating the mean, range and variance of number of tubercles for all 14 *Poecilotheria* species including specimens represented as the lowland morph of *P. subfusca*.

Similar to previous observations (Gabriel, 2010), in the vast majority of cases, the left maxilla rarely mirrors the right in number or position of tubercles. Provided these new data it becomes clear that the proposed subgroupings within *Poecilotheria* are not valid in respect to this character system. Group A displays a higher tubercle number on average than does group C, while both Group A and Group B are indistinguishable from each other. Both groups A & B, on the other hand, display a higher number of tubercles on average than Group C although extreme outliers do exist. Tubercle number and positioning was found to be highly variable within species and plastic within individuals. This character system is thus inadequate for species delineation due to the overlap in tubercle number and position across the genus. Secondly, the plastic nature of the character during development and through maturity (exemplified in **Fig 4**) further degrades its usefulness in taxonomy.

In conclusion, the number of tubercles seems unstable, polymorphic, and not ideal for identification or sub-grouping in the genus *Poecilotheria*. Novel approaches such as the use of genetic markers and potentially the analysis of male behaviour are needed in order to discover alternative taxonomically stable characters, other than ventral banding and coloration, in this genus of tarantula if we are to unveil the systematics of the group and come to a clear grasp on identification and delineation of the 14 species.

## References

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Table 1: Metadata compilation of all published accounts of *Poecilotheria* specimens with recorded tubercle counts. Included is the species ID, Specimen ID, status, carapace length(CL) and width(CW) and finally the source. All molts from this study are from live or since deceased specimens now vouchers held at the Biodiversity Institute in Guelph, Ontario, Canada.

| Species ID               | Specimen ID/Code | molt# | SEX | #tub (R) | #tub (L) | CL          | CW          | Source     |
|--------------------------|------------------|-------|-----|----------|----------|-------------|-------------|------------|
| <i>P. subfusca</i> (I) 1 | BIOGU00532-C09   | 73    | ♀   | 2        | 2        | 15.0        | 13.1        | This study |
| <i>P. subfusca</i> (I) 1 | BIOGU00532-C09   | 70    | ♀   | 2        | 1        | 18.6        | 15.7        | –          |
| <i>P. subfusca</i> (I) 1 | BIOGU00532-C09   | 106   | ♀   | 2        | 1        | 18.7        | 15.9        | –          |
| <i>P. subfusca</i> (I) 1 | BIOGU00532-C09   | 125   | ♀   | 2        | 1        | <b>19.6</b> | <b>15.5</b> | –          |
| <i>P. subfusca</i> (I) 2 | BIOGU00532-C10   | 116b  | ♀   | 3        | 4        | <b>13.9</b> | <b>10.6</b> | –          |
| <i>P. subfusca</i> (I) 2 | BIOGU00532-C10   | 71    | ♀   | 3        | 4        | 18.4        | 15.6        | –          |
| <i>P. subfusca</i> (I) 2 | BIOGU00532-C10   | 102   | ♀   | 3        | 4        | 19.0        | 15.5        | –          |
| <i>P. subfusca</i> (I) 2 | BIOGU00532-C10   | 126   | ♀   | 3        | 4        | 19.6        | 16.1        | –          |
| <i>P. subfusca</i> (I) 5 | BIOGU00533-B12   | 123   | ♂   | 2        | 1        | 10.5        | 8.8         | –          |
| <i>P. subfusca</i> (I) 6 | BIOGU00533-C01   | 107C  | ♂   | 2        | 2        | 9.0         | 7.4         | –          |
| <i>P. subfusca</i> (I) 6 | BIOGU00533-C01   | 124   | ♂   | 2        | 2        | 10.2        | 8.4         | –          |
| <i>P. subfusca</i> 1     | BIOGU00532-C11   | 74    | ♂   | 3        | 4        | 15.7        | 14.0        | –          |

Table 1: *continued*

| <i>Species ID</i>            | <b>Specimen ID/Code</b> | molt#    | <b>SEX</b> | <b>#tub (R)</b> | <b>#tub (L)</b> | <b>CL</b>   | <b>CW</b>   | <b>Source</b> |
|------------------------------|-------------------------|----------|------------|-----------------|-----------------|-------------|-------------|---------------|
| <i>P. subfusca</i> 1         | BIOGU00532-C11          | 105      | ♂          | 3               | 4               | –           | –           | –             |
| <i>P. subfusca</i> 2         | BIOGU00533-B03          | 108      | ♀          | 6               | 5               | 15.9        | 11.7        | –             |
| <i>P. subfusca</i> 3         | BIOGU00533-B04          | 100      | ♂          | 2               | 2               | 15.0        | 13.0        | –             |
| <i>P. subfusca</i> 5         | BIOGU00533-C06          | 117      | ♂          | 3               | 3               | 13.9        | 15.6        | –             |
| <i>P. ornata</i> 1           | BIOGU00532-E06          | 24       | ♀          | 1               | 2               | <b>25.0</b> | <b>21.7</b> | –             |
| <i>P. ornata</i> 1           | BIOGU00532-E06          | 86       | ♀          | 1               | 2               | 26.9        | 23.5        | –             |
| <i>P. ornata</i> 2           | BIOGU00532-A02          | 24       | ♂          | 1               | 1               | <b>15.8</b> | <b>13.8</b> | –             |
| <i>P. ornata</i> 4           | BIOGU00533-A02          | 25       | ♀          | 1               | 1               | 23.0        | 19.0        | –             |
| <i>P. ornata</i> 4           | BIOGU00533-A02          | 22       | ♀          | 2               | 1               | <b>25.4</b> | <b>21.5</b> | –             |
| <i>P. ornata</i> 4           | BIOGU00533-A02          | 23       | ♀          | 2               | 1               | 29.7        | 25.5        | –             |
| <i>P. ornata</i> 4           | BIOGU00533-A02          | 87       | ♀          | 2               | 1               | 30.6        | 25.9        | –             |
| <i>P. fasciata</i> 1         | BIOGU00532-D02          | 76       | ♀          | 1               | 2               | <b>21.0</b> | <b>18.0</b> | –             |
| <i>P. fasciata</i> 2         | BIOGU00532-D04          | 18       | ♀          | 2               | 1               | <b>18.5</b> | <b>15.9</b> | –             |
| <i>P. fasciata</i> 2         | BIOGU00532-D04          | 77       | ♀          | 2               | 1               | <b>19.7</b> | <b>17.0</b> | –             |
| <i>P. fasciata</i> 4         | BIOGU00532-D05          | 19       | ♂          | 2               | 1               | 16.0        | 13.8        | –             |
| <i>P. fasciata</i> 4         | BIOGU00532-D05          | 17       | ♂          | 1               | 2               | 18.5        | 16.5        | –             |
| <i>P. fasciata</i> 7         | BIOGU00532-B07          | 15       | ♀          | 1               | 1               | <b>22.0</b> | 19.5        | –             |
| <i>P. fasciata</i> 7         | BIOGU00532-B07          | 104      | ♀          | 1               | 1               | 23.1        | 20.1        | –             |
| <i>P. fasciata</i> 7         | BIOGU00532-B07          | 109      | ♀          | 1               | 2               | <b>24.5</b> | <b>20.9</b> | –             |
| <i>P. hanumavilasumica</i> 1 | BIOGU00532-C12          | 21b      | ♂          | 2               | 1               | 15.2        | 12.6        | –             |
| <i>P. hanumavilasumica</i> 1 | BIOGU00532-C12          | 113      | ♂          | 1               | 1               | <b>16.9</b> | <b>14.0</b> | –             |
| <i>P. hanumavilasumica</i> 1 | BIOGU00532-C12          | 21       | ♂          | 1               | 1               | 18.5        | 15.6        | –             |
| <i>P. hanumavilasumica</i> 1 | BIOGU00532-C12          | 20       | ♂          | 1               | 1               | 20.7        | 16.2        | –             |
| <i>P. hanumavilasumica</i>   | BMNH ?                  | Holotype | ♀          | ?               | 1               | 27.0        | 21.0        | (Smith, 2004) |
| <i>P. metallica</i> 1        | BIOGU00532-D09          | 116a     | ♀          | 1               | 3               | <b>17.0</b> | <b>15.2</b> | This study    |
| <i>P. metallica</i> 1        | BIOGU00532-D08          | 32       | ♀          | 1               | 3               | 18.8        | 17.0        | –             |
| <i>P. metallica</i> 1        | BIOGU00532-D09          | 90       | ♀          | 1               | 3               | 21.3        | 20.0        | –             |
| <i>P. metallica</i> 2        | BIOGU00532-D09          | 34       | ♀          | 5               | 5               | <b>14.0</b> | <b>12.0</b> | –             |
| <i>P. metallica</i> 2        | BIOGU00532-D09          | 33       | ♀          | 5               | 6               | <b>15.3</b> | <b>13.0</b> | –             |
| <i>P. metallica</i> 2        | BIOGU00532-D08          | 91       | ♀          | 5               | 6               | 19.0        | 17.5        | –             |
| <i>P. metallica</i> 6        | BIOGU00533-D10          | 211      | ♀          | 8               | 7               | N/A         | N/A         | –             |
| <i>P. metallica</i> 7        | BIOGU00533-D12          | 117      | ♀          | 2               | 3               | 17.5        | 17.3        | –             |
| <i>P. metallica</i> 8        | BIOGU00533-E01          | 118      | ♀          | 6               | 7               | 15.6        | 14.2        | –             |

Table 1: *continued*

| Species ID           | Specimen ID/Code    | molt#    | SEX | #tub (R) | #tub (L) | CL          | CW          | Source               |
|----------------------|---------------------|----------|-----|----------|----------|-------------|-------------|----------------------|
| <i>P. miranda</i> 1  | BIOGU00532-A05      | 65b      | ♀   | 2        | 2        | 13.9        | 12.6        | –                    |
| <i>P. miranda</i> 1  | BIOGU00532-A05      | 47       | ♀   | 2        | 2        | <b>16.0</b> | <b>13.0</b> | –                    |
| <i>P. miranda</i> 1  | BIOGU00532-A05      | 46       | ♀   | 2        | 3        | 19.0        | 15.0        | –                    |
| <i>P. miranda</i> 1  | BIOGU00532-A05      | 45       | ♀   | 2        | 3        | 21.2        | 18.7        | –                    |
| <i>P. miranda</i> 5  | BIOGU00533-B05      | 43       | ♀   | 4        | 3        | <b>21.6</b> | <b>18.5</b> | –                    |
| <i>P. miranda</i> 5  | BIOGU00533-B05      | 42       | ♀   | 2        | 4        | <b>22.8</b> | <b>19.0</b> | –                    |
| <i>P. miranda</i> 5  | BIOGU00533-B05      | 97       | ♀   | 2        | 7        | 24.0        | 21.2        | –                    |
| <i>P. miranda</i> 6  | BIOGU00533-A01      | 98       | ♀   | 4        | 5        | <b>23.5</b> | <b>19.3</b> | –                    |
| <i>P. miranda</i> 6  | BIOGU00533-A01      | 44       | ♀   | 4        | 4        | 24.8        | 21.2        | –                    |
| <i>P. miranda</i> 8  | BIOGU00533-D02      | 120      | ♂   | 3        | 2        | 13.8        | 11.3        | –                    |
| <i>P. miranda</i> 9  | BIOGU00533-D03      | 121      | ♂   | 3        | 2        | 13.7        | 11.1        | –                    |
| <i>P. pedersen</i> 1 | BIOGU00533-A03      | 28       | ♀   | 3        | 1        | 23.3        | 21.5        | –                    |
| <i>P. pedersen</i> 2 | BIOGU00532-E02      | 30       | ♀   | 3        | 3        | <b>16.7</b> | <b>13.5</b> | –                    |
| <i>P. pedersen</i> 2 | BIOGU00532-E02      | 75       | ♀   | 1        | 1        | 19.6        | 18.5        | –                    |
| <i>P. pedersen</i> 4 | BIOGU00533-A04      | 29       | ♀   | 1        | 1        | <b>22.9</b> | <b>19.2</b> | –                    |
| <i>P. pedersen</i> 4 | BIOGU00533-A04      | 7        | ♀   | 1        | 1        | <b>27.0</b> | <b>20.6</b> | –                    |
| <i>P. pedersen</i>   | BMNH?               | Holotype | ♀   | ?        | 1        | 24.0        | 20.0        | (Kirk, 2001)         |
| <i>P. pedersen</i>   | BMNH?               | Paratype | ♂   | ?        | 1        | 20.0        | 16.5        | (Kirk, 2001)         |
| <i>P. smith</i> 5    | BIOGU00533-C11      | 129      | ♂   | 2        | 2        | 8.25        | 7.96        | This study           |
| <i>P. smith</i> 7    | BIOGU00533-E02      | 122      | ♂   | 2        | 1        | 8.95        | 7.27        | –                    |
| <i>P. smith</i>      | BMNH?               | Holotype | ♂   | N/A      | 1        | 17.0        | 14.0        | (Charpentier, 1996b) |
| <i>P. smith</i>      | BMNH(Waldo Coll.)   | Paratype | ♀   | N/A      | 1        | 23.0        | 20.0        | (Charpentier, 1996b) |
| <i>P. smith</i>      | Verdez Coll. (molt) | non type | ♀   | N/A      | 2        | –           | –           | (Charpentier, 1996b) |
| <i>P. smith</i>      | Verdez Coll. (molt) | non type | ♀   | N/A      | 1        | –           | –           | (Charpentier, 1996b) |
| <i>P. smith</i>      | Verdez Coll.        | paratype | ♀   | N/A      | 2        | 26.0        | 23.0        | (Charpentier, 1996b) |
| <i>P. smith</i>      | Verdez Coll.        | non type | ♂   | N/A      | 1        | –           | –           | (Charpentier, 1996b) |
| <i>P. smith</i>      | Charpentier Coll.   | non type | ♂   | N/A      | 1        | –           | –           | (Charpentier, 1996b) |
| <i>P. smith</i>      | BMNH 1908.6.30.2    | Holotype | ♀   | N/A      | 1        | 23.0        | 20.0        | (Kirk, 1996)         |

Table 1: *continued*

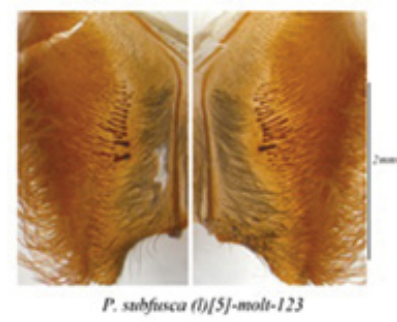
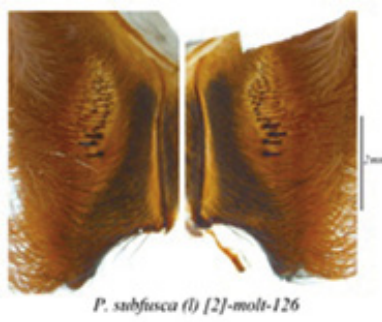
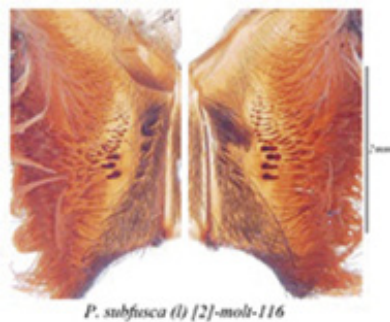
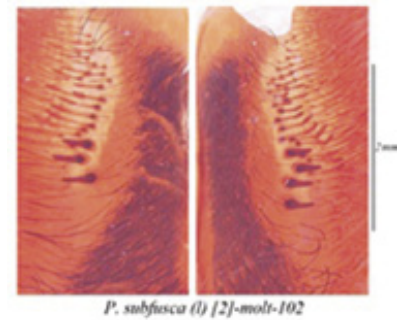
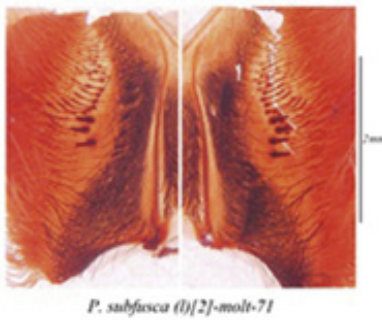
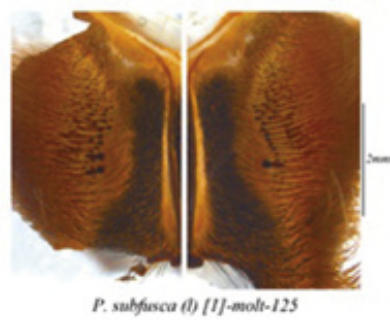
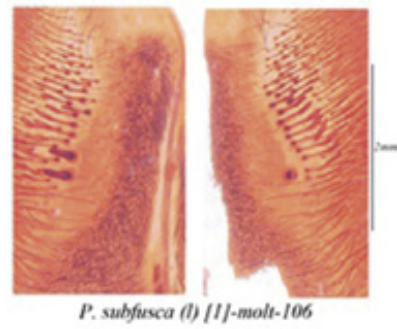
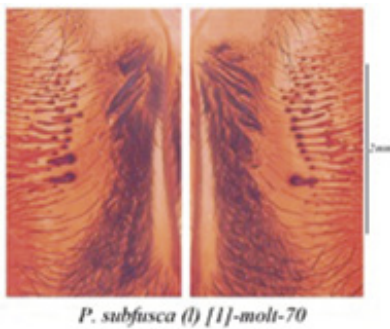
| Species ID           | Specimen ID/Code     | molt#       | SEX | #tub (R) | #tub (L) | CL          | CW          | Source               |
|----------------------|----------------------|-------------|-----|----------|----------|-------------|-------------|----------------------|
| <i>P. regalis</i> 1  | BIOGU00532-D10       | 115         | ♀   | 2        | 2        | 17.5        | 14.6        | This study           |
| <i>P. regalis</i> 1  | BIOGU00532-D10       | 81          | ♀   | 2        | 2        | <b>21.6</b> | <b>17.0</b> | –                    |
| <i>P. regalis</i> 2  | BIOGU00532-E02       | 80          | ♀   | 4        | 3        | <b>19.8</b> | <b>16.0</b> | –                    |
| <i>P. regalis</i> 2  | BIOGU00532-E01       | 79          | ♀   | 4        | 1        | 21.1        | 19.0        | –                    |
| <i>P. regalis</i> 4  | BIOGU00532-D11       | 119         | ♀   | 1        | 2        | <b>17.8</b> | <b>15.9</b> | –                    |
| <i>P. regalis</i> 7  | BIOGU00533-A08       | 4           | ♀   | 2        | 2        | <b>23.0</b> | <b>18.9</b> | –                    |
| <i>P. regalis</i> 7  | BIOGU00533-A08       | 5           | ♀   | 4        | 2        | <b>24.5</b> | <b>19.8</b> | –                    |
| <i>P. regalis</i> 7  | BIOGU00533-A08       | 78          | ♀   | 5        | 3        | –           | –           | –                    |
| <i>P. striata</i> 1  | BIOGU00532-C03       | 101         | ♂   | 2        | 1        | 15.7        | 14.3        | –                    |
| <i>P. striata</i> 2  | BIOGU00532-C04       | 84          | ♂   | 2        | 2        | 17.9        | 15.6        | –                    |
| <i>P. striata</i> 3  | BIOGU00533-A11       | 2           | ♀   | 4        | 2        | <b>24.0</b> | <b>19.6</b> | –                    |
| <i>P. striata</i> 3  | BIOGU00533-A11       | 1           | ♀   | 1        | 2        | <b>25.1</b> | <b>20.2</b> | –                    |
| <i>P. striata</i> 3  | BIOGU00533-A11       | 119         | ♀   | 2        | 2        | 25.6        | 22.9        | –                    |
| <i>P. striata</i> 4  | BIOGU00533-A12       | 110         | ♂   | 2        | 2        | 8.2         | 6.9         | –                    |
| <i>P. striata</i> 7  | BIOGU00532-C06       | 130         | ♂   | 1        | 2        | 14.1        | 12.6        | –                    |
| <i>P. striata</i> 10 | BIOGU00532-G11       | 85          | ♂   | 2        | 1        | <b>15.6</b> | <b>12.0</b> | –                    |
| <i>P. striata</i> 11 | BIOGU00533-B02       | 3           | ♀   | 1        | 2        | <b>24.0</b> | <b>19.0</b> | –                    |
| <i>P. striata</i> 11 | BIOGU00533-B02       | 83          | ♀   | 10       | 9        | <b>25.9</b> | <b>19.6</b> | –                    |
| <i>P. rufilata</i> 1 | BIOGU00532-E12       | 37          | ♀   | 3        | 2        | <b>14.0</b> | <b>11.9</b> | –                    |
| <i>P. rufilata</i> 1 | BIOGU00532-E12       | 36          | ♀   | 6        | 3        | 15.0        | 13.2        | –                    |
| <i>P. rufilata</i> 1 | BIOGU00532-E12       | 35          | ♀   | 3        | 2        | <b>15.7</b> | <b>13.9</b> | –                    |
| <i>P. rufilata</i> 1 | BIOGU00532-E12       | 89          | ♀   | 3        | 2        | 22.1        | 19.6        | –                    |
| <i>P. rufilata</i> 3 | BIOGU00532-F02       | 40          | ♂   | 2        | 1        | <b>8.5</b>  | <b>7.8</b>  | –                    |
| <i>P. rufilata</i> 3 | BIOGU00532-F02       | 39          | ♂   | 3        | 2        | <b>12.0</b> | <b>11.0</b> | –                    |
| <i>P. rufilata</i> 3 | BIOGU00532-F02       | 113         | ♂   | 2        | 2        | 15.2        | 13.9        | –                    |
| <i>P. rufilata</i> 8 | BIOGU00533-A10       | 38          | ♀   | 3        | 4        | <b>27.0</b> | <b>24.0</b> | –                    |
| <i>P. rufilata</i> 8 | BIOGU00533-A10       | 88          | ♀   | 2        | 4        | 28.4        | 25.1        | –                    |
| <i>P. rufilata</i>   | BMNH 99.7-12.8       | Holotype    | ♂   | N/A      | 2        | 15.0        | 15.0        | (Charpentier, 1996a) |
| <i>P. rufilata</i>   | BMNH?                | Allotype    | ♀   | N/A      | N/A      | <b>N/A</b>  | <b>N/A</b>  | (Pocock, 1900)       |
| <i>P. rufilata</i>   | Coll. P. Charpentier | non type    | ♂   | N/A      | 2        | <b>N/A</b>  | <b>N/A</b>  | (Charpentier, 1996a) |
| <i>P. rufilata</i>   | Coll. P. Charpentier | non type    | ♀   | N/A      | 4        | 23.0        | 23.0        | (Charpentier, 1996a) |
| <i>P. rufilata</i>   | Coll. P. Charpentier | illustrated | ♀   | N/A      | 3        | <b>N/A</b>  | <b>N/A</b>  | (Charpentier, 1996a) |

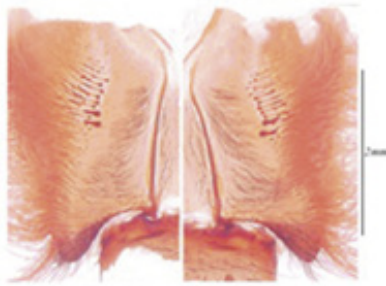
Table 1: *continued*

| Species ID                 | Specimen ID/Code    | molt#    | SEX | #tub (R) | #tub (L) | CL          | CW          | Source          |
|----------------------------|---------------------|----------|-----|----------|----------|-------------|-------------|-----------------|
| <i>P. tigrinawesseli</i> 2 | BIOGU00532-D06      | 53       | ♂   | 4        | 4        | 17.4        | 14.6        | This study      |
| <i>P. tigrinawesseli</i> 2 | BIOGU00532-D06      | 52       | ♂   | 4        | 4        | <b>11.9</b> | <b>10.1</b> | –               |
| <i>P. tigrinawesseli</i> 2 | BIOGU00532-D06      | 54       | ♂   | 4        | 4        | <b>15.0</b> | <b>12.6</b> | –               |
| <i>P. tigrinawesseli</i> 5 | BIOGU00533-D07      | 111      | ♂   | 2        | 1        | 8.8         | 7.8         | –               |
| <i>P. tigrinawesseli</i> 5 | BIOGU00533-D07      | 128      |     | 2        | 2        | 10.1        | 8.7         | –               |
| <i>P. tigrinawesseli</i> 6 | BIOGU00533-D08      | 123      | ♂   | 1        | 2        | 8.2         | 7.3         | –               |
| <i>P. tigrinawesseli</i>   | BMNH?               | Holotype | ♀   | –        | 7        | 25.0        | 21.0        | (Smith, 2006)   |
| <i>P. tigrinawesseli</i>   | BMNH?               | Paratype | ♂   | –        | 2        | 16.0        | 14.5        | (Smith, 2006)   |
| <i>P. formosa</i> 2        | BIOGU00532-F06      | 103      | ♀   | 1        | 2        | 16.9        | 14.1        | This study      |
| <i>P. formosa</i> 3        | BIOGU00532-F07      | 96       | ♂   | 2        | 1        | <b>11.4</b> | <b>8.8</b>  | –               |
| <i>P. formosa</i> 3        | BIOGU00532-F07      | 99       | ♂   | 2        | 1        | <b>12.1</b> | <b>9.9</b>  | –               |
| <i>P. formosa</i> 3        | BIOGU00532-F07      | 66       | ♂   | 2        | 3        | 12.9        | 11.5        | –               |
| <i>P. formosa</i> 3        | BIOGU00532-F07      | 95       | ♂   | 1        | 2        | <b>13.4</b> | <b>11.4</b> | –               |
| <i>P. formosa</i> 5        | BIOGU00532-F10      | 49       | ♀   | 3        | 3        | <b>18.2</b> | <b>15.0</b> | –               |
| <i>P. formosa</i> 5        | BIOGU00532-F10      | 93       | ♀   | 2        | 2        | <b>20.3</b> | <b>17.0</b> | –               |
| <i>P. formosa</i> 6        | BIOGU00532-H09      | 50       | ♀   | 2        | 3        | 20.1        | 17.6        | –               |
| <i>P. formosa</i> 6        | BIOGU00532-H09      | 94       | ♀   | 2        | 3        | <b>21.5</b> | <b>17.5</b> | –               |
| <i>P. formosa</i> 7        | BIOGU00532-G12      | 48       | ♂   | 2        | 2        | <b>19.0</b> | <b>15.9</b> | –               |
| <i>P. formosa</i> 7        | BIOGU00532-G12      | 92       | ♂   | 2        | 3        | 22.5        | 18.9        | –               |
| <i>P. formosa</i>          | OUMNH 2007-064      | non type | ♂   | 2        | 4        | –           | –           | (Gabriel, 2010) |
| <i>P. formosa</i>          | OUMNH 2007-064      | non type | ♀   | 3        | 3        | –           | –           | (Gabriel, 2010) |
| <i>P. formosa</i>          | OUMNH 2009-007      | non type | ♂   | 3        | 2        | –           | –           | (Gabriel, 2010) |
| <i>P. formosa</i>          | OUMNH 2007-064      | non type | ♂   | 8        | 6        | –           | –           | (Gabriel, 2010) |
| <i>P. formosa</i>          | OUMNH 2007-064      | non type | ♀   | 1        | 3        | –           | –           | (Gabriel, 2010) |
| <i>P. formosa</i>          | OUMNH 2007-064      | non type | ♂   | 3        | 3        | –           | –           | (Gabriel, 2010) |
| <i>P. formosa</i>          | OUMNH 2007-064      | non type | ♂   | 5        | 3        | –           | –           | (Gabriel, 2010) |
| <i>P. formosa</i>          | OUMNH 2007-064      | non type | ♀   | 5        | 4        | –           | –           | (Gabriel, 2010) |
| <i>P. formosa</i>          | OUMNH 2009-007      | non type | ♂   | 3        | 2        | –           | –           | (Gabriel, 2010) |
| <i>P. formosa</i>          | BMNH?               | non type | ♂   | 1        | 1        | –           | –           | (Gabriel, 2010) |
| <i>P. formosa</i>          | BMNH 1902-12-13-9   | non type | ♀   | 1        | 2        | –           | –           | (Gabriel, 2010) |
| <i>P. formosa</i>          | BMNH 1898-10-10-1-2 | non type | ♀   | 2        | 2        | –           | –           | (Gabriel, 2010) |
| <i>P. formosa</i>          | BMNH 1898-10-10-1-2 | non type | ♀   | 2        | 4        | –           | –           | (Gabriel, 2010) |
| <i>P. formosa</i>          | BMNH 1898-1031-1-4  | non type | ♀   | 1        | 0        | –           | –           | (Gabriel, 2010) |

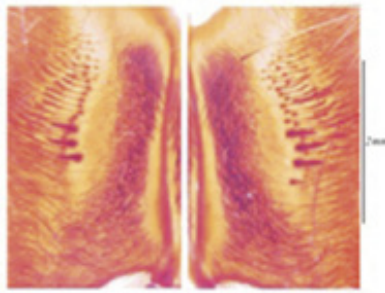
Table 1: *continued*

| Species ID                | Specimen ID/Code   | molt#    | SEX | #tub (R) | #tub (L) | CL   | CW   | Source                     |
|---------------------------|--------------------|----------|-----|----------|----------|------|------|----------------------------|
| <i>P. formosa</i>         | BMNH 1898-1031-1-4 | non type | ♀   | 2        | 2        | –    | –    | (Gabriel, 2010)            |
| <i>P. formosa</i>         | BMNH 1898-1031-1-4 | non type | ♀   | 2        | 1        | –    | –    | (Gabriel, 2010)            |
| <i>P. formosa</i>         | BMNH 1898-1031-1-4 | non type | ♂   | 1        | 0        | –    | –    | (Gabriel, 2010)            |
| <i>P. nallamalaiensis</i> | NOT DEPOSITED      | non type | ♀   | –        | 3        | 21.5 | 18.2 | (Rao et al., 2006)         |
| <i>P. rajaei</i>          | National museum SL | Holotype | ♀   | –        | 2        | 26.2 | 23.4 | (Nanayakkara et al., 2012) |
| <i>P. rajaei</i>          | National museum SL | Paratype | ♂   | –        | 1        | 18.0 | 16.2 | (Nanayakkara et al., 2012) |

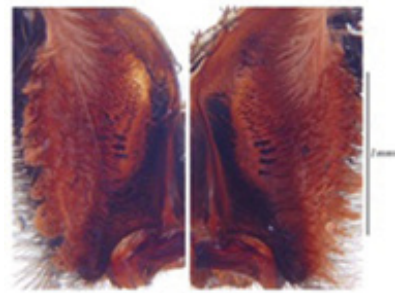




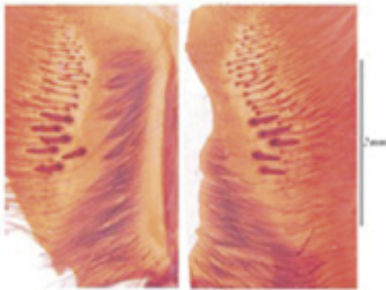
*P. subfusca* (l) [6]-molt-107



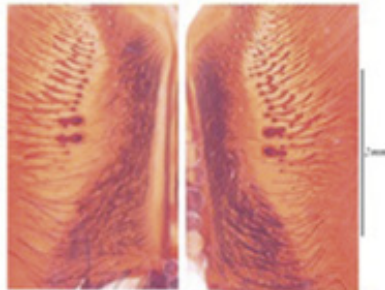
*P. subfusca* [1]-molt-74



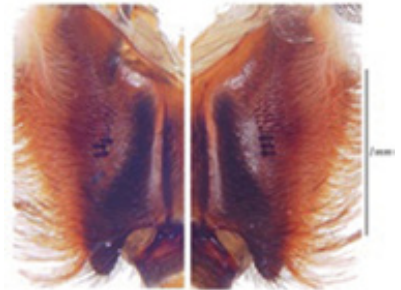
*P. subfusca* [1]-molt-105



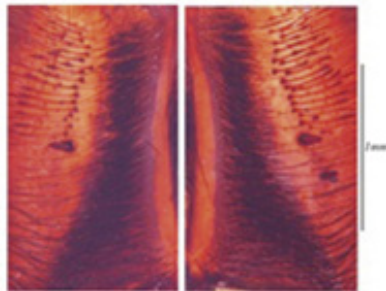
*P. subfusca* [2]-molt-108



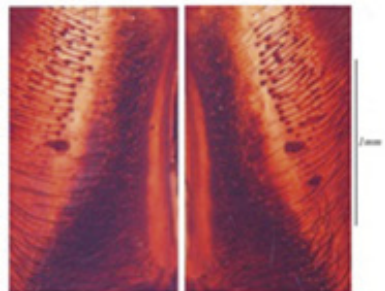
*P. subfusca* [3]-molt-100



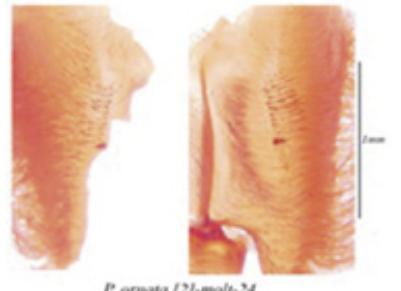
*P. subfusca* [5]-molt-117



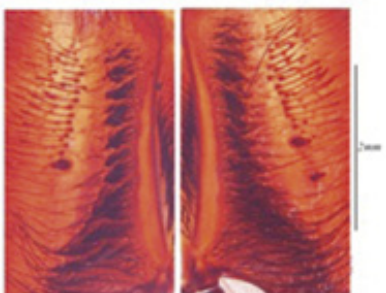
*P. ornata* [1]-molt-24



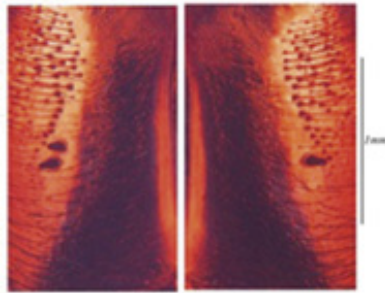
*P. ornata* [1]-molt-86



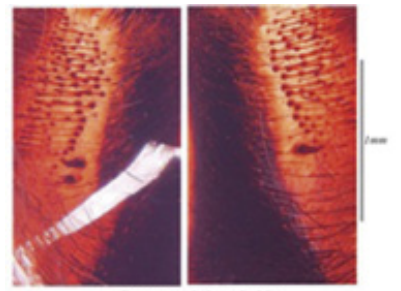
*P. ornata* [2]-molt-24



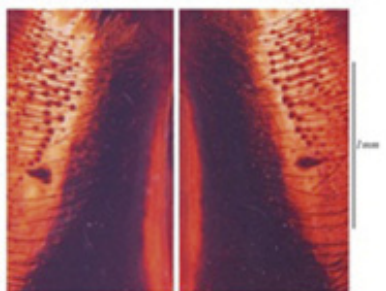
*P. ornata* [4]-molt-25



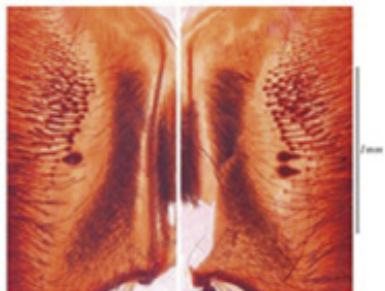
*P. ornata* [4]-molt-22



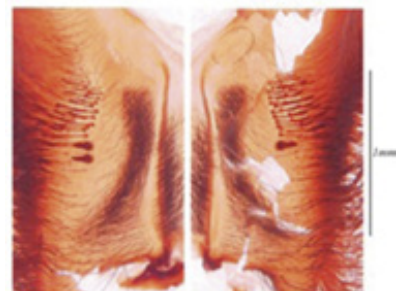
*P. ornata* [4]-molt-23



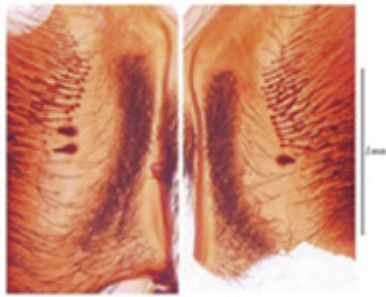
*P. ornata* [4]-molt-87



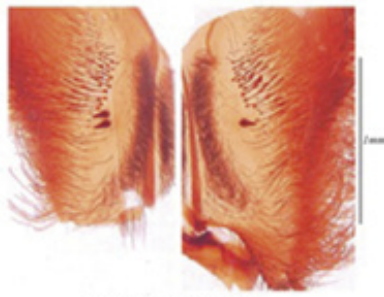
*P. fasciata* [1]-molt-76



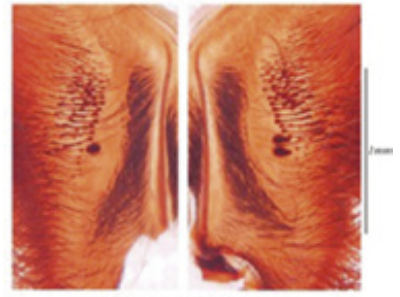
*P. fasciata* [2]-molt-18



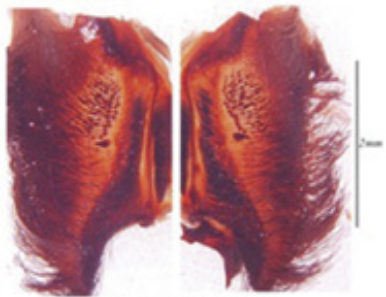
*P. fasciata* [2]-molt-77



*P. fasciata* [4]-molt-19



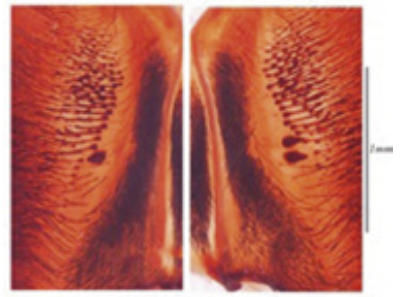
*P. fasciata* [2]-molt-17



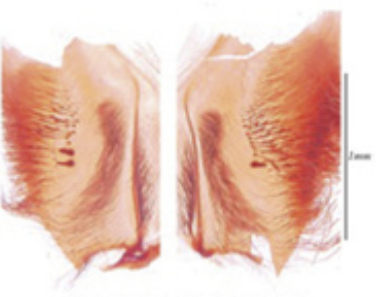
*P. fasciata* [7]-molt-15



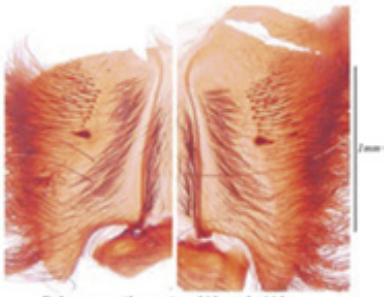
*P. fasciata* [7]-molt-104



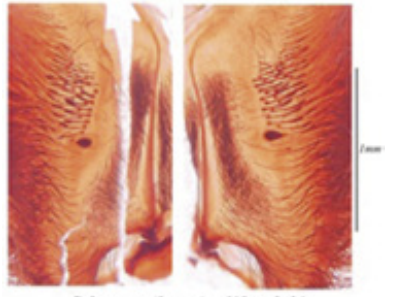
*P. fasciata* [7]-molt-109



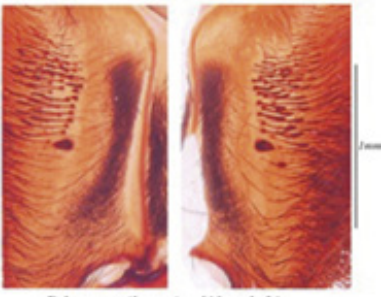
*P. hamnavilasomica* [1]-molt-21B



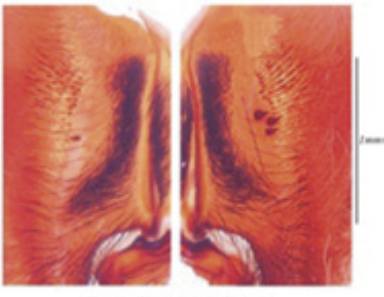
*P. hamnavilasomica* [1]-molt-113



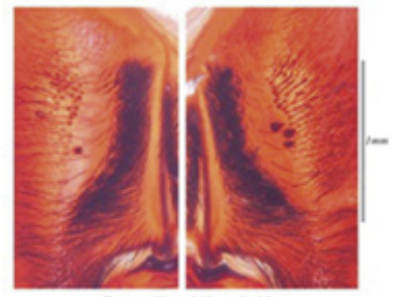
*P. hamnavilasomica* [1]-molt-21



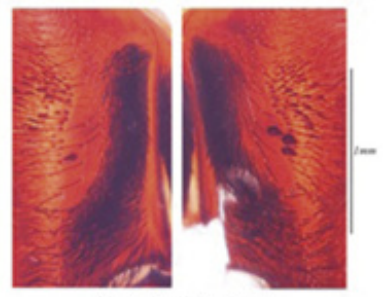
*P. hamnavilasomica* [1]-molt-20



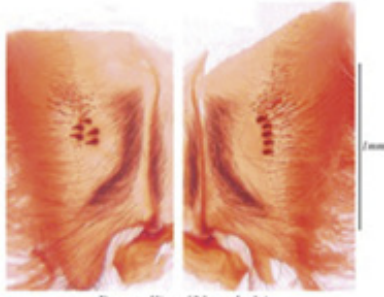
*P. metallica* [1]-molt-116



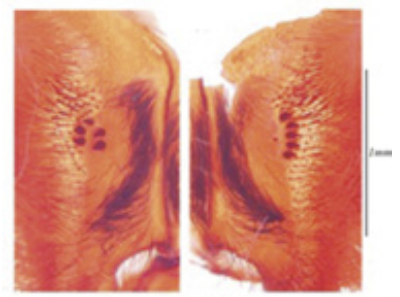
*P. metallica* [1]-molt-32



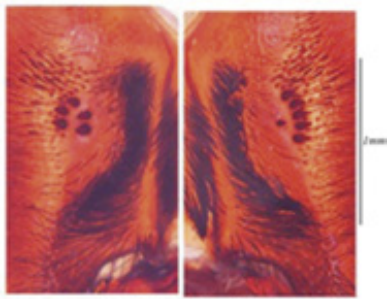
*P. metallica* [1]-molt-90



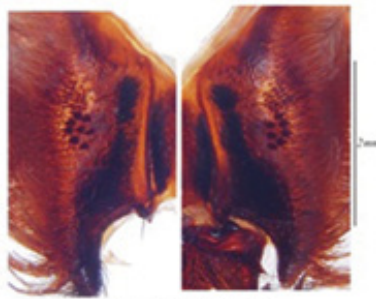
*P. metallica* [2]-molt-34



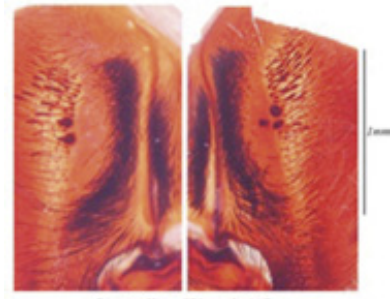
*P. metallica* [2]-molt-33



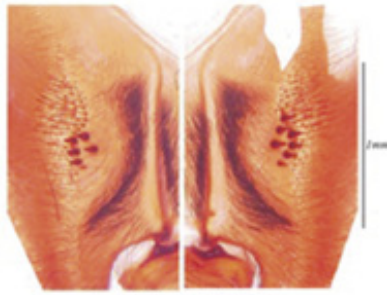
*P. metallica* [2]-molt-91



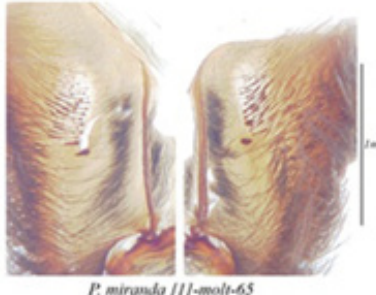
*P. metallica* [6]-molt-211



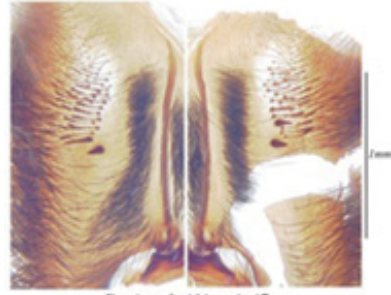
*P. metallica* [7]-molt-117



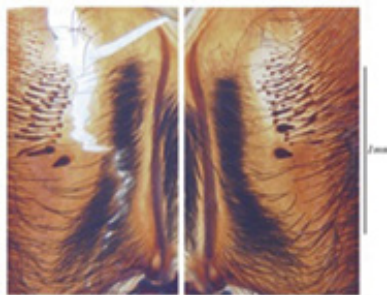
*P. metallica* [8]-Molt-118



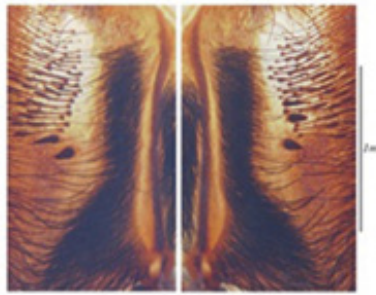
*P. miranda* [1]-molt-65



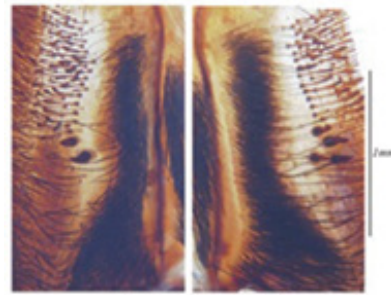
*P. miranda* [1]-molt-47



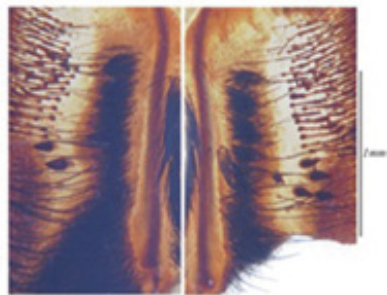
*P. miranda* [1]-molt-46



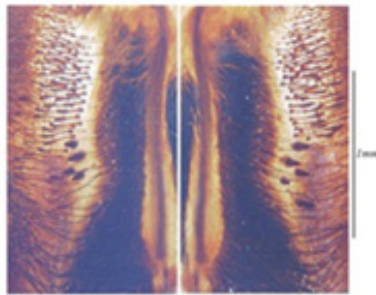
*P. miranda* [1]-molt-45



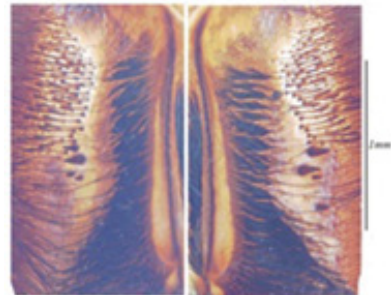
*P. miranda* [5]-molt-42



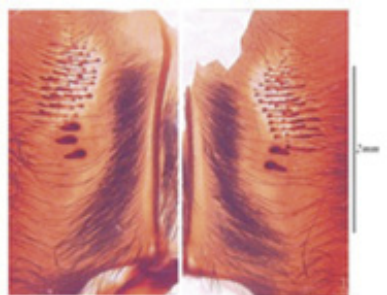
*P. miranda* [5]-molt-97



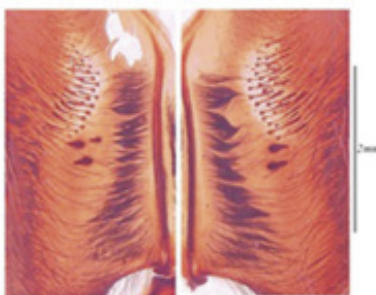
*P. miranda* [6]-molt-98



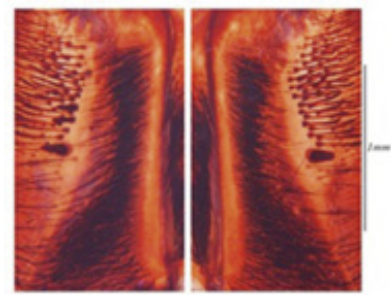
*P. miranda* [6]-molt-44



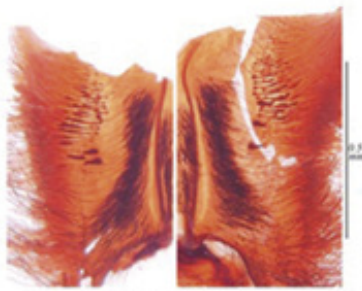
*P. miranda* [8]-molt-120



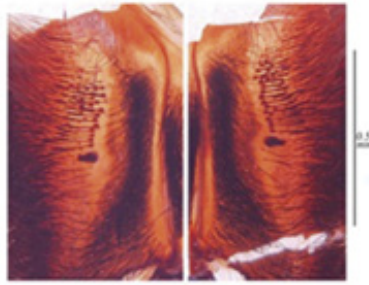
*P. miranda* [9]-molt-121



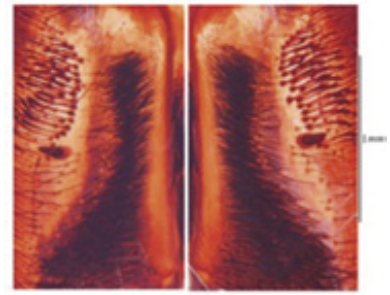
*P. pedersenii* [1]-molt-28



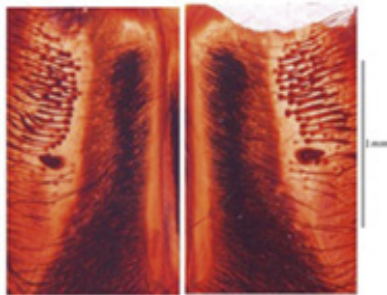
*P. pedersenii* [2]-molt-30



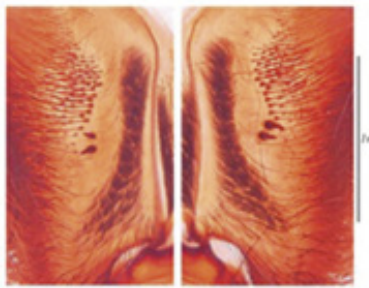
*P. pedersenii* [2]-molt-75



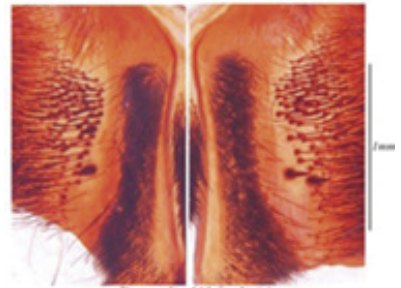
*P. pedersenii* [4]-molt-29



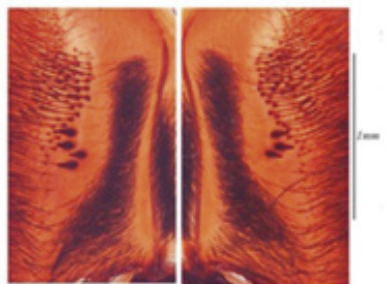
*P. pedersenii* [4]-molt-7



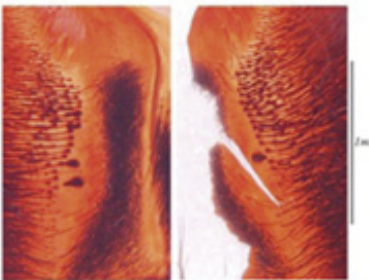
*P. regalis* [1]-molt-115



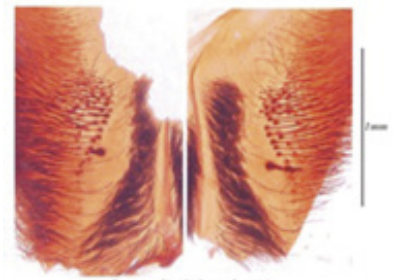
*P. regalis* [1]-molt-81



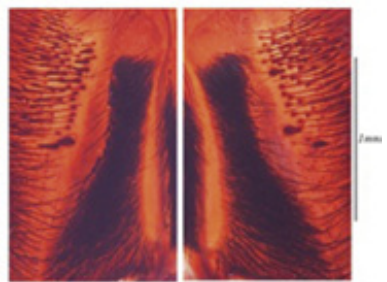
*P. regalis* [2]-molt-80



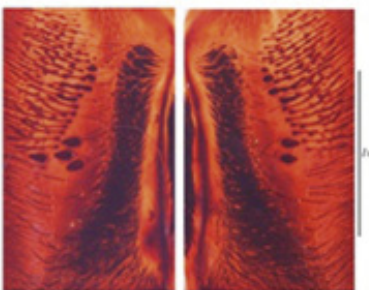
*P. regalis* [2]-molt-79



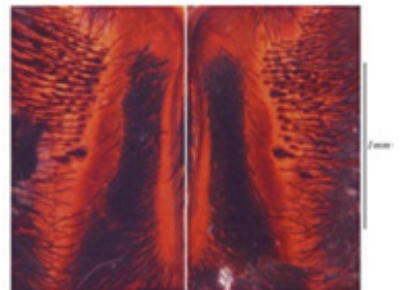
*P. regalis* [4]-molt-119



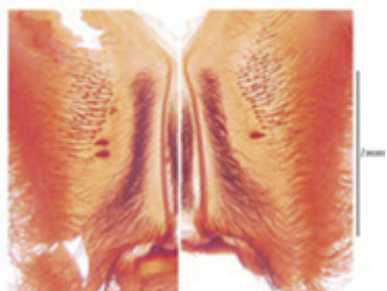
*P. regalis* [7]-molt-4



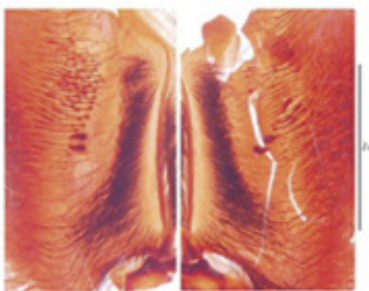
*P. regalis* [7]-molt-5



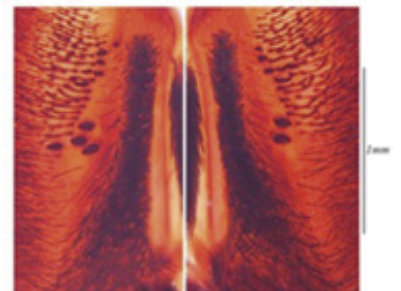
*P. regalis* [7]-molt-78



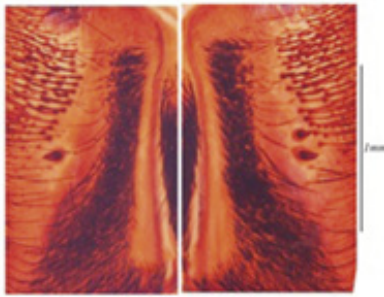
*P. striata* [1]-molt-101



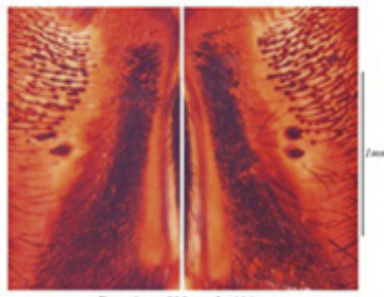
*P. striata* [2]-molt-84



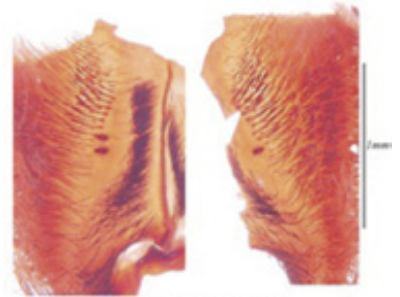
*P. striata* [3]-molt-2



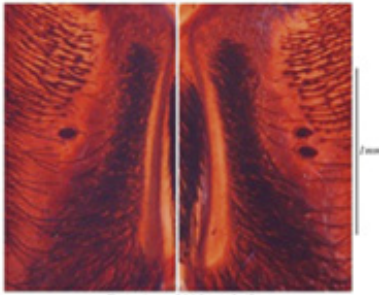
*P. striata* [3]-molt-1



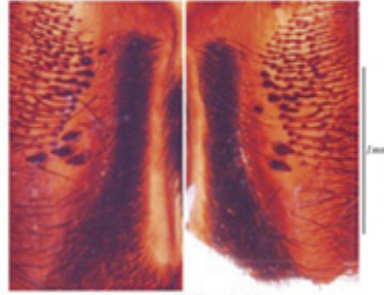
*P. striata* [31]-molt-118



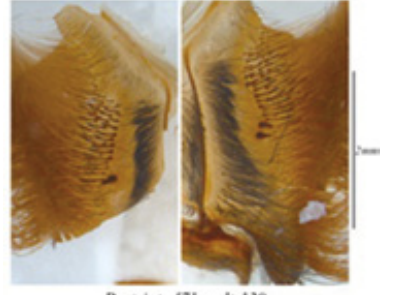
*P. striata* [10]-molt-85



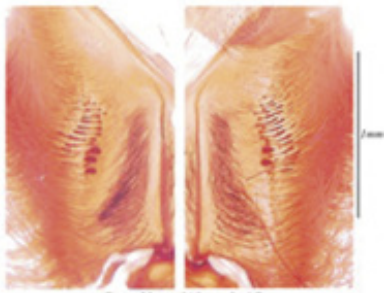
*P. striata* [11]-molt-3



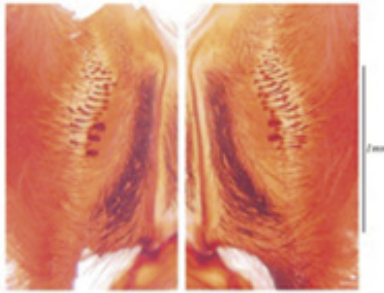
*P. striata* [11]-molt-83



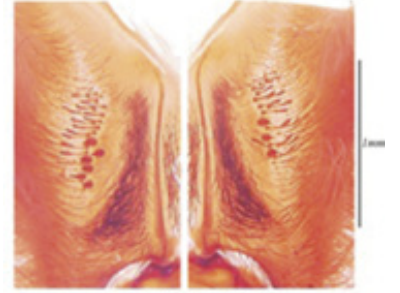
*P. striata* [7]-molt-130



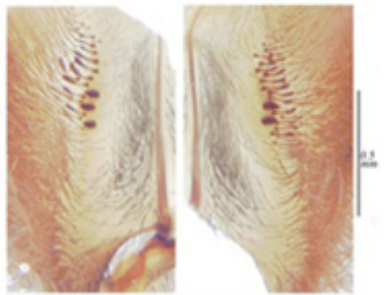
*P. rufilata* [1]-molt-37



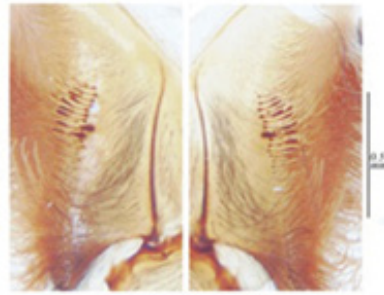
*P. rufilata* [1]-molt-35



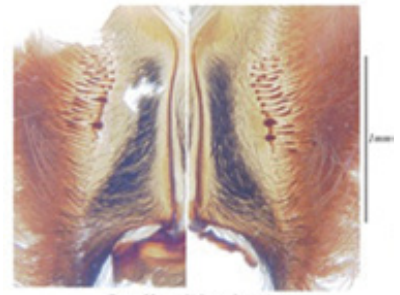
*P. rufilata* [1]-molt-36



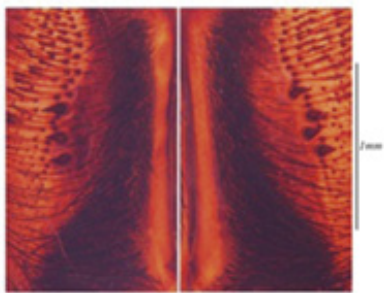
*P. rufilata* [31]-molt-39



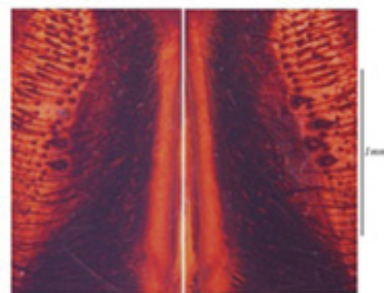
*P. rufilata* [3]-molt-40



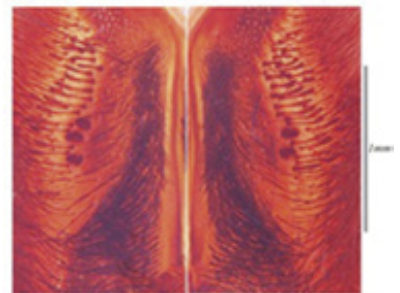
*P. rufilata* [3]-molt-113



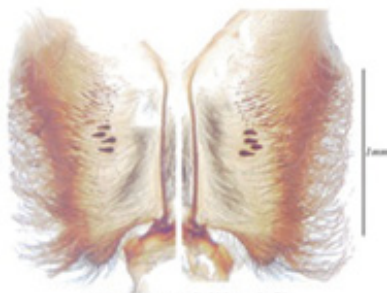
*P. rufilata* [8]-molt-38



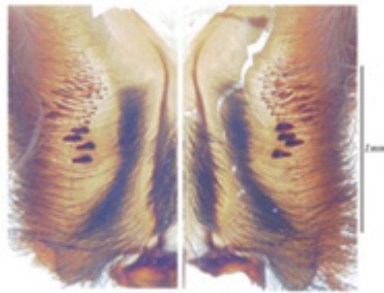
*P. rufilata* [8]-molt-88



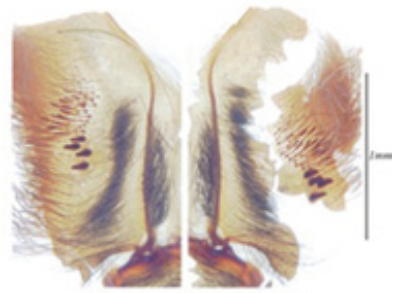
*P. rufilata* [8]-molt-89



*P. tigrinawesseli* [2]-molt-52



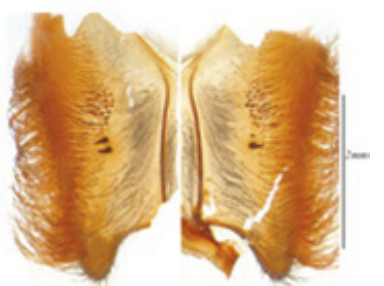
*P. tigrinawesseli* [2]-molt-53



*P. tigrinawesseli* [2]-molt-54



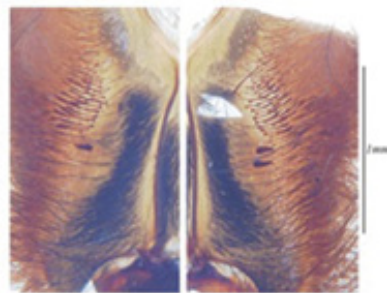
*P. tigrinawesseli* [5]-molt-111



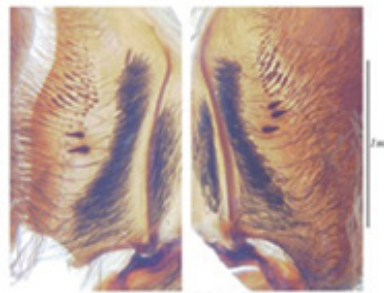
*P. tigrinawesseli* [5]-molt-128



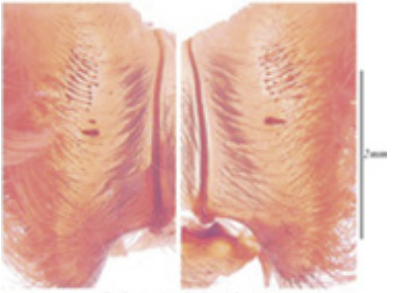
*P. formosa* [2]-molt-95



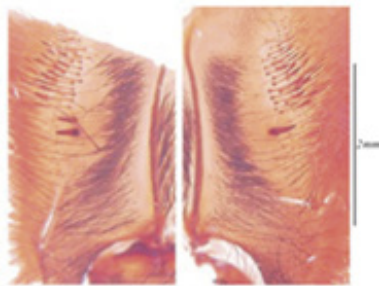
*P. formosa* [2]-molt-103



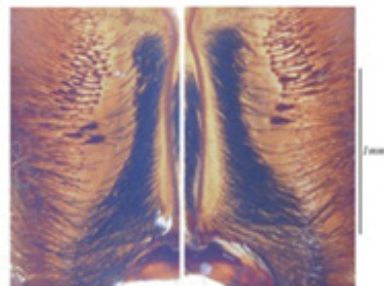
*P. formosa* [3]-molt-66



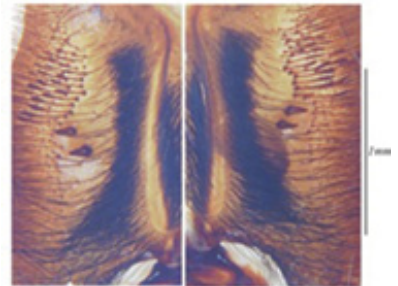
*P. formosa* [3]-molt-96



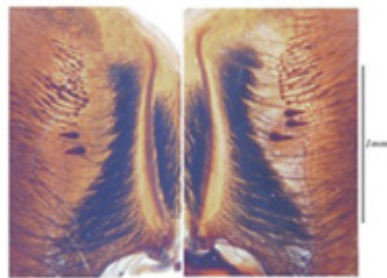
*P. formosa* [3]-molt-99



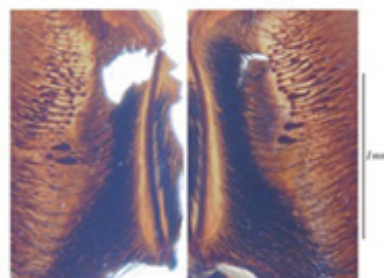
*P. formosa* [5]-molt-49



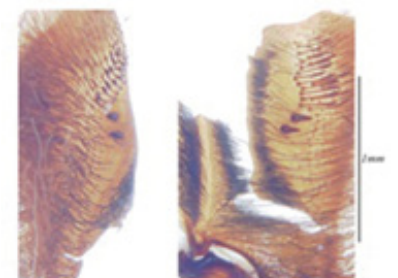
*P. formosa* [5]-molt-93



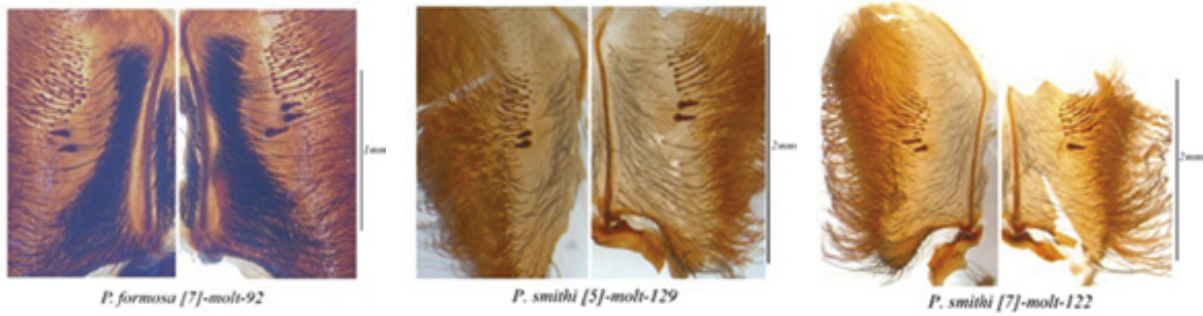
*P. formosa* [5]-molt-50



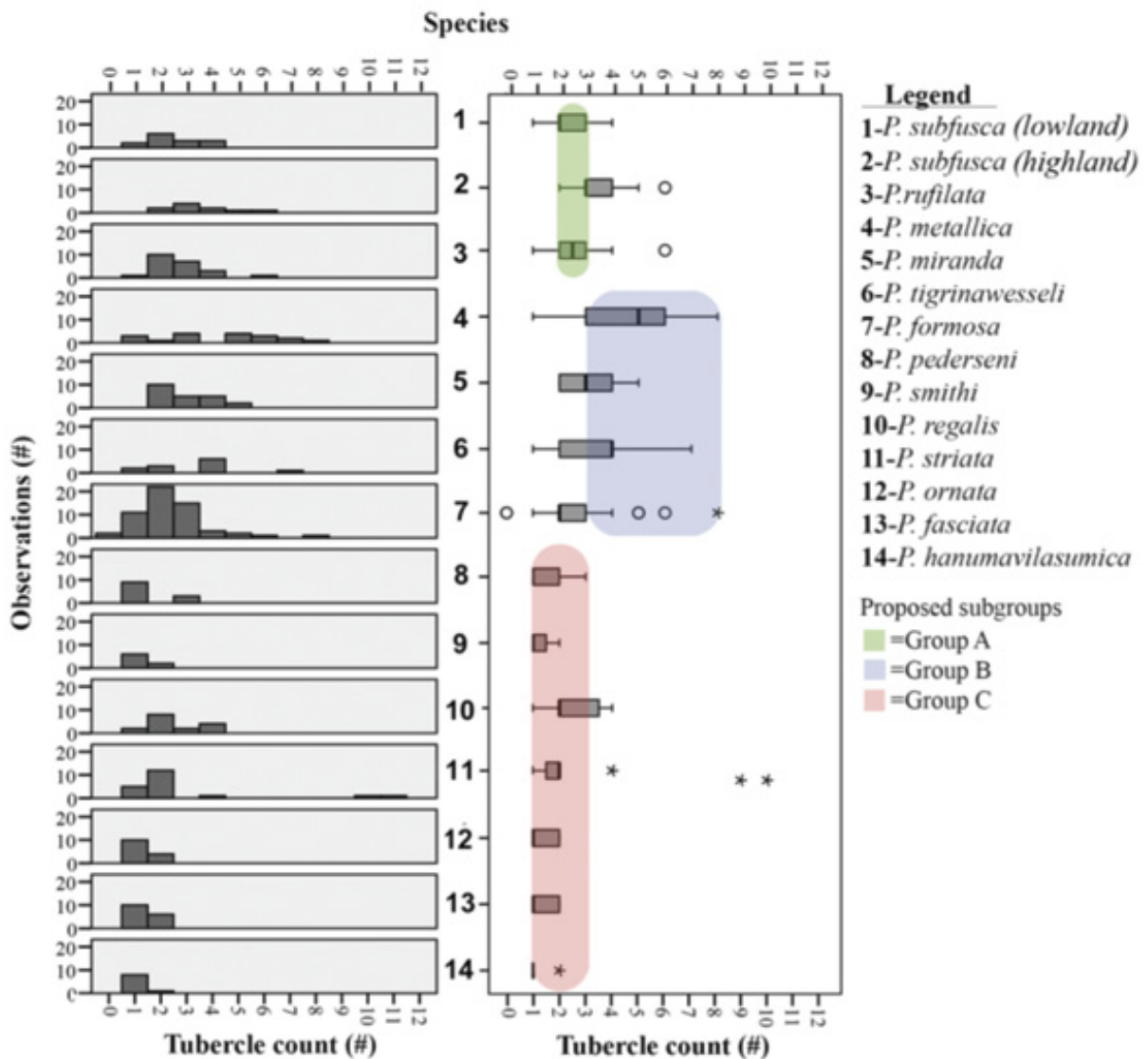
*P. formosa* [6]-molt-94



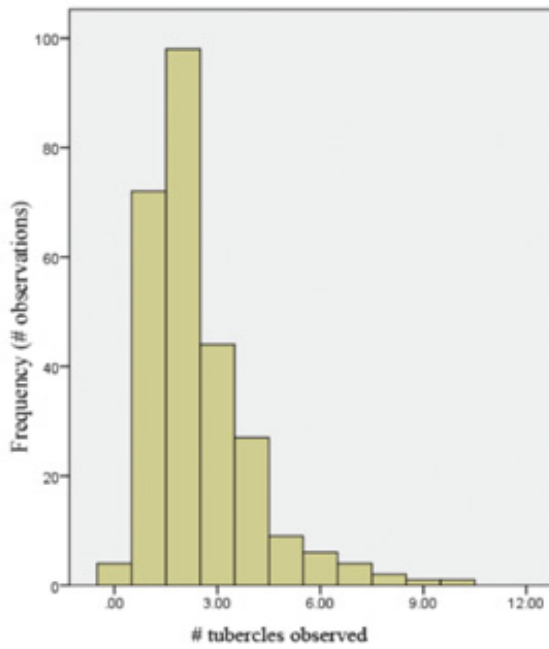
*P. formosa* [7]-molt-48



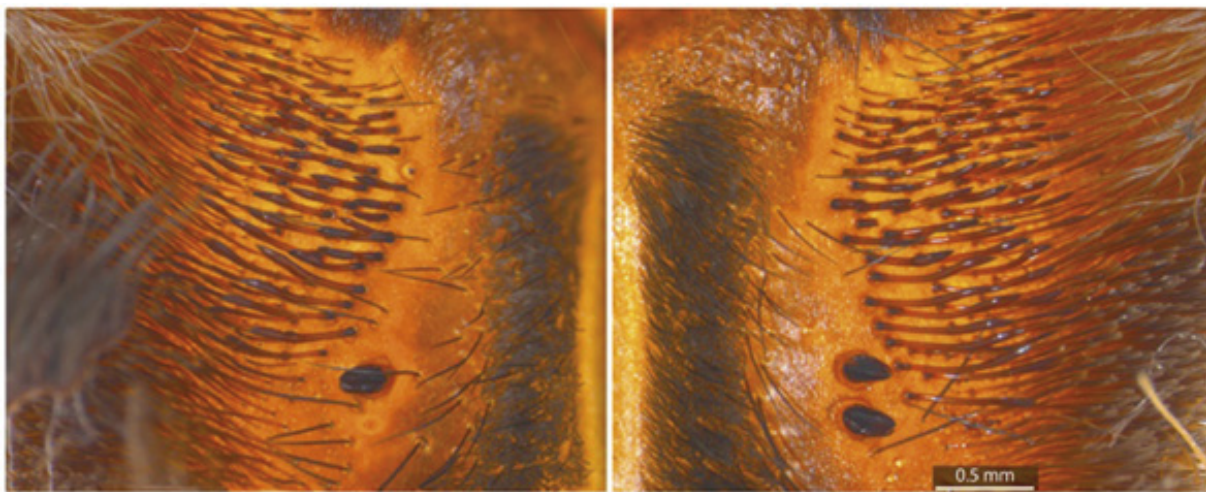
**Fig 1:** Compilation of the cropped images of the prolatral face(s) of the maxilla from the specimens included in this study. Right and left side are shown. The tooth like tubercles can be clearly seen on the edge or within the dense field of maxillary lyra.



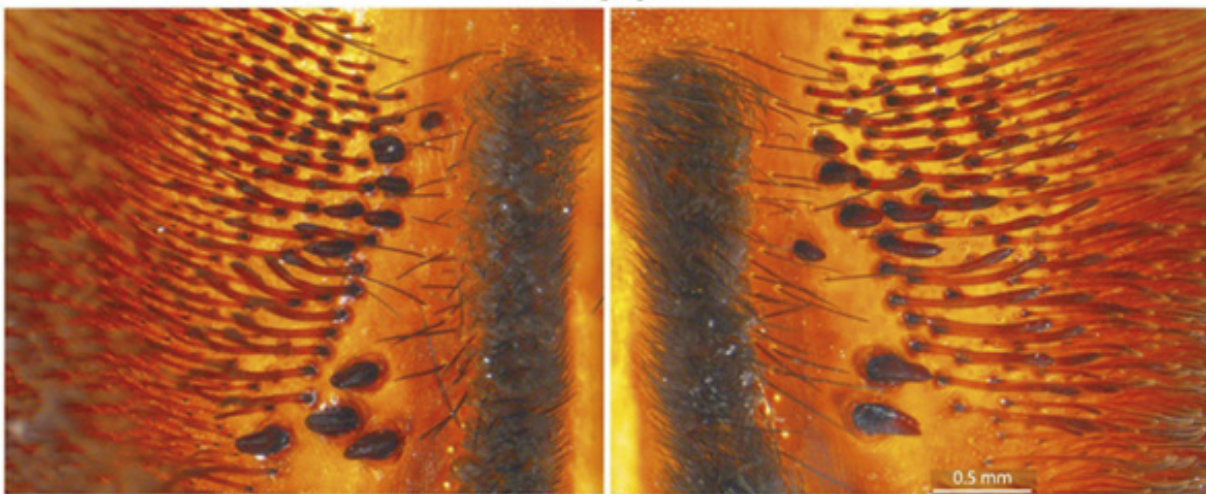
**Fig 2:** Histogram and box plot of tubercle count data for each species. Smith's proposed subgroupings are overlaid as the green, blue and red bubbles representing Group A, B, and C respectively.



**Fig 3:** Histogram showing the distribution of tubercle count data for all *Poecilotheria* specimens included in this study and from the literature. N=268 mean±SD=2.43±1.58.



*P. striata* [11]-molt-3



*P. striata* [11]-molt-83

**Fig 4:** Higher resolution image of the left & right pro-lateral faces of the maxilla from *P. striata* [11] (specimen ID: BIOGU00533-B02). This sequence of molts are from the mature specimen and are in tandem.