Using collections to uncover hidden diversity: a case study with the Chagas Disease vector *Triatoma sanguisuga* (Hemiptera: Reduviidae)

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Abstract:

Triatoma sanguisuga (Hemiptera: Reduviidae) is the most widespread member of the reduviid subfamily Triatominae in the United States. This subfamily presents an epidemiological importance, as virtually all the species are potential Chagas disease (American Trypanosomiasis) vectors. Throughout the subfamily, morphologically similar species are known for having distinct epidemiological relevance, making it vital to have accurate species identifications. The USNM Heteroptera collection houses over 150 specimens of *T. sanguisuga*, which were used for morphological characterization of the species' populations. We measured 20 characters from 150 specimens, with geographic distribution ranging from Florida to Maryland, extending west through Texas. We found two distinct but overlapping populations regarding geographic distribution and measurement of the characters. We also compared head shape using geometric morphometrics and reached the same results. Because populations do not exhibit clear diagnostic characters that could lead to the morphological description of distinct taxonomic entities, further study on the mitochondrial genomes of the different populations will help understand the diversification of *T. sanguisuga* throughout the United States.

Figure 1: Smallest male and female of *T. sanguisuga* next to the largest male and female of *T. sanguisuga* from the USNM Hererooptera collection.

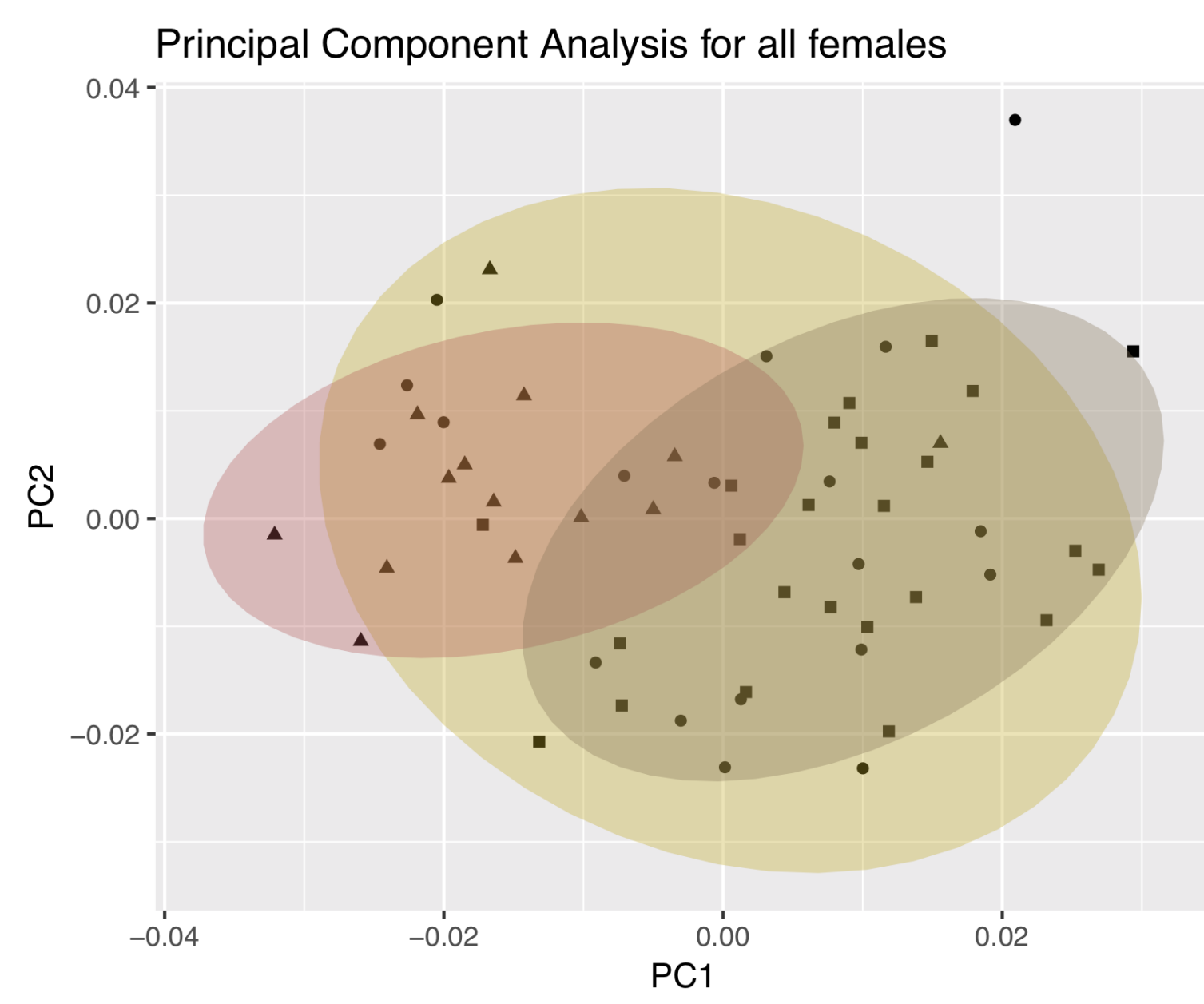Figure 2: Schematic view of a Triatomine insect.

Figure 3: Principal component analysis showing difference in shape of head of female Population A, B, and overlapping population.
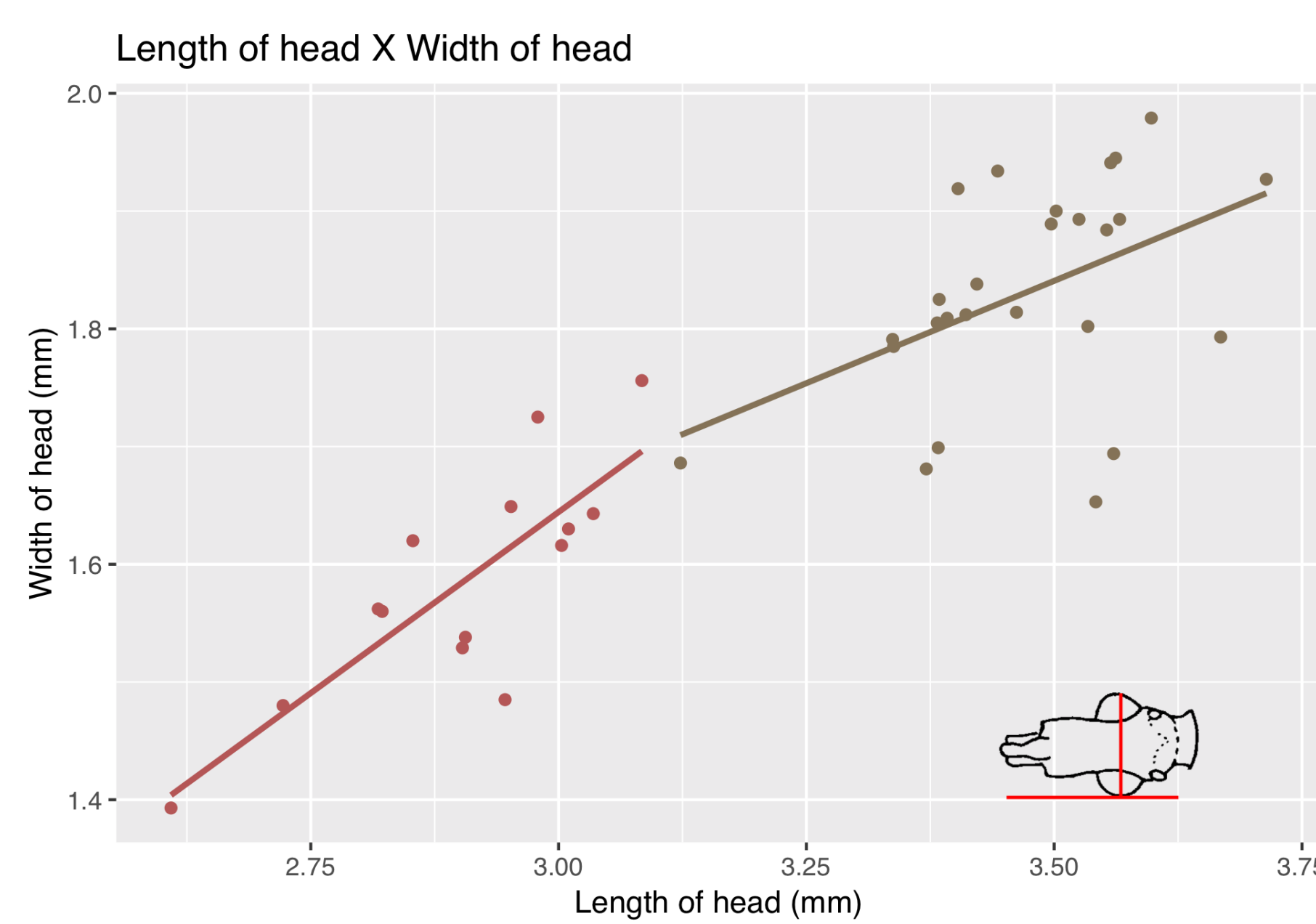

Figure 4: Principal component analysis showing difference in shape of head of male Population A, B, and overlapping population.

Figure 5: Analysis showing difference in male body length of Population A, B, and overlapping population.

Figure 6: Analysis showing difference in female body length of Population A, B, and overlapping population.

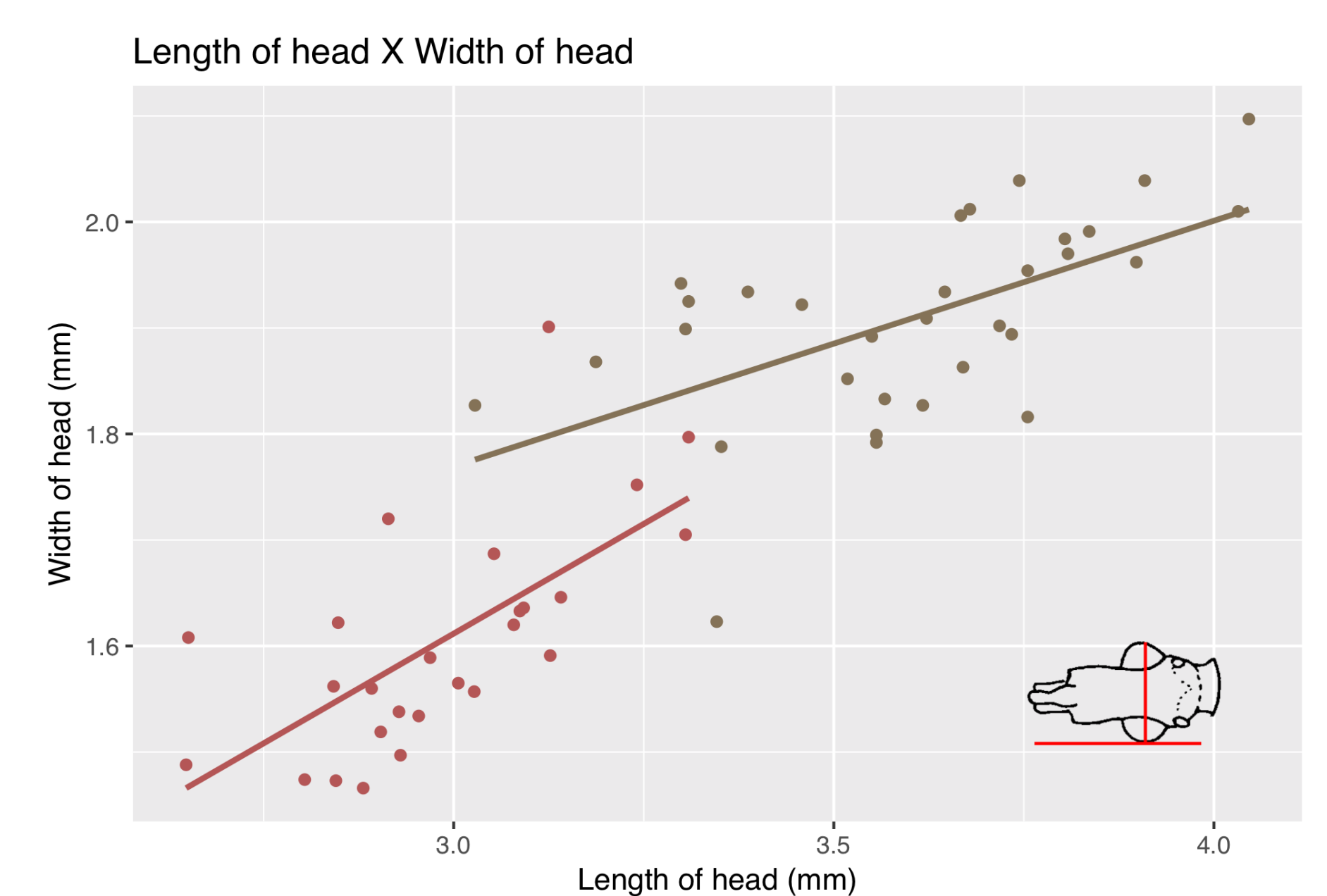Figure 7: Correlation between male length and width of head for Population A (red) and B (brown).

Figure 8: Correlation between male length and width of pronotum for Population A (red) and B (brown).

Figure 9: Correlation between male length and width of abdomen for Population A (red) and B (brown).

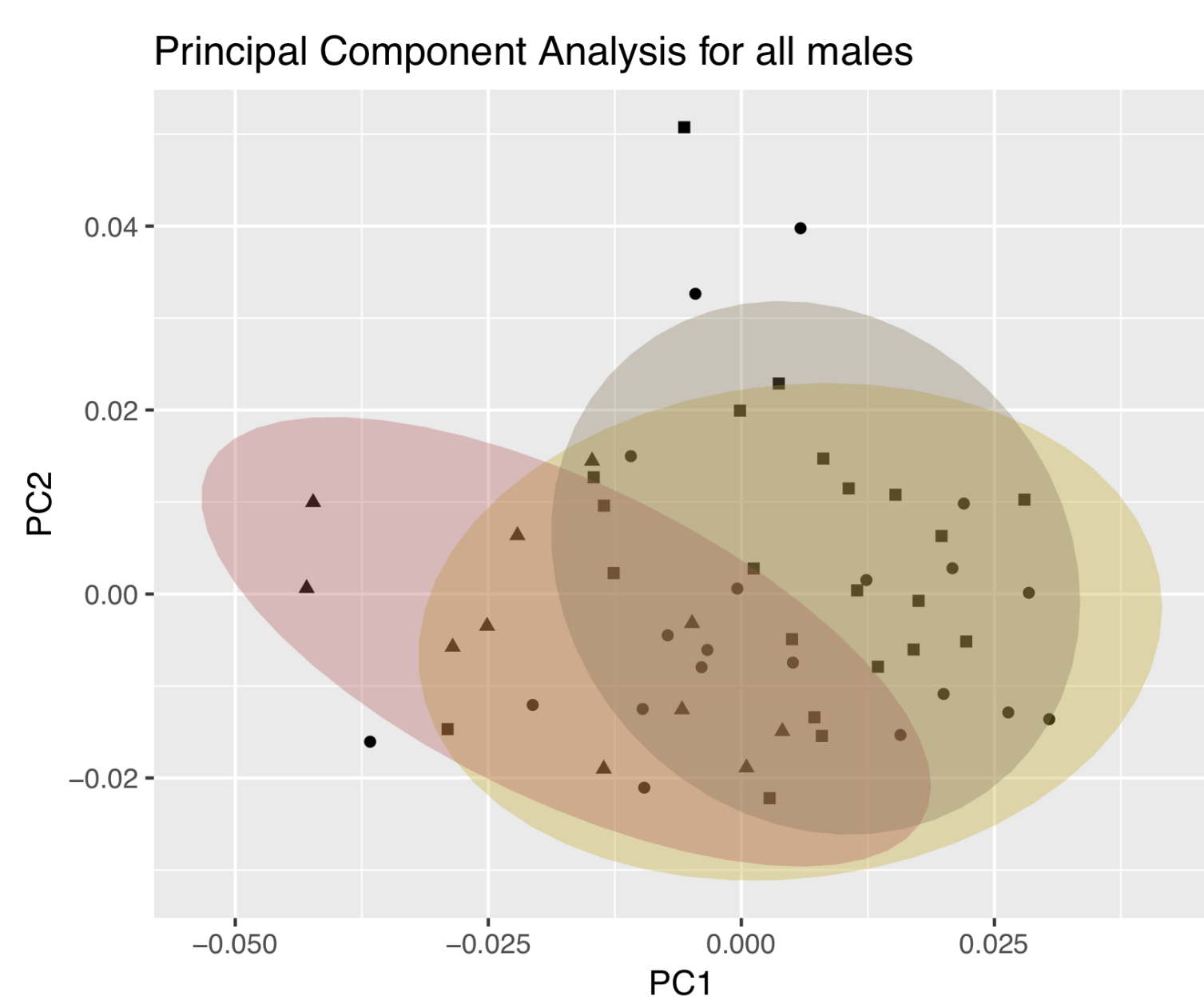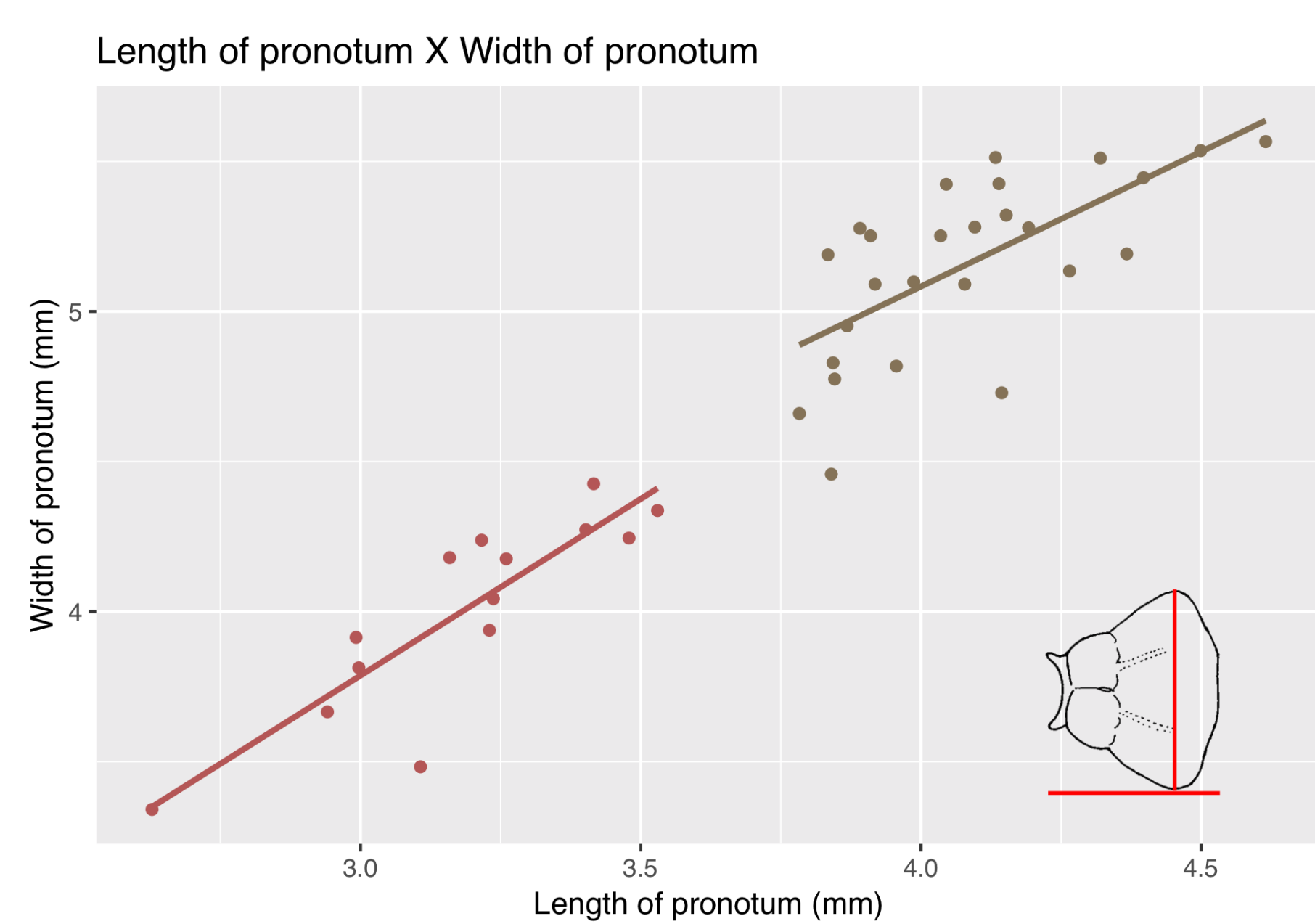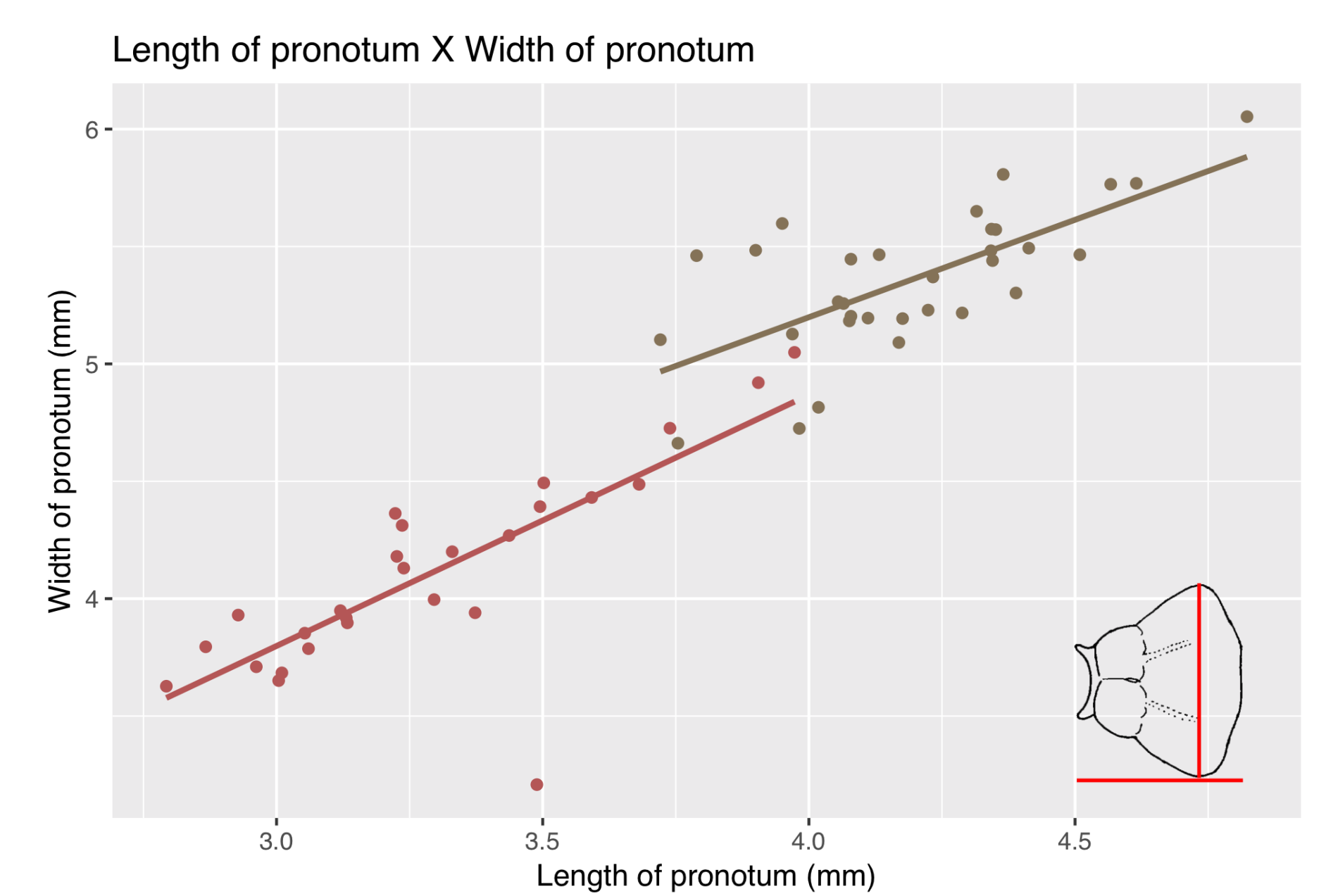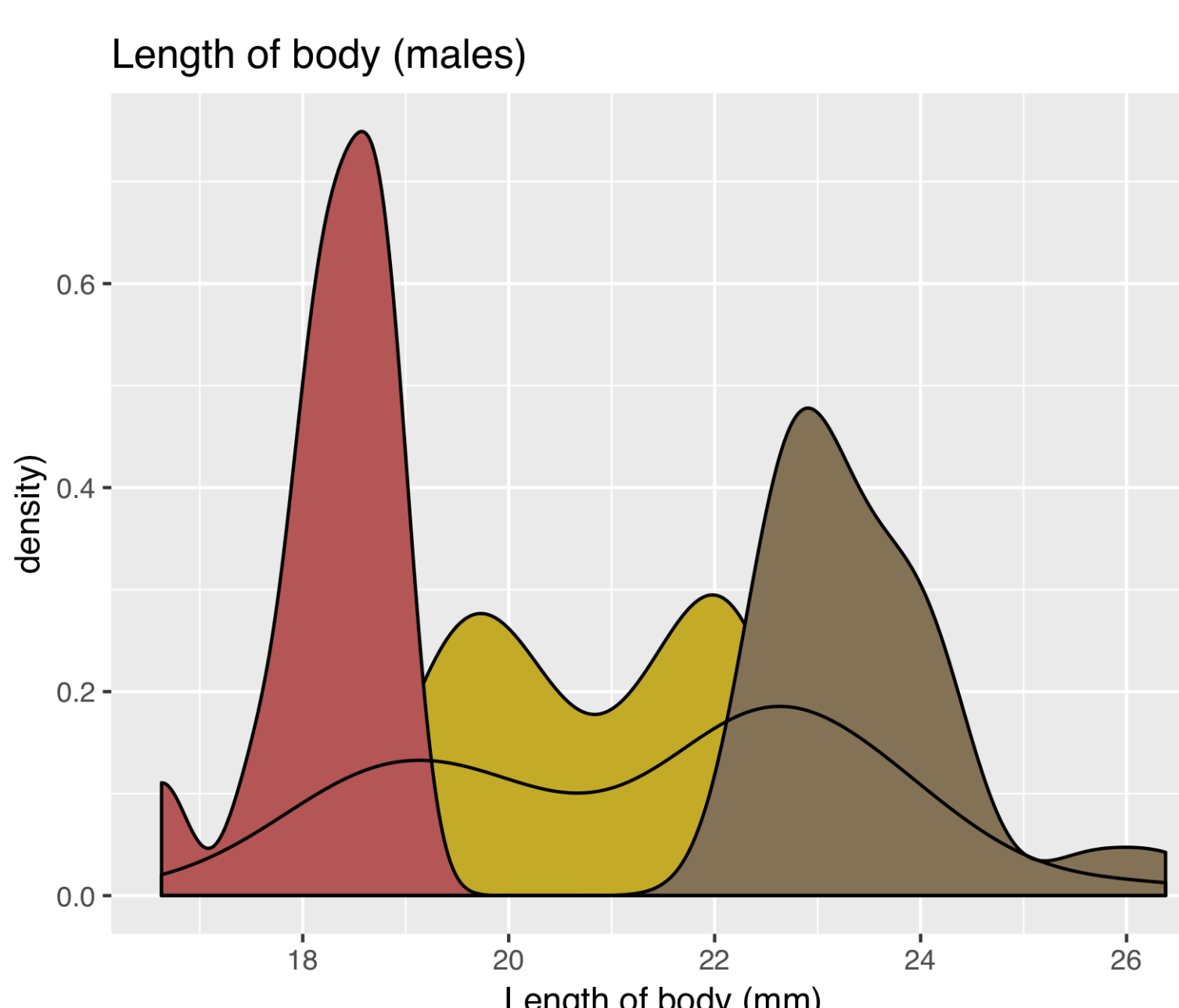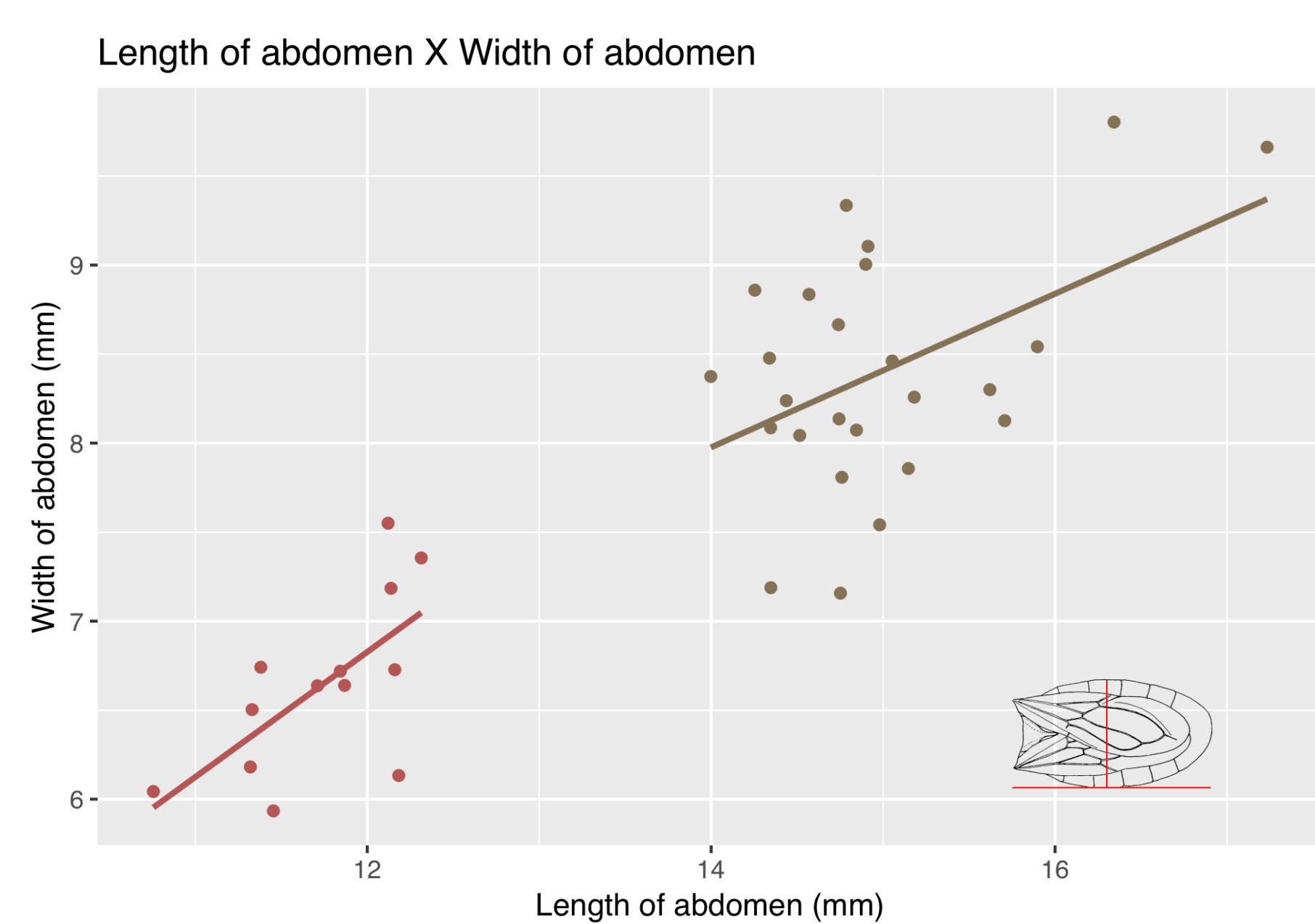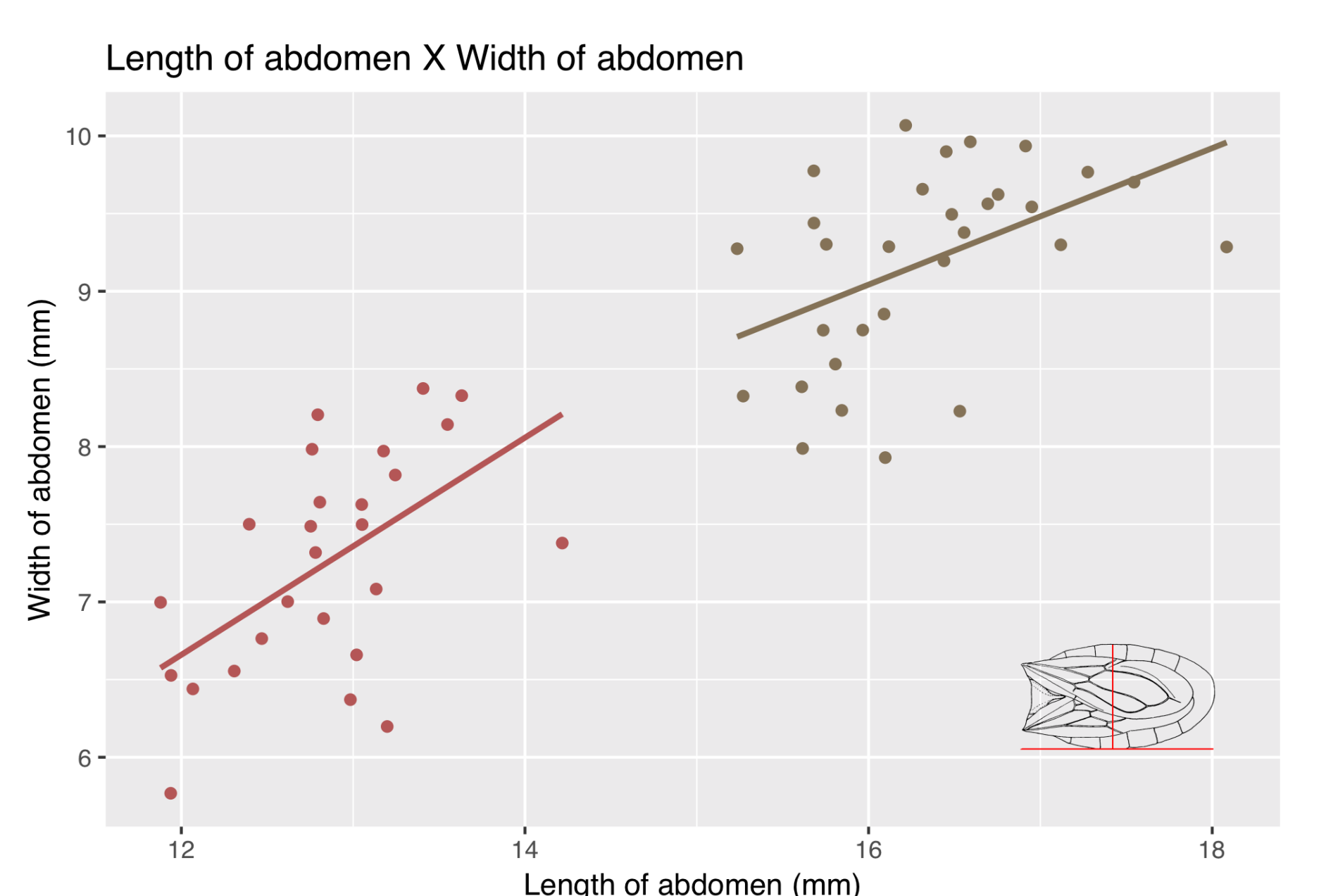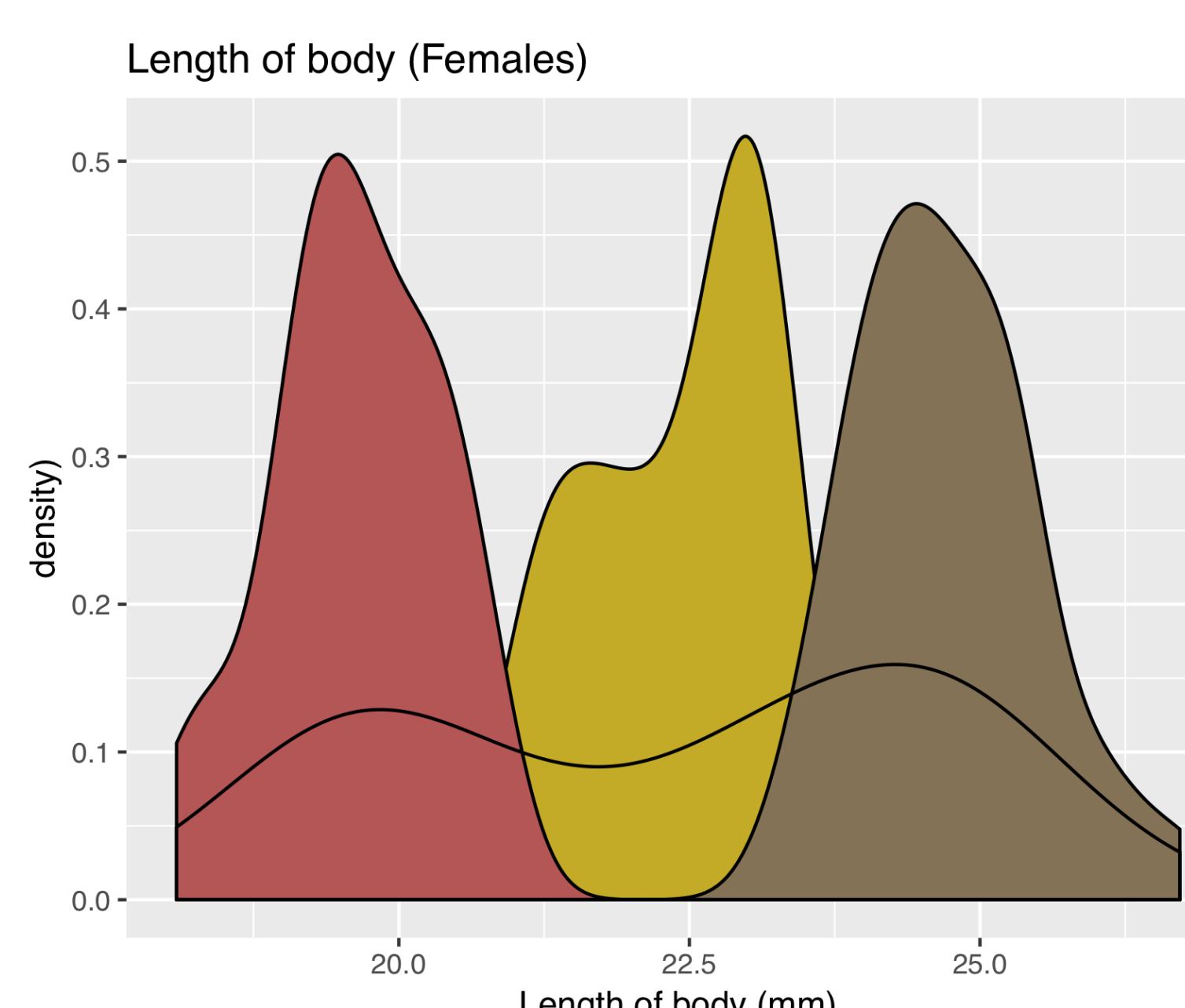Figure 10: Correlation between female length and width of head for Population A (red) and B (brown).

Figure 11: Correlation between female length and width of pronotum for Population A (red) and B (brown).

Figure 12: Correlation between female length and width of abdomen for Population A (red) and B (brown).