

Sexual dimorphism in size and shape of morphological traits in *Drosophila simulans* (Diptera: Drosophilidae): geometric morphometric approach

Vukica Vujčić^{1*}, Boris Dudić¹, Luka Lučić¹, Vladimir Tomić¹, Sofija Pavković-Lučić¹, Tatjana Savić²

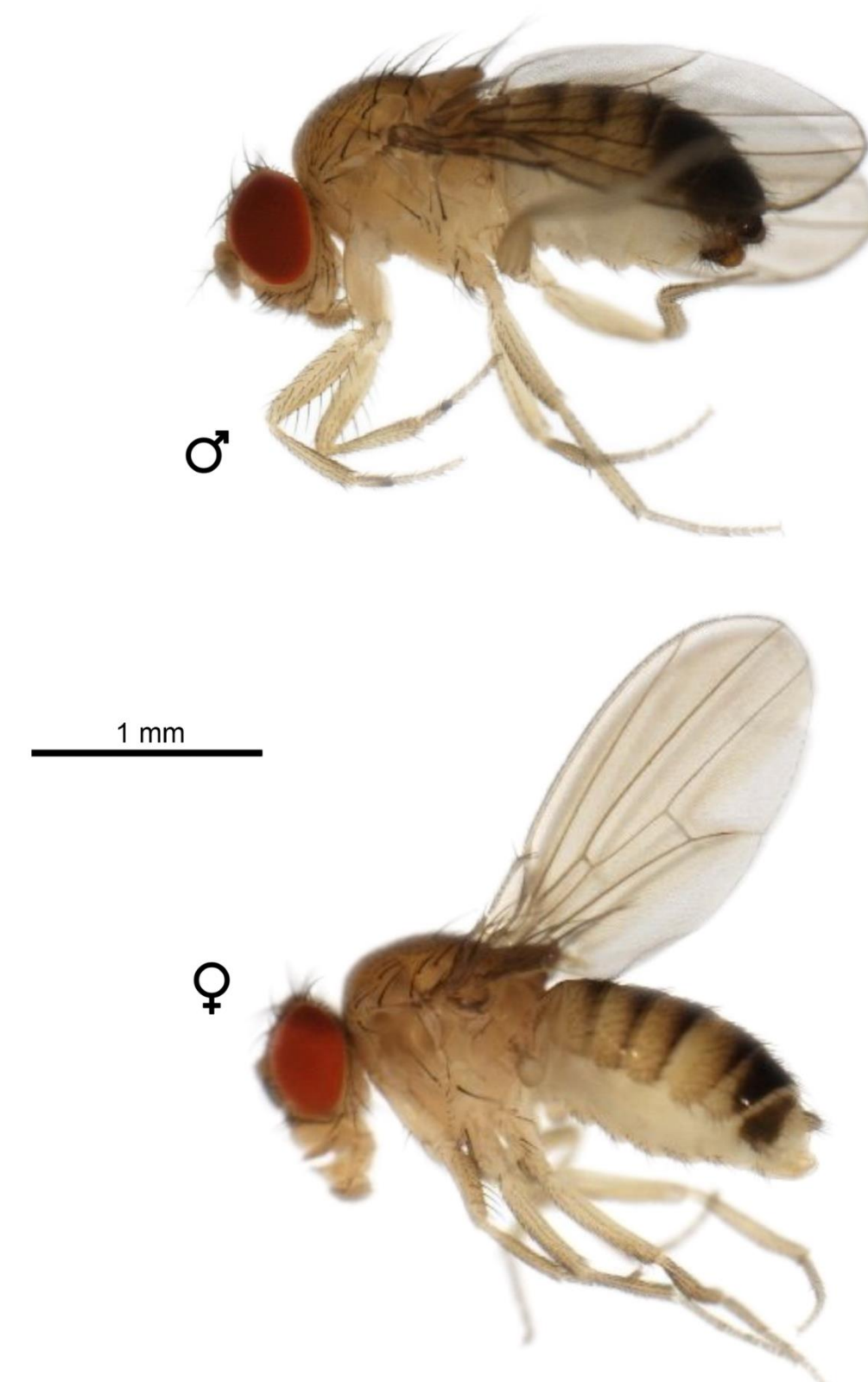
¹Faculty of Biology - University of Belgrade, Studentski Trg 16, Belgrade, Serbia

²Institute for Biological Research “Siniša Stanković”- National Institute of the Republic of Serbia, University of Belgrade, Despota Stefana Boulevard 142, Belgrade, Serbia

*vukica.vujic@bio.bg.ac.rs

Introduction and Aim of the Study

- ❖ Intersexual morphological differences have been widely analyzed in the field of evolutionary biology.
- ❖ Non-sexual morphological traits, secondary sexual morphological traits, colour pattern, ornamentation, and behavioural repertoire have been studied in most animals.
- ❖ Two different components of sexual dimorphism (SD) should be analyzed separately:
 - sexual size dimorphism (SSD) and
 - sexual shape dimorphism (SShD).



- ❖ This work aimed to investigate the presence of SSD and SShD in morphological traits important for visual, acoustic and tactile stimulation during courtship in *D. simulans*.

- ❖ Both components of SD have been poorly investigated in *Drosophila simulans*.

Material and Methods

- ❖ *Drosophila simulans* flies were reared on standard cornmeal-sugar-agar-yeast medium under the constant laboratory conditions (25°C, humidity of 60%, and 12h L: 12h D cycle).

- ❖ Geometric morphometric approach was applied in order to analyze SSD and SShD in three morphological structures: wings, head and the first legs (Figure 1), by using TpsDig, MorphoJ, CoordGen6, and R package programs.

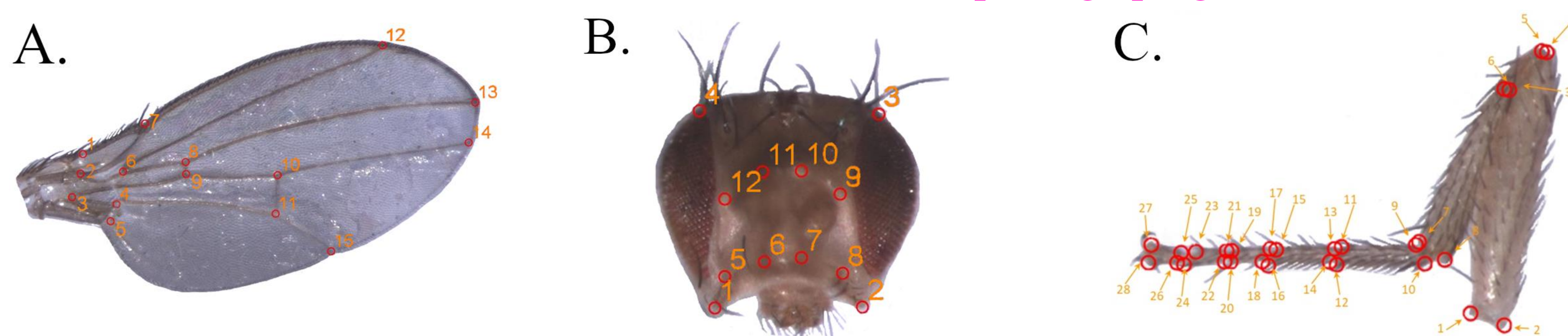


Figure 1. Analyzed morphological structures: A. right wing; B. frontal part of a head; C. the first leg pair (right leg).

Results

- ❖ Sexual size dimorphism was significant ($p < 0.0001$) in all morphological structures (Figure 2).

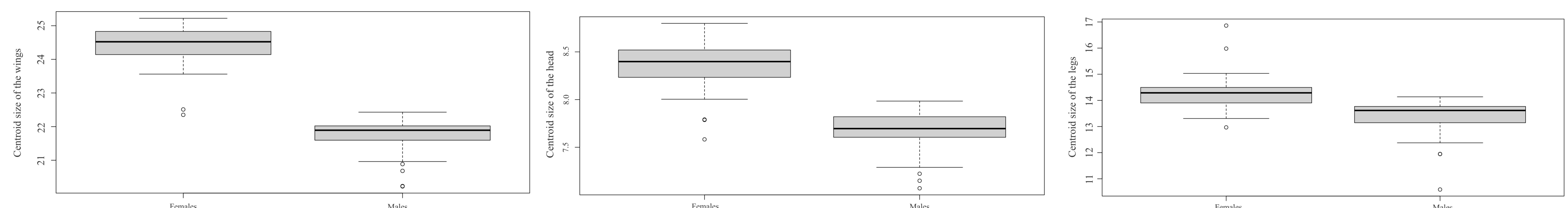


Figure 2. Sexual centroid size and the median with the first and the third quartiles, the range of variation and outliers of: A) wing; B) head; and C) leg in *D. simulans*.

- ❖ Both SSD and SShD were significant ($p < 0.05$) in all morphological structures (Figures 2 and 3).

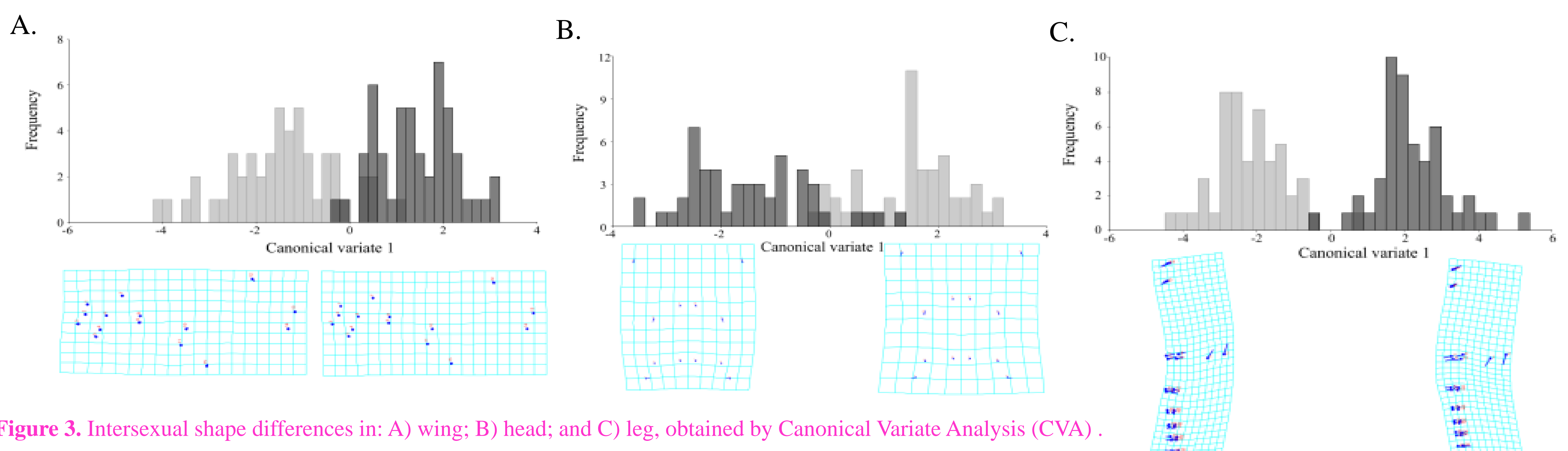


Figure 3. Intersexual shape differences in: A) wing; B) head; and C) leg, obtained by Canonical Variate Analysis (CVA).

Conclusions

- ❖ Results of the present study indicate the presence of significant SSD and SShD in analyzed morphological structures in *D. simulans*.

- ❖ Considering results, it is possible to assume that different evolutionary pressures act in *D. simulans* males and females.