Title: The use of Geometric Morphometric Analysis to illustrate the shape change induced by different fruit hosts on the wing shape of *Bactrocera dorsalis* and *Ceratitis capitata* (Diptera: Tephritidae)

Authors: W Pieterse, HA Benítez, P Addison

PII: S0044-5231(17)30060-8
DOI: http://dx.doi.org/10.1016/j.jcz.2017.08.004
Reference: JCZ 25482

To appear in:

Received date: 10-5-2017
Revised date: 26-7-2017
Accepted date: 21-8-2017

Please cite this article as: Pieterse, W, Benítez, HA, Addison, P, The use of Geometric Morphometric Analysis to illustrate the shape change induced by different fruit hosts on the wing shape of Bactrocera dorsalis and Ceratitis capitata (Diptera: Tephritidae).Zoologischer Anzeiger - A Journal of Comparative Zoology http://dx.doi.org/10.1016/j.jcz.2017.08.004

The use of Geometric Morphometric Analysis to illustrate the shape change induced by different fruit hosts on the wing shape of *Bactrocera dorsalis* and *Ceratitis capitata* (Diptera: Tephritidae)

Pieterse W* [1,4], Benítez H A [2,3],& Addison P[1]

[1] Department of Conservation Ecology and Entomology, Faculty of AgriSciences, Stellenbosch University, Stellenbosch, 7600, South Africa

[2] Departamento de Recursos Ambientales, Facultad de Ciencias Agronómicas, Universidad de Tarapacá, Arica, Chile.

[3] Museum of Zoology, Cambridge University, Downing Street, Cambridge CB2 3EJ, UK.3

[4] Department Agriculture, Forestry and Fisheries, Plant Quarantine Station, Stellenbosch, 7600, South Africa

*Correspondence: Welma Pieterse, Department Agriculture, Forestry and Fisheries, Plant Quarantine Station, Stellenbosch, 7600, South Africa. E-mail: welmap@daff.gov.za

Abstract

Ceratitis capitata is a fruit fly pest of major importance in the South Western Cape of South Africa with *Bactrocera dorsalis* posing an invasive threat. Nutritional stress and population density are some of the factors that can contribute to morphological changes in insects. The following study evaluated the effect of four different fruit crops (nectarine, plum, pear and apple), commonly grown in the Western Cape of South Africa, on the wing shape of the two species. Geometric morphometric tools were used to compare the relative positions of landmarks on the wings of the flies. The results show significant differences in the shape of wings between males and females of both species, indicating sexual dimorphism. The distances between corresponding landmarks among the averaged wings of *B. dorsalis* and *C. capitata* were highly significant (p=<0.0001) between individuals that were reared on nectarine, plum, apple and pear. It is as yet unclear how these results translate into fly fitness, but observing significant shape changes resulting from nutritional factors warrant further investigation.

Keywords: landmarks, fruit fly, apple, pear, plum, nectarine