

**SCIENTIFIC PROGRAMME
ABSTRACT BOOK**



#ECE2026Tours

Fluctuating asymmetry as a reliable biomarker of nutritive stress: The rice weevil (*Sitophilus oryzae* L) case

Sonja GVOZDENAC (Institute of Field and Vegetable Crops, National Institute of the Republic of Serbia, Sonja.gvozdenc@ifvcns.ns.ac.rs)

Marko RADENKOVIĆ, Jelena AČANSKI

Abstract

Developmental stability (DS) represents the ability of an organism to develop a genetically determined phenotype despite environmental stress. Feeding on an unsuitable host can act as a stressor for insects, leading to slower population development, reduced progeny production, and disrupted stability, ultimately decreasing population size. Fluctuating asymmetry (FA), expressed as slight random deviations from bilateral symmetry is a widely used indicator of disturbed DS, since stress is expected to affect organismal symmetry.

In this study, we used the rice weevil (*Sitophilus oryzae* L.) as a model organism to test the reliability of FA as an indicator of disturbed DS in relation to progeny production (PP) and feeding intensity (% of consumed kernels, %CK). Weevils were reared on wheat and maize (favorable hosts) and sorghum (unfavorable host) in “no choice” feeding tests over four months. FA was quantified on the ventral body side using geometric morphometric analysis.

Highly significant differences in PP and %CK were observed between individuals feeding on favorable hosts (629–658 individuals, 88.7–98.7%) compared to those feeding on sorghum (150–167 individuals, 7.9–14.4%). Procrustes ANOVA revealed significant asymmetry among populations. Correlation between symmetric and asymmetric shape components was low and non-significant ($r = 0.228$, $P > 0.05$). All populations showed significant FA, with the highest FA observed in individuals feeding on sorghum and the lowest in those feeding on wheat. Discriminant function analysis confirmed significant differences in asymmetric components between wheat and sorghum ($T^2 = 36.3995$; $P < 0.05$) and maize and sorghum ($T^2 = 27.4233$; $P < 0.05$), but not between favorable hosts ($T^2 = 20.4120$; $P > 0.05$).

These results demonstrate that higher FA corresponds to reduced PP and lower feeding intensity on the unfavorable host. Thus, FA reliably reflects host-related nutritive stress and represents a useful biomarker of disturbed DS in *S. oryzae*.

Research was carried out within the SafeSeed project (#6691) funded by Science Fund of Republic of Serbia.