

HOST PLANT DETERMINES MICROBIOME COMPOSITION AND STRUCTURE IN WILD MELON FLY LARVAE (DIPTERA, TEPHRITIDAE: *ZEUGODACUS CUCURBITAE*)

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INTRODUCTION

The diversity observed in phytophagous insects seems to have arisen from plant–insect interactions. Microbial symbionts play a relevant role in host plant choice and adaptation of phytophagous insects. In this study we investigated the effects of inter-generational shifts between conventional and unconventional host plants on the microbiome diversity and composition of the oligophagous cucurbit feeder *Zeugodacus cucurbitae*.

MATERIAL & METHODS

Zeugodacus cucurbitae adults were (a) reared from infested ivy gourds ('Co': ivy gourd) collected in two locations in La Réunion ('BP': Bassin Plat and 'M': Manapany) and (b) allowed to oviposit on two conventional cucurbit host plants (ivy gourd; 'Cu': squash) and one unconventional non cucurbit host ('Au': eggplant, Solanaceae) (Fig. 1). The microbiomes of the emerging third instar larvae were subjected to 16S rRNA metagenomic profiling and compared.

RESULTS & DISCUSSION

We recovered 2949 Amplicon Sequence Variants (ASV) belonging to 527 microbial genera in 204 different families and 26 phyla. Our results show complex differences between the microbiome profiles of larvae from different generations and sampling locations feeding on different host fruits and, to a less extent, between larvae originating from different locations (Fig. 2). The results also showed differences between the predicted metabolic pathways of the microbial symbionts associated with adults and larvae (Fig. 3). These preliminary results suggest a possible role of *Z. cucurbitae* associated microbiomes in host plant utilization and host switching to unconventional host plants.

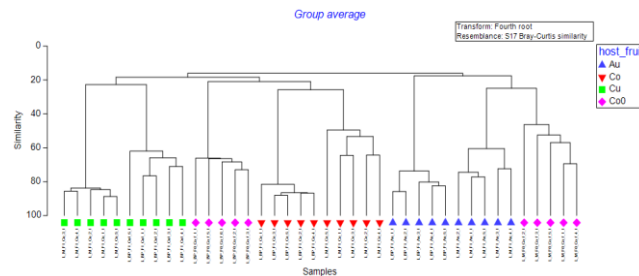
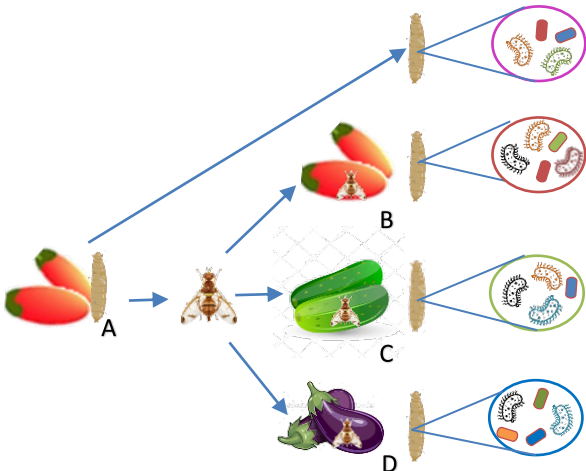


Fig. 2 UPGMA clustering of larval microbiomes from different locations and generations feeding on different host plant (fCo are F0 larvae from wild ivy gourds, see M&M for other abbreviations).

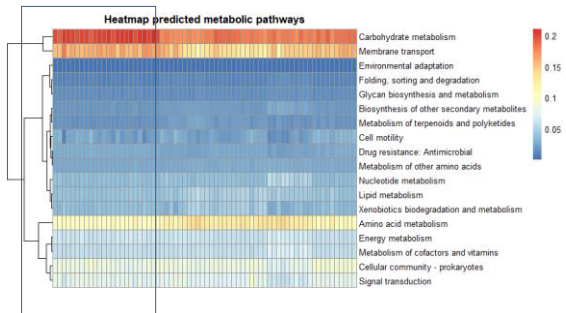


Fig. 3 Heatmap showing predicted metabolic pathways in the adult (left, within frame) and larval microbiome (right, outside frame)

Fig. 1 The experimental setup of this study. Infested ivy gourd were collected in the field. Some larvae were raised until adulthood and allowed to oviposit in three host fruit species. Third instar larvae were collected for microbiome characterization. A,B) Coccinia Grandis, C) Cucumis sativus, D) Solanum melongena. A) F0 generation while B, C,D) F1 generation