

Preliminary Phylogenetic Analysis of Hosts of *Pimpla turionellae* Based on Cytochrome Oxidase I

Havva Kübra SOYDABAS¹, Fevzi UÇKAN¹, Buse NOGAYLAR¹

¹Department of Biology, Faculty of Science and Arts, Kocaeli University Turkey
havvasoydabas@gmail.com; kubra.soydabas@kocaeli.edu.tr

Aim of the study: *Pimpla turionellae* is a solitary pupal endo-parasitoid wasp which has been suggested as a biological control agent of agriculturally harmful lepidopteran pests. Having a broad host range makes *P. turionellae* superior to the other biological control agents. Hosts have also effects on the parasitoids. Due to their morphological, physiological and behavioural defence mechanisms, lepidopteran hosts are not passive victims. For lepidopteran species mitochondrial COI (cytochrome oxidase I) region successfully used as a barcoding gene. Objective of the current study is to represent a preliminary analysis for diversity and phylogenetic relationships of hosts of *P. turionellae* based on COI.

Material and Methods: Related literature was reviewed and cross examined to analyse phylogeny and diversity of Lepidopteran hosts of *P. turionellae*. COI sequences of approved species from BOLD taxonomy browser and *Galleria mellonella* and *Achroia grisella* from our laboratory used for analysis. Nodes are annotated with BOLD ID. All COI sequences aligned by Clustal W. Evolutionary divergence between species estimated by pairwise distance in MEGA7. The evolutionary history was inferred using Kimura-2 parameter for Neighbor-Joining (NJ) tree, associated clusters are conducted with 1000 bootstraps in MEGA7.

Results: Fifty-three lepidopteran species, detected by cross examination of literature, were placed in 26 subfamily of 16 family. Cosmopterigidae, Crambidae, Oecophoridae, Depressariidae were represented by only one species. As a result of pairwise distance, the closest species were *Yponomeuta cagnagella* and *Yponomeuta padellus* (0,003) and the most distant species were *Euproctis similis* and *Psyche casta* (0,289). Taking into consideration the NJ tree, Gracillariinae (Gracillariidae), Galleriinae and Phycitinae (Pyralidae) were branches of the same node. Furthermore, species from Gracillariinae (Gracillariidae) and Galleriinae (Pyralidae) subfamilies were also placed among branches of Phycitinae (Pyralidae). We were not able to differentiate Lasiocampiinae (Lasiocampidae) and Ennominae (Geometridae) subfamilies as they were found as branches of the same node. These two subfamilies were found to be closely relative.

Keywords: Lepidopteran hosts, *Pimpla turionellae*, Phylogeny, COI