
MONITORING AND ANALYSING HIVE SOUNDS AS A POTENTIAL TOOL FOR THE DETECTION OF THE QUEEN'S ABSENCE IN COLONIES OF *APIS MELLIFERA* L.

Kanelis Dimitrios¹, Ziogas Michail², Siozios Konstantinos², Liolios Vasilios¹, Rodopoulou Maria-Anna¹, Siskos Stylianos², Laopoulos Theodoros², Tananaki Chrysoula¹

¹ Laboratory of Apiculture-Sericulture, Aristotle University of Thessaloniki, Thermi, Thessaloniki, Greece

² Section of Electronics and Electronic Computers, Department of Physics, Faculty of Sciences, Aristotle University of Thessaloniki, University Campus, Thessaloniki, Greece

Honeybee has the most important contribution to the pollination among the other insects, playing an important role in the prosperity of ecosystems around the world. Several factors can affect them and contribute to the loss of bees and the total extinction of the colonies. Thus, the need for intensive monitoring of the activity of the whole colony is considered urgent, in order to understand the problems and the causes of bee mortality. Recording the sounds of the colony and creating an automated system which will be able to recognize and distinguish them, could provide useful information to the beekeepers for the remote monitoring of their colonies. The main purpose of a bee monitoring system is to identify the condition of the colony through the analysis of the acoustic position. The examined phenomena in the present study were the presence and absence of the queen (queenless colonies) and the workerlaid male eggs, while at the same time the environmental conditions were recorded. According to the results, when bees are in a queen-right colony, the frequency of their sounds is around 250Hz, while the harmonic sounds have small amplitude. On the other hand, in the case queenless colonies, there is large amplitude of intensity at low frequencies and the bees become noisier, with the frequency dropping to 240Hz. The bee colony, five days after the return of the queen, seems to return to its normal sounds.

Keywords: Colony sounds, bee-hive monitoring, queenless colony