عنوان مقاله:

Acoustic Detection Possibility of Different Stages of the Confused Flour Beetle (Triboium confusum) in Grain Bulks Using an Audio Sensor

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خلاصه مقاله:

Recent advances in computer technology as well as in signal processing and pattern recognition, provide the possibility of automatic identification of pests, based on their audio signals. In this research a sound reinforced piezoelectric sensor along with a detection circuit based on a database was designed in order to receive audio signals with intensity lower than human hearing limit (zero dB). The confused flour beetle, Triboium confusum was used in this experiment. The signals received from larvae, adult and the combination of these two stages, in wheat grain bulk at three distances of ۱۰, ۲۰ and ۳۰ cm from acoustic sensors were investigated. In each experimental run the characteristics of signals frequency including range, time, amplitude and intensity were extracted. For all three distances the sound produced by the larvae had a peak intensity in the frequency range of ۲.۴ kHz (for feeding) and the adult insect's sound had two peaks intensity in the frequency range of ۲ kHz (for feeding) and ۲.۳ kHz (for walking). The differences between the frequency characteristics of sound produced at different stages might provide the possibility of identifying the life stages of the pest, pest distance to the sensor and approximate location of the pest. Based on these findings, the sound sensor and the audio circuit were designed to detect larvae, adult, or both at a distance of ۳۰ cm. Further investigation is continuing to improve the audio system programming and the related circuits for more accurate detection of the pest.

کلمات کلیدی:

Acoustic, Insect, Sensor, Stored product, Triboium confusum