A Sound Solution: An Innovative Application of Insects' Bioacoustics Effect on Herbaceous Plants

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Agricultural and horticultural crops evolve through competing against herbaceous plants, aka. weeds, with the help of herbicide. Finding an environment-friendly alternative has been a challenge and common pursuit of scientists. Plants have their unique defense mechanisms when being attacked or threatened by insects, usually pests. The initial purpose of this investigation is to determine the effect of insect chirping on plant physiology. A compilation of sounds from 21 different insects was played repeatedly to 9 different herbaceous plants, while the control group of plants was not exposed to any insect sound. Key physiological factors were monitored daily, e.g., chlorophyll content (SPAD), nitrogen content, leaf surface temperature, leaf water content, TVOC, CO2, PM1 to PM10, and gas “fingerprint”. After several months of observation and testing, physiological differences were observed among the plants, and qualitative observations such as withering and decayed leaves on plants were recorded. Various mechanisms were suggested for insect sound effects on weeds. The results showed a great potential that an innovative bioacoustics technique can be developed for inhibiting herbaceous plants by applying a combination of sound profiles from various insects, with the optimization of frequency, intensity, and timing.

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