

## BOTANICAL DIVERSITY – AN UNEXPLOITED RESOURCE FOR PLANT PROTECTION

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**Abstract.** Sustainable insect pest management is often focused on using crop cultivars that are tolerant or resistant to pest attack. However, resistance breeding against aphids has not been sufficiently successful and, in addition, insect-pests can break this plant resistance. Furthermore in modern crop production, crops fields are planted with single genetic varieties, allowing insect pests to spread easily from plant to plant reducing crop yield. Plant biodiversity within crops, such as plant species mixtures (intercropping) and variety mixtures, has been shown to improve ecosystem processes and function, including insect pest management, productivity and system stability. Utilizing this co-existence with other plants, our research provides new evidence that plants interact with each other by the release of volatile signals, which have implications for neighbouring plants. The results of our investigations show that these chemical interactions between plants have effects on biomass allocation [1], leaf temperature [2], plant volatile emission [3], aphid settling responses [4]-[6], and searching behaviour of aphid natural enemies [7],[8]. However, the effects of plant chemical interactions on aphids and their natural enemies depend on botanical composition. In a recent study it was found that older barley cultivars were generally more frequently affected by volatiles than modern cultivar [9]. Certain cultivars respond to volatiles from other cultivars more frequently than others, showing that the responses are specific to certain cultivar combinations [4],[5]. Also interactions between barley and certain weed species have been found to be species dependent [10]. This indicates that the interaction between the emitting and receiving plants works in a lock and key fashion, and the exact dynamics of this interplay are still to be discovered. Our results show that insects such as herbivores and their natural enemies are closely adapted to plant physiology and are highly sensitive to plant responses induced by volatiles. The results stimulate discussion on different farming approaches for improved effectiveness in controlling pests including aphids.

**Key words:** cultivar mixture, induced resistance, pest management, plant-plant interaction, volatile signals.

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