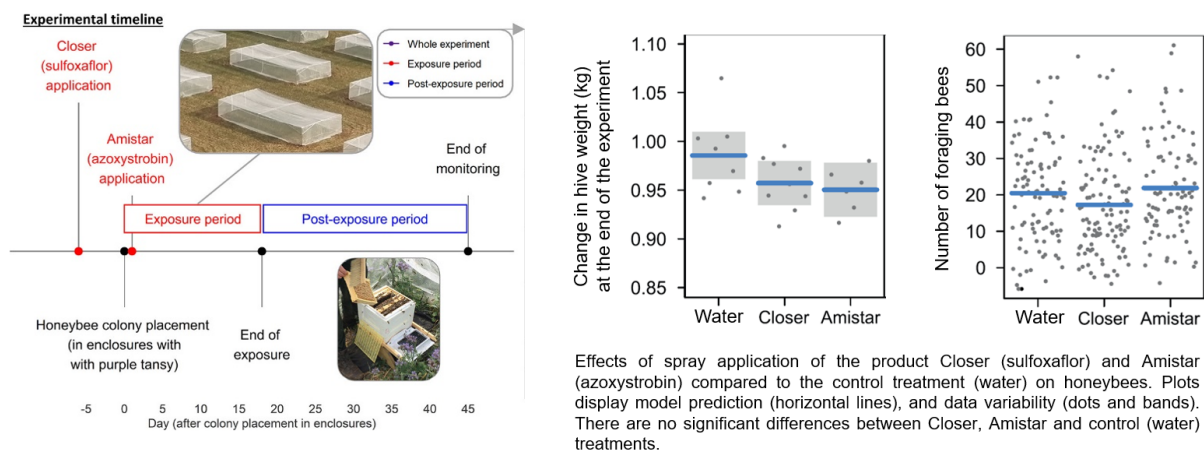


Sulfoxaflor insecticide and azoxystrobin fungicide have no major impact on honeybees

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Exposure to pesticides is considered a major threat to bees and several neonicotinoid insecticides were recently banned in cropland within the European Union because of their potential negative effects. However, bees remain exposed to many pesticides whose effects are poorly understood. Recent evidence suggests that one of the most prominent replacements of the banned neonicotinoids – the insecticide sulfoxaflor - harms bees. Similarly to neonicotinoids, sulfoxaflor is an insecticide that is first absorbed by treated crops and then it spreads throughout plant tissues, and can contaminate their pollen and nectar. However, experiments testing bee response to spray application of sulfoxaflor under real-world conditions are scarce. Moreover, fungicides have received less attention than insecticides, as they are often viewed as relatively non-toxic to bees. Some experiments have however shown that fungicides alone or mixed with other pesticides can have negative effects on bees. Here, we assess the impact of the product Closer, containing the insecticide sulfoxaflor, and the widely used Amistar, containing the fungicide azoxystrobin, on honeybees. We set up 30 large cages (12 m × 5.9 m, height:2 m, covered by nets), each one containing purple tansy (a plant often used in pollinator studies) and a small honeybee colony (approximately 3000 adult bees). The products were applied according to the then current regulations: Closer before and Amistar during the bloom of purple tansy. In this study, Closer was applied six days before bloom. The health and growth of treated colonies were compared to those of colonies placed in cages where only water was applied. We found no significant effects of Closer or Amistar on the development of honeybee colonies (e.g., growth in colony weight, adult bee mortality, change in number of adults and brood cells, brood failure) or foraging activity (number of bees entering the hive and visiting flowers, daily pollen collection). Our study suggests that these pesticides pose no notable risk to honeybees when applied in isolation and following stringent label instructions. The findings on Closer indicate that a safety-period of 5–6 days between application and bloom, which is only prescribed in a few EU member states, may prevent its impacts on honeybees. However, to conclude whether Closer and Amistar can safely be applied, further realistic-exposure studies should examine their effects in combination with other chemical or biological stressors on various pollinator species.