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Modeling the distribution of adventitious GM cross-pollination in agricultural maize fields

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Abstract:

Commercialization of genetically modified (GM) plants started about two decades ago. In 2014 10% of the total global crop acreage was sown with GM plants. GM maize is cultured in more than 30 countries, and is one of 4 species with the majority of commercial GM plants both in terms of acreage and specific events. To support farmers and consumers freedom of choice, coexistence systems need to be implemented. MON810, expressing the Bacillus thuringiensis Cry1Ab toxin against corn borers, is the only GM maize transformation event cultured in the EU and predominantly in Spain. Numerous conventional and MON810 maize varieties coexist in agricultural fields since 1998; and the proportion of GM fields has continuously increased up to about 70-80% in some zones, particularly in Catalonia, where fields are usually below 1 ha. Conventional agricultural fields in these zones support high GM pressure and thus, they can represent the worst-case scenario in coexistence studies. We monitored adventitious GM cross-pollination in twenty non-GM fields in these regions during 5 cropping seasons. Analysis of the obtained data allowed deducing a model to explain cross-pollination distribution in agricultural maize fields.