GENE FLOW BETWEEN SUGAR BEET AND WEED BEET: FROM FACTS TO MODELS. Henri Darmency, Nathalie Colbach, Yann Tricault, Mathilde Sester, Etienne Klein and Marc Richard-Molard, Seniors and graduate scientists, Weed Biology and Management, Institut National de la Recherche Agronomique, BP 86510, 21065, Dijon, Senior scientist, Biostatistics, Institut National de la Recherche Agronomique, 84914 Avignon cedex 9 and Director, Institut Technique de la Betterave, 45 rue de Naples, 75008 Paris, France.

Farm-scale monitoring was conducted at two locations in root production fields during six-years to study the occurrence and the mechanisms of gene flow between transgenic herbicide-resistant sugar beet and weed beet. We investigated the impacts of cultivar properties and control of bolting plants on the frequency of the transgene presence in weed beet populations. Specific experiments were carried out to quantify biological parameters affecting competition response, flowering, pollen flow, seed set and survival in the soil. These quantifications were incorporated as sub-models in the GENESYS model to simulate the effects of various farming systems (crop succession, cultivation techniques) on the dynamics and genetic composition of weed beet populations in a small region, and to propose the best agricultural practices to control weed beet and to prevent the advent of herbicide resistance in weed beet.

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