Global warming: lifting the inactivation of host plant resistance under elevated soil temperatures

Vegetable crop production is often hindered by pest and diseases, leading to yield and quality losses and income insecurity for growers. Root-knot nematodes (RKN) - microscopic wormlike plant parasites - affect the production of numerous crops. In tomato and pepper, the use of RKN-resistant varieties is one of the most sustainable and economically viable control strategies. **However, global warming jeopardizes this control handle as high soil temperatures render several crop resistance genes ineffective**. This happened to a major tomato resistance gene (*Mi1.2*), and this gene is no longer effective in protecting tomato plants from RKN at soil temperatures above 28°C. It is noted that this plant pathogen itself is perfectly able to handle these high soil temperatures. So global warming has an unexpected side effect: it poses a significant threat to tomato production, especially in Mediterranean countries.

Within Nem-Emerge novel heat-stable resistances to RKN in tomato will be developed. We investigate the molecular and physiological **mechanisms that confer heat-stability to resistance genes** against pests and diseases and apply this knowledge to obtain **new tomato varieties with heat-stable, broad-spectrum resistance and high horticultural value in the near future.**

In conclusion, we will address a current key challenge posed by global warming by restoring the effectiveness of **root-knot nematodes resistance in tomato under elevated temperatures.**

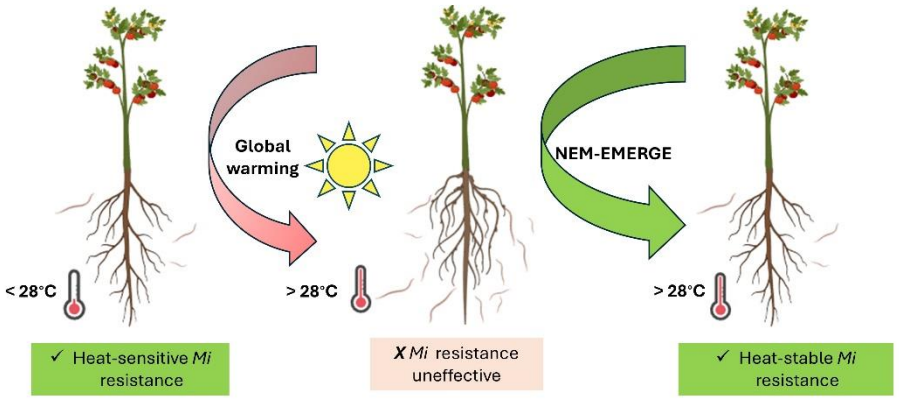

Figure 1: *Mi* resistance protecting tomato against root-knot nematodes (left), global warming jeopardizes this protection (middle), Nem-Emerge develops ways to fix the heat instability of host plant resistance (right).

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