Roam Technology

CASE STUDY

AGRICULTURE

Crazy Roots in Tomatoes

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the Challenge

Nowadays, more than 25% of tomato growers are being confronted with the phenomenon of '**Crazy Roots**', a plant pathology also found in cucumber, courgette and aubergine plants.

Crazy Roots is caused by the **Agrobacterium Rhizogenes**, a unicellular bacterium that deregulates the hormone balance of the plant. Upon infection, a part of its DNA is transferred to the plant cell and becomes incorporated into the plant's DNA. As a consequence, root cells will start to multiply at an abnormally high rate.[1] Since this **genetic modification** is irreversible: once infected, plants are difficult to treat so **preventive action** is key here.

Infection causes the plant to turn into a **vegetative state**. Besides gigantic root formation, the plants displays deformed fruit production and lacks flower formation. Fruit production can decrease for more than 10% per plant. Due to diminished fruit quality, growers are forced to prematurely abort the cultivation period, resulting in severe **production losses of € 15,000 to € 25,000 per ha.**[2] Counteracting the occurrence of Crazy Roots has remained a difficult task, until today.

the Set-up

This case study was performed at a Dutch tomato company in the Westland. Huwa-San TR-50 was administered to infected and healthy plants. Treatment was performed by combining a **maintenance dose** (1) and an **enhancement dose** (2). The study was completed after 3 months follow-up.

(1) **Maintenance dose:** Huwa-San TR-50 was continuously applied in the drip irrigation system at **40ppm**

(1) **Enhancement dose:** either 200ml or 400ml of Huwa-San TR-50 was locally administered to the stonewool slabs once every 10 days at **2000ppm**

the Results

Disease prevention: No healthy plant treated with Huwa-San TR-50 developed Crazy Roots during the study period.

Disease suppression: after 3 weeks, Crazy Roots progression had ceased in infected plants treated with 200ml as well as 400ml Huwa-San TR-50. With 200ml, Huwa-San was uniformly spread over the stonewool slab. With 400ml, the spread of Huwa-San was improved throughout the whole of the block, further improving the results. This effect maintained until the end of the follow-up.

Phytoxicity: No phytotoxic effects of leaf burn or fruit damage were detected during the entire follow-up.

Silver residual: administration of 200ml of 4000ppm Huwa-San TR-50 on tomatoes resulted is less than 0.05ppm residual silver, as confirmed by an analysis report of SGS Belgium NV.

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Huwa-San®
A sustainable way of disinfection

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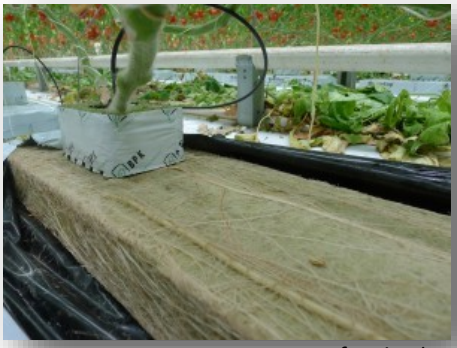

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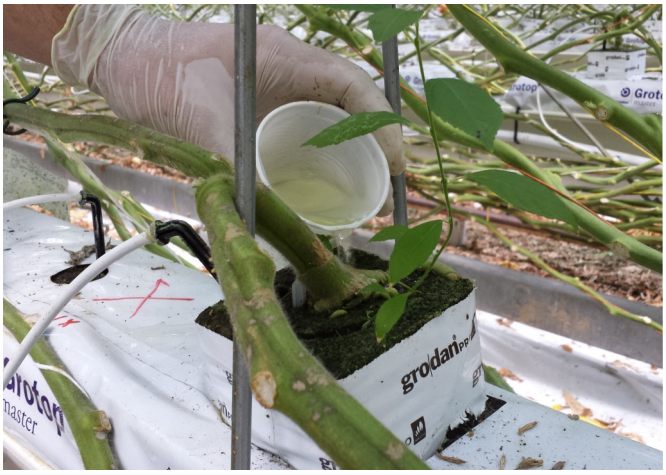
the Images

Test set-up



Results

Healthy plant

Infected plant

Untreated

Treated

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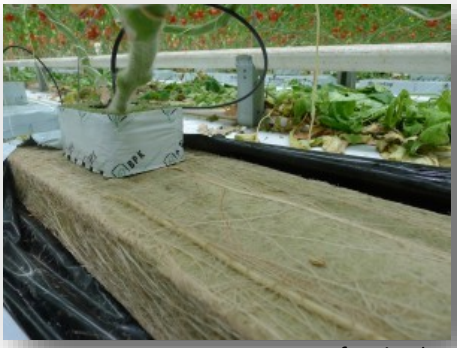

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the Primary Benefit

Huwa-San TR-50 is highly effective to counter Crazy Roots in tomato plants through:

(1) **Infection prevention:** Huwa-San TR-50 disinfects the irrigation water avoiding A. Rhizogenes to infect the plant.
(2) **Disease suppression:** Huwa-San TR-50 blocks progression and spread of A. Rhizogenes.

Our advice: application of a daily maintenance dose of 40ppm Huwa-San TR-50 in the dripping system combined with a 10-day enhancement dose of 200ml containing 2000ppm Huwa-San TR-50.

the Return on Investment

Huwa-San TR-50 **treatment improves tomato quality and harvesting yield** (€ 20,000 - € 50,000). Additionally, it saves the growers time and energy.

the Secondary Benefit

Besides suppression of vegetative growth, Huwa-San TR-50 treatment stimulated plant recovery as demonstrated by **additional generative growth** including the formation of new roots as well as healthy, normal fruits.

the Return on Environment

Upon reaction, Huwa-San TR-50 **degrades into water and oxygen** with only negligible amounts of residual silver.
Furthermore, since Huwa-San TR-50 is active in the whole water system, it **combats the harmful action of micro-organisms in the entire system** without the risk for accumulation of free chlorine and other harmful byproducts.
In conclusion, Huwa-San TR-50 is **safe** for the plant, the irrigation system as well as the employees.

References: (1) Weller et al. 2006; (2) Weller et al, 2000a; 2000b

This Crazy Roots Case Study was established by a cooperation between Roam Technology and Van Iperen.

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