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*Agricultural*



**Features from your Farm Advisors**

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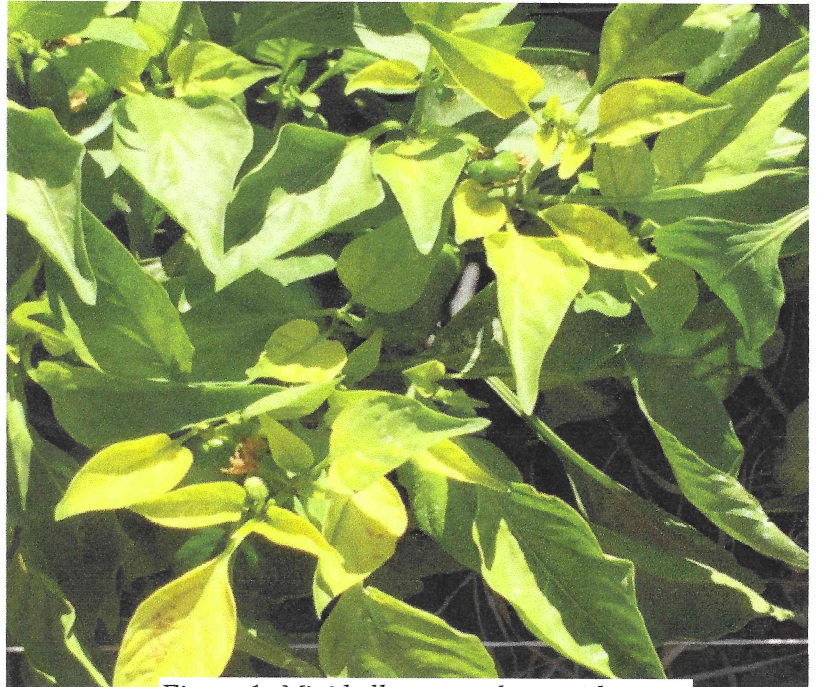
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## ROOT-KNOT NEMATODES ON MINI BELL PEPPERS

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Many plants in mini bell pepper field near Mecca, Coachella Valley, Riverside County, began to show chlorosis (yellowing) on the newer plant growth in early April of 2015. Plants that showed yellowing symptoms are shown in Figure 1. At this time, the crops were mature and close to harvesting. Such yellowing symptom of crops was commonly associated with nitrogen deficiency. In addition to yellowing, Aguiar's records indicated that this field had a history of root-knot nematode infestation on previous bell pepper crops.



*Figure 1: Mini bell pepper plants with yellowing symptoms on new growths*

Yellowing symptoms became more and more obvious and spread into larger fields over a period of time. Although the symptoms became widespread throughout the field, there was one spot within the mini bell pepper fields that appeared to be a major hotspot. Such field area is shown in Figure 2.



*Figure 2: Area of the mini bell pepper field with hotspot and heavily chlorotic/yellowing symptoms*

Soil and crop root samples from the healthy looking and chlorotic fields were collected and sent to the Nematology Dept. of the University of California, Riverside (UCR.) for detailed analysis of the problem.



Prior to the sample collection and conducting laboratory soil and plant root analysis, the Farm Advisor of the area and the a nematology specialist at the UCR visited the field and detected heavy galling on the roots of crops within the hotspot area (see Figure 3) that looked very similar to a characteristic root-knot nematode (RKN) infestation.



*Figure 3: Field check of area with the most yellowing revealed many root galls.*

Results of laboratory analysis of the soil and root samples are shown in Table 1.

**Table 1. Nematode analysis results (Root-knot nematodes)**

Root Samples	Root Weights in grams	Number of RKN J2s
1: from healthy area, no galling on roots	13.43	11
2: from healthy area, no galling on roots	14.31	0
3: from affected area galling on roots	18.18	121,000



*Figure 4: Roots of samples analyzed at the lab (left) and roots showing galling from RKN infestation*

Laboratory analysis results showed that infestation (RKN J2 population) was insignificant on the healthy looking plants, while there were a huge population density (121,000) J2's on 18.18 grams of infested crop roots (Table

1). It is the second-stage RKN juveniles (J2) with worm-shapes that could enter susceptible crop roots and cause damage to the crops. These Juveniles develop into females and cause galling on the infested root system. . A female RKN can lay up to 400 eggs. The eggs can hatch and serve as a source of inoculum, by remain in the soil to infect the next crop. The species of RKN, known as *Meloidogyne incognita*, can complete its life cycle in 4 weeks under optimum soil temperature of 32C, (90<sup>0</sup>F) and becomes inactive when soil temperatures drop below 17C (62F).

**Suggestions:** the following can be suggested as better management of RKN infestation

- Avoid mono-cropping peppers or rotating with other host crops, such as tomato, eggplant, snab beans, cucurbits, etc.
- Soil should be sampled early, at the middle and during late season to track the root-knot nematode populations. It is expected to be low during the early season and begins to escalate during the late season.
- Clean up the field as soon as the last harvest is completed. Disk plant residues into the soil where it can be broken down quickly and decompose.
- If you suspect of having nematode problem, call the Farm Advisor's office. The farm advisor can coordinate with Extension Nematologist to test soil and plant roots for nematode infestation.

New materials appropriate for nematode control are being registered for vegetable crops. The Extension Nematologist and the Farm Advisor have established a nematode research plot at Coachella Valley Agricultural Research Station for testing new materials under local conditions and crop varieties. Check with the Farm Advisor to see when seminars are scheduled that presents these research results.