



Successful Integration of Biocontrol Products into Citrus Production in Turkey

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Citrus is one of the main good for agricultural exportation in Turkey



Main components of citrus biocontrol

- Citrus varieties;



lemon,



mandarin,



orange and



grapefruit



Citrus mealybug, *Planococcus citri*



Leptomastix dactylopii



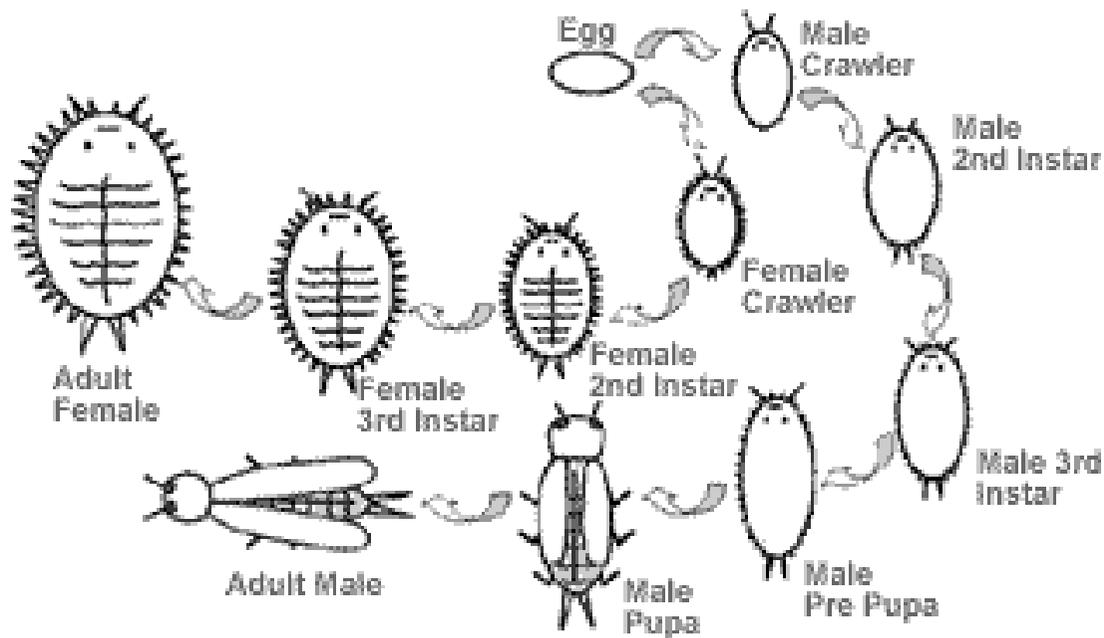
Cryptolaemus montrozieri

Citrus mealybug

- Damage



Citrus mealybug biology



Economic importance



Mealybug scouting

- Beginning of May the overwintering adults start to move upwards of tree
- In June mealybug start to settle down under sepal leaves



- After June depends on variety and population of mealybug damage will be increase



Biocontrol on Citrus varieties

- Lemons – easy to control mealybug
- Mandarins – easy to control mealybug
- Oranges – easy to control mealybug
- Grapefruits –DIFFICULT to control mealybug

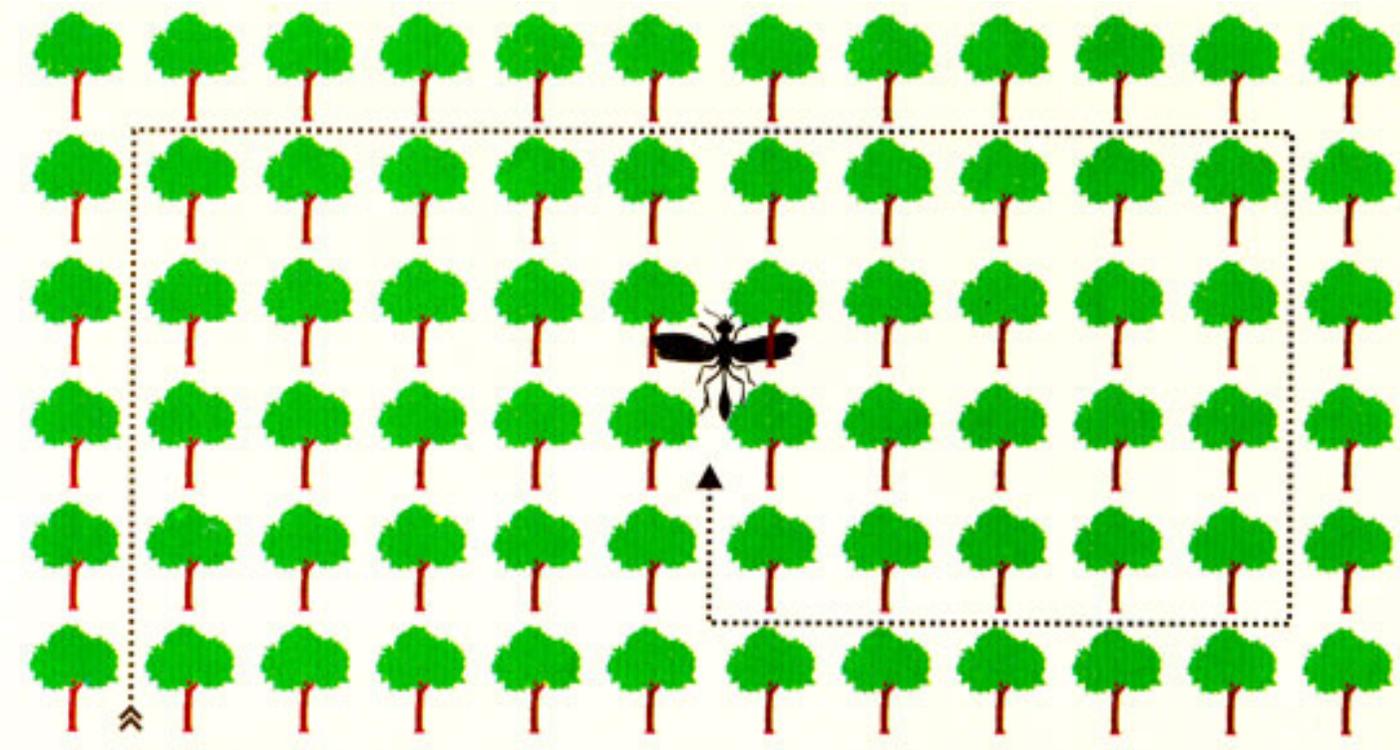
Leptomastix dactylopii

>1000 adults in releasing package





L. dactylopii releasing diagram



Efficacy of Parasitism

- Parasitism can recognize after 2 - 3 weeks by mealybug mummies
- and emerging holes

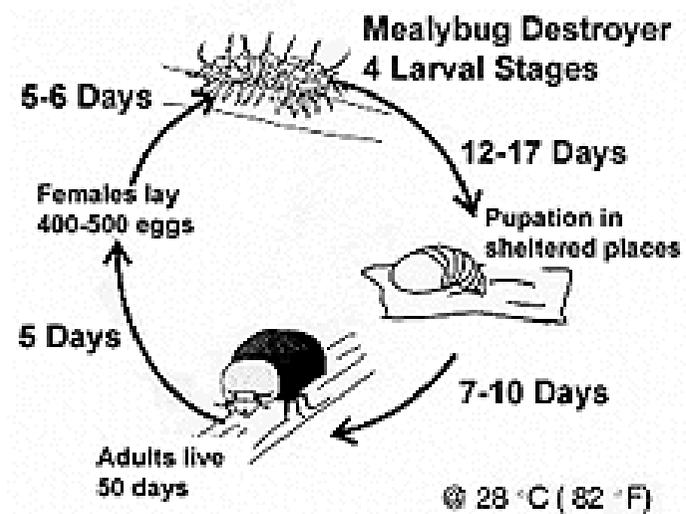


Cryptoleamous montrozieri

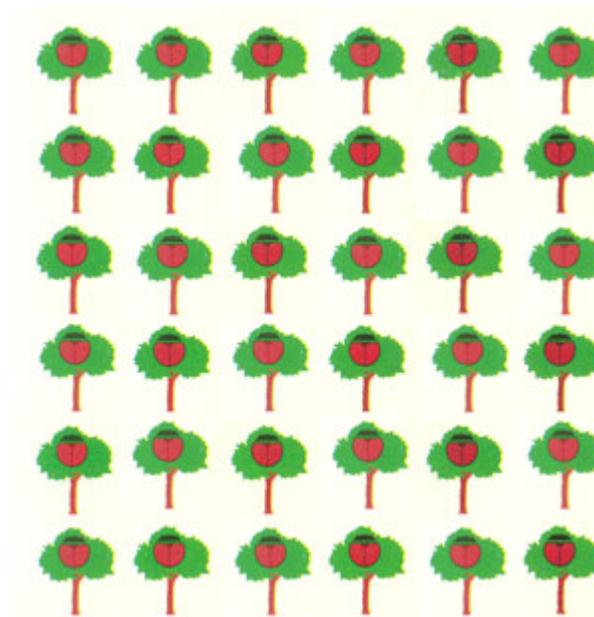
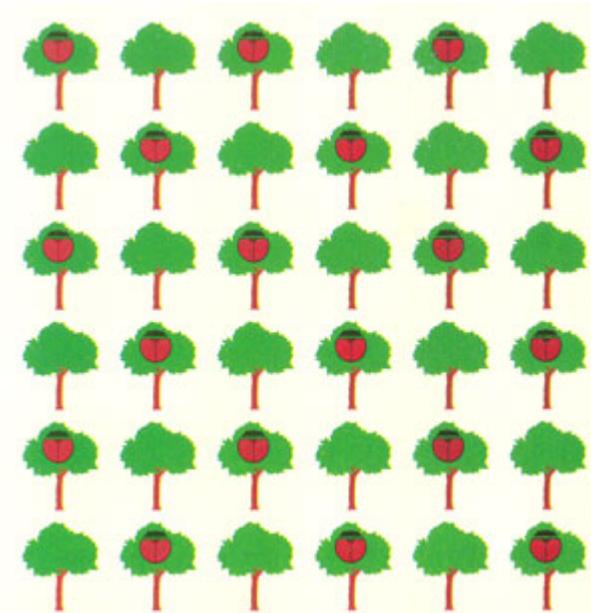
10±1 adults in releasing package



C. montrozieri biology



***C. montrozieri* releasing diagram**



Efficacy of Predator

- They directly feed on eggs and small larval stages of mealybug



For Best Results

- Release in early morning or late evening
- Do not store under any conditions
- The releasing packages should not expose to direct sun light
- *C. montrozieri* and *L. dactylopii* should be use together to complete result
- Broad spectrum pesticides should not used 4 weeks before and after release

For Best Results

- Ant activities should be under control

Malathion dust application on only 10 cm wide around the trunk



Biocontrol agents releasing time

- The earliest in May
- Before the first egg mass only *L. dactylopii* release may be possible
- June and afterwards two beneficials, *C. montrozieri* and *L. dactylopii* recommended together,
- The release could be continue upto mid October

***L. dactylopii* and *C. montrozieri* releasing rates**

- Preventive – no recommended
- Curative light – 10 adults per tree
(10 *L. dactylopii* and 10 *C. montrozieri*)
- Curative heavy – 20 adults per tree
(20 *L. dactylopii* and 20 *C. montrozieri*)
- First infection detected without egg masses only
L. dactylopii release may be possible
- The orchards should be scouted every week to understand population development of mealybug.

Mealybug biological control on some other crops

Ornamentals



Pomegranate



Cover Crop Banana





Thanks

See you at 25-26 October 2010 !!

