Novel Technologies in Mass Rearing of Beneficial Arthropods

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BioBee Sde Eliyahu Ltd. Produces, markets and implements comprehensive solutions by means of:

- Macrobial natural enemies for biological pest control
- Bumblebees for natural pollination
- Sterile Mediterranean fruit flies for medfly control using Sterile Insect Technique (SIT)
- Biopesticides - To complement the natural enemy’s package
Established 1983

Two hundred employees in Israel and in 3 subsidiaries

The majority of the produce is exported to 100 destinations worldwide
BioBee
Production of *P. persimilis*

Off-Plant Production of the Predatory Mite: *Phytoseiulus persimilis*
Production of *P. persimilis*

**Modified Tri-trophic System**

- **Bean**
- **Spider-mite**
- **P. persimilis**
Production of *P. persimilis*

- Indoor (=climate room) controlled rearing system
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- The product: age distribution includes 30-50% eggs
- The product: well fed gravid females capable of surviving storage and transport and establish rapidly in the field
Tomato | 2012

P. persimilis rate of establishment
Prey/predator ratio

Tomato | 2012

[Graph showing the prey/predator ratio vs. date for different treatments labeled as TB, TT, BB, and NP. The graph highlights the data for 11/12 with a red circle.]
Inactivated Frozen Medfly Eggs
Alternative to *Ephestia* eggs as feed for mass rearing of predatory bugs, predatory beetles, others?
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• One year storage capacity
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• One year storage capacity

• Patent granted. Product on sale
Orius laevigatus mass rearing

**Graph 1:**
- **Y-axis:** No. of individuals collected
- **X-axis:** Diet
- **Legend:**
  - Low feeding
  - High feeding

**Graph 2:**
- **Y-axis:** % Mortality
- **X-axis:** Diet
- **Legend:**
  - High feeding
  - Low feeding

**Observations:**
- The graph shows the number of individuals collected and the percentage mortality under different diets.
- The data indicates that the number of individuals collected and the percentage mortality are higher in the high feeding diet compared to the low feeding diet.
Mealybugs’ Mummies

Mealybug Parasitoid’s Mummies

Leptomastix algirica

Anagyrus pseudococci
Mealybugs’ Mummies
A robust rearing system that can be applied to a number of mealybug parasitoids
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- A robust rearing system that can be applied to a number of mealybug parasitoids
- A breakthrough in delivery of mealybug parasitoids’ commercial products to the field
- Patent granted (national phase). Two products on sale
Mealybugs’ Mummies

Post-storage capacity | @12°C

(a) Emergence rate

Anagyrus pseudococci

Emergence rate (%)

Storage (days)

R² = 0.9167

(b) Fertility

R² = 0.8949

Average eggs/female

Leptomastix algirica

(a) Emergence rate

R² = 0.9872

(b) Fertility

R² = 0.9832
Robyn - % fruit infestation by mealybug

Moore et al. 2012
Conclusion

Augmentation with *Anagyrus* sp. nr *pseudococci* should be conducted at a rate of at least 5000 parasitoids per ha in the first year, and possibly a lesser quantity from the second year onwards.

Moore et al. 2012
Mass rearing of macrobial biocontrol agents is an everlasting challenge

BioBee has developed novel rearing techniques which contribute significantly to its commercial products’ Availability-Consistency-Quality
Thank you!

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