Novel Preparation and Application Method of Entomopathogenic Nematodes to Control Insect Pests

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Background and Origin of the Idea of this work

During Search for effective procedure to control larvae of The Red Palm Weevil we came out with some ideas which eventually lead us to come out with this new preparation and Application procedure used to control insect inside plant tissues which we have now patented it.

The Red Palm Weevil

Class	:	Insecta
Order	:	Coleoptera
Family	:	Curculionidae
Genus	:	*Rhynchphorus*
Species:		*ferrugineus*

Geographical Distribution of The RPW

The native of Red Palm Weevil is Asia (India).

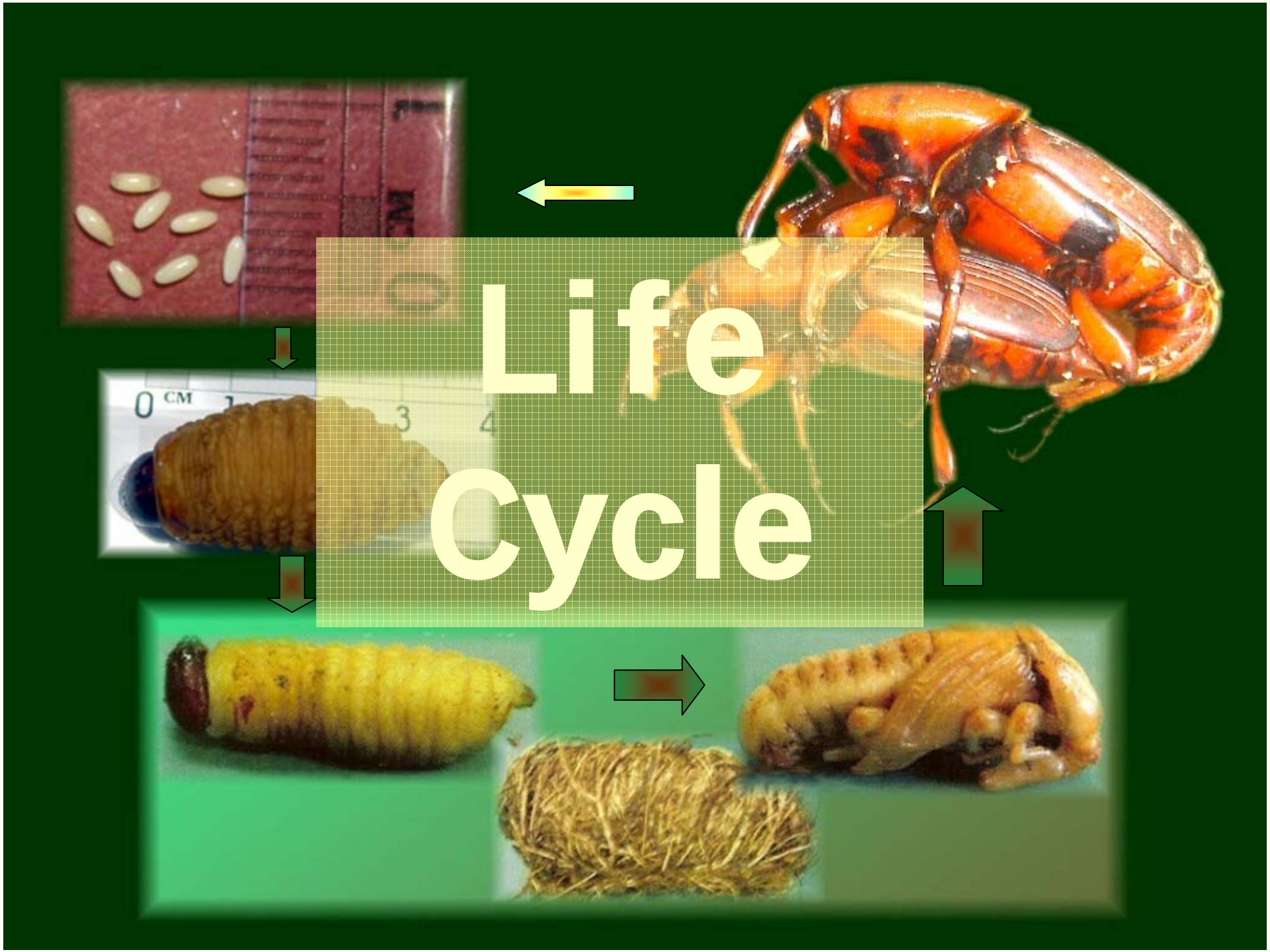
(Indian Palm Weevil) (Asian Palm Weevil).

The pest is found in the following countries:

Pakistan, Malaysia, Indonesia, Sri Lanka, Thailand. Taiwan, Burma, Philippines and China. Recently the insect was reported in Spain Italy and Cyprus and Turkey.

RPW Attacks several plants belonging to Family Palmaceae.

RPW has been introduced to Middle East Region since early 1980's and is considered now as one of the serious pests which threatens date plantation.


Life
Cycle


Damage & Economic Importance
The majority of infestation happens in young date trees (2-10 years).

Control and Management of RPW

Tough !

Why ?

- Concealed Nature of the damage induced by RPW larvae.
- Infestation is usually detected and diagnosed at late stages. (Larva is most destructive stage of the life cycle).
- Longevity of the larval stage.
- Adult fecundity.
- Number and overlapping of generations.
- No effective control procedure is practiced till to target RPW larvae and most effort are directed towards the control of adults.

Management measures used against The Red Palm Weevil

Chemical control measures targeting adults are currently practiced using chemical pesticide with little success to all stages of the pest and also causing environmental concern.

Mechanical control practices using pheromone and kairomone traps have been used with reasonable of success as it targets adult stages and the traps needed to incorporated in comprehensive integrated system.

Biocontrol measures targeting adults of RPW using EPNS & EPFS is currently researched at UAE and other GCC. Biocontrol agents also need to integrated with each other to achieve better control results.

Current Situation of RPW in Gulf

None of the previous methods offered any real progress or noticeable success in enhancing effective control particularly for RPW larvae which are residing and attacking internal part of date plant tissues.

In this presentation I am reporting findings of assays assessing the use of new method for preparation and delivering EPNS in an attempt to achieve successful control larvae of the RPW inside date tree trunks and also to enhance the control for RPW pupae and adults. The method can be used against other pests with similar close nature of habitation.

Components of the New Control Procedure

Two elements

- The method of preparing EPN product.

- The method of delivery and application of EPN prepared product.

Preparation of Nematode for Application

The main objective of perpetrating this nematode product is to allow EPNS which IJS can be suspended and delivered to sites of habitation and tunnels of RPW larvae.

After several trails the new preparation was prepared and was made to possess the following features:

- Homogeneous to acts as a holding medium on which IJS of EPNS can be suspended.
- Contains enough air bubbles.
- Improve survival of and allow free movement of IJS.
- Defined consistency to enable IJS to search for potential hosts and also allow to the prepared formulation to be pushed deep inside tunnels of the date plant tissues.
- Contains some stabilizing materials and phagostimulants.

Constituents of the paste

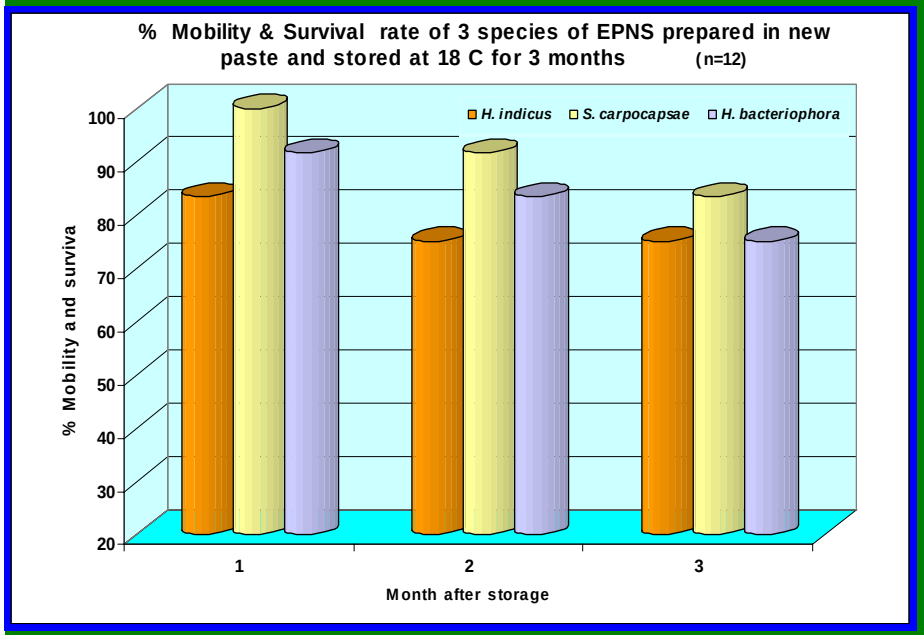
- Starch polymer
- Water
- Stablising materials

All ingredients are mixed in certain way to form a unique preparation with known physical properties and known parameters.

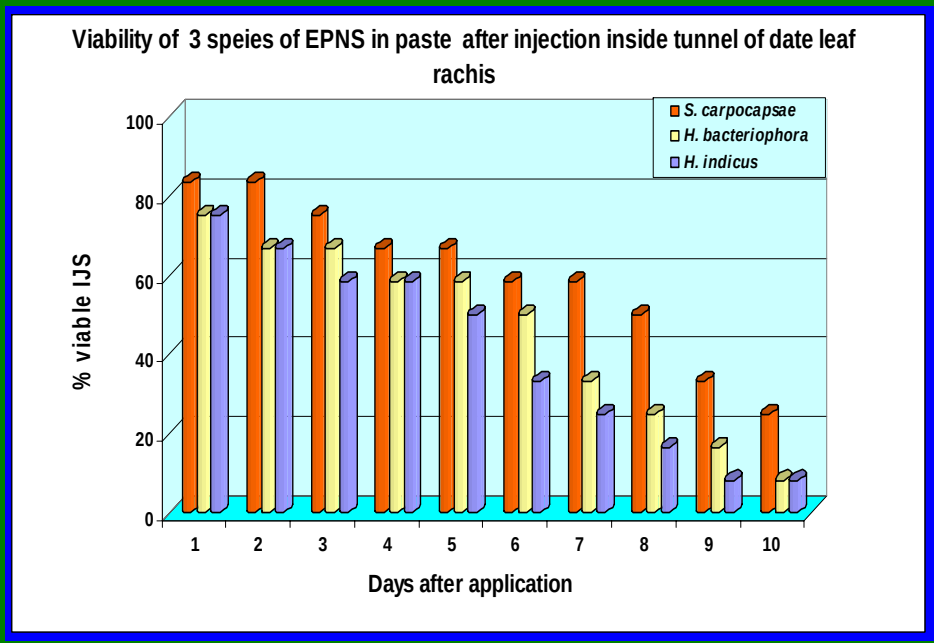
Of course the bio- active - ingredient (IJS of EPNS) are Added and mixed at the final stage.

Assays to investigate the efficacy of the paste

Mobility & survival rate of 3 species of EPNS prepared in the new preparation and stored at 18ºC

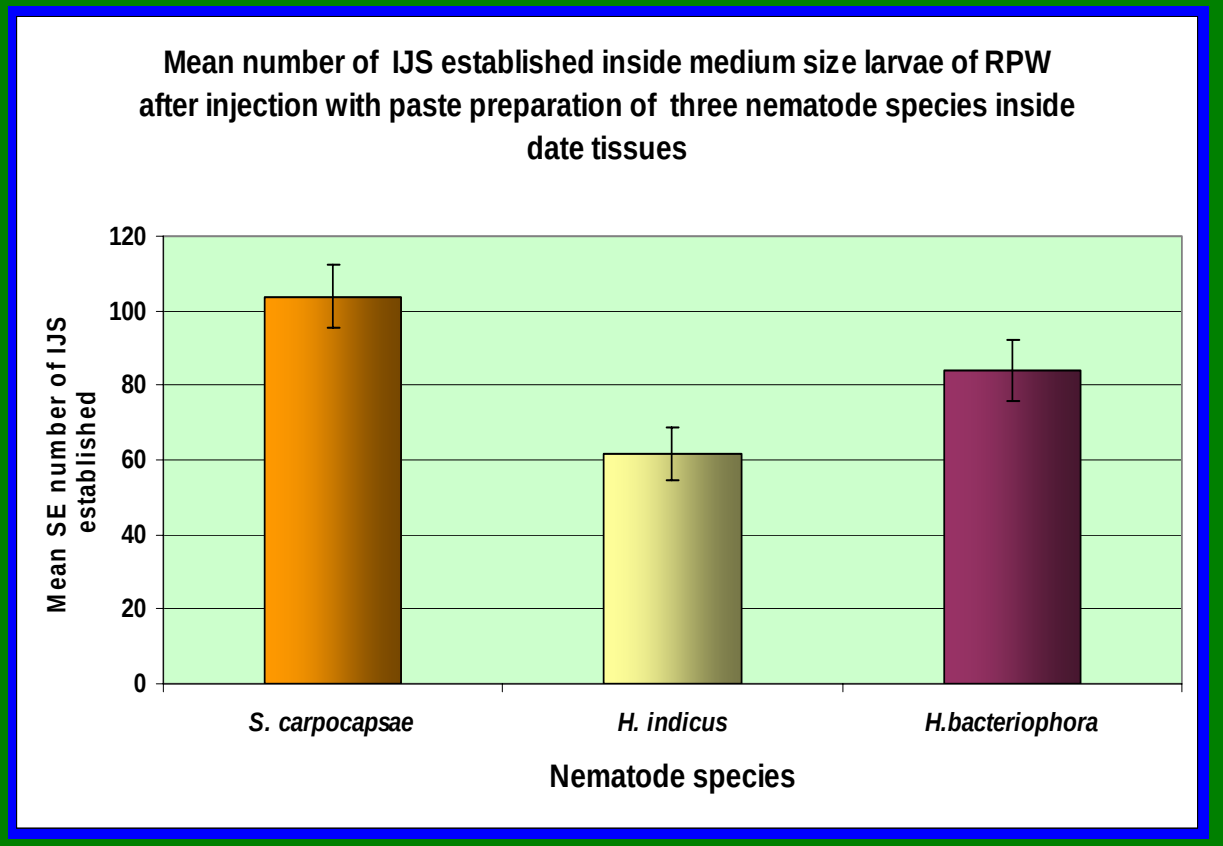


The viability of 3 species of EPNS in the prepared paste after application in the field for period of ten days:



Date tissues assays in the Lab to assess injection of formulation inside artificially induced infestation

Virulence and pathogenicity of IJS of three species of EPNS in new prepared formulation



Treatment of infested date tress

Field Assay

Tree	State of infestation	Number holes of with active infestation
1	High	14
2	Medium	8
3	Low	2

Results of field Assay

Tree	Number of injections	State of infestation after injection
1	4	No active infestation
2	2	No active infestation
3	1	No active infestation

After One month No signs of active infestation

Conclusion

The same procedure with great success rate has been tried against larvae and adults stages of other major pest of date which is *Oryctes* beetle

- It is quite evident from the results obtained in study that the success of this system to control insects depends mainly on two crucial elements which are:
- (a) Preparation of EPNS
- (b) Delivery of EPNS to sites of larvae inside the tunnels. .

Acknowledgements

- AOAD
- MOE & W, UAE.
- EPN National team at Biological Control Project of the Red Palm weevil
- The administration of Annual Biocontrol Industry Meeting.