Pest Invasiveness and Control Strategy for *Pomacea* spp.

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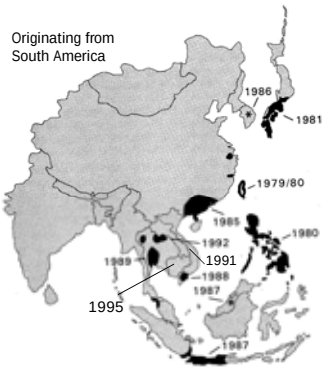
CONTENTS

- Brief introduction to *Pomacea*
- Sharing experiences - what has been done in Malaysia and elsewhere , especially on the control
- Why *Pomacea* is difficult pest
- Strategies – old and new?
- Conclusion and Recommendation

SOME INTRODUCTION TO *POMACEA*

- *Pomacea* is belonged to the family Pilidae (Amphulariidae)
- Local snails such as *Pila* belonging to this family are known as gondang (Malay), kuhol (Filipina), koi(Thai) etc. which are harmless
- *Pomacea,* the introduced species, is nicknamed gondang emas, golden kuhol and koi cherry etc.

Originating from South America



Chronology of *Pomacea* Spreading In Asia

SOME OF ITS UNIQUE CHARACTERISTICS

- Have little external features used for species identification
- Male and female in separate individuals
- Gas exchange using both gill and lung
- Grow fast and reproduce early
- Produces a lot of eggs and plenty of young
- Aestivating (inactive underground) during dry season
- Practically has no natural enemy in its new territories (SEA)

INVESIVENESS OF *POMACEA* AS PEST SNAIL

- *Pomacea* has become important pest, especially on paddy and other aquatic crops in Asia and other rice growing areas (South America and Australia).
- The damage occurs in monoculture crops such as paddy
- The snail is very difficult to control and spread very fast

SHARING THE EXPERIENCES

Two major workshops had been organized in the region:

- Management of Golden Apple Snail in Rice Production in Asia, June 1997, Phitsanuluk, Thailand
- International Workshop on Golden Apple Snail Management in Rice, Aug. 1998, Nge An City, Vietnam,

What was done since its appearance in Asia and Malaysia

- *Lab studies on its biology (species identity, life cycle, physiology*
- *Field studies (Ecology, trials on its control, dispersion)*
- *Effort to contain and manage the snail*
- *Sharing experiences in forum, conferences etc*

Life cycle studies:

- Females mature in 60 -85 days and weekly lay 25 -500 eggs. Eggs hatch in 10 -15 days. Hatchability up to 90 %
- Snail lives for 3 years
- Male female ratio: 1:2



Genetic studies (Malaysia):

Isoenzyme analysis (using Vertical Polyacrylamide Gel Electrophoresis) revealed:

- Three populations of *Pomacea* found in Malaysia: The northern population was closely related to its Southern Thailand relative. The Sarawak population (Bakalalan area) was closely related to those in Kalimantan. The Sabah population was neither close to Peninsular or Sarawak populations. Thus it was believed that the Sabah population might be closely related to the Philippine relative.
- Genetic study also revealed three species of *Pomacea* present in Malaysia: *P. insularus, P. canaliculata* and another still undetermined species

Aestivation (hibernating during drought):

- Snails were induced to burrowing into the soft mud by slowly draining the water. The snails were kept dry for five months underground. Samples were taken weekly to investigate the energy spent and the survival rate.
- 40% of the population managed to survive the 5 mth aestivation. Energy consumption was slow at the onset of aestivation but becoming rapid after 3.5 months when protein was presumably used at this stage.

CONTROL MEASURES:

- Legislation. Eg. Declared as dangerous pest under Plant quarantine Regulation 1982 (Malaysia).
- Control by saline water. (Malaysia)
  Control was conducted in Pengkalan Semeling, Kedah. Brackish water (salinity 8-12ppt) from nearby river was flooded into the infested rice field and left for 3days. Drained field was then flushed with fresh water from a nearby pond.
- Chemical (Biological and Synthetic) control.
  Tea Seed Cake, retenone, neem and other plant molluscicides
  Bacillus thurigiensis H 4
  Bayluscide, Metaldehyde,

Note: Only few commercial molluscicides in the market, unlike insecticides

- Biological control
  Fishes (catfish, black carp, common carp, tilapia,)
  Ducks (Mascovi and Khaki Campbell)
- Manual collection and utilization of snail
  Manual collection of adult and eggs.
  Collected snails were processed into animal feed
- Cultural control
  Transplanting older paddy , managing water level, screening water ways

All these were integrated into the IPM program

WHY *POMACEA* IS DIFFICULT TO CONTROL

- Poor perception and mindset by farmers
- The snail is not yet fully understood
- Lack of interest on snail pest amongst researchers as compared to other pests
- Too few chemicals (organic and synthetics) available for control measures
- In the past, weaning cooperation among stake holders in the country and in the region in managing the snail

CONTROL STRATEGIES

- Keep in using the old established methods
- Finding more control methods to be incorporated into IPM strategy

CONCLUSIONS

- *Pomacea* is here to stay and quite impossible to eliminate entirely
- With good planting practice, proper water management, and effective control, the damage could be minimized.
- *Pomacea* can be put into good use, e.g. animal feed

RECOMMENDATIONS

- Some other ways of control have to be found, eg.. better molluscicides and other technologies
- Better coordination and cooperation among affected countries in the region

DEVELOPING OTHER CONTROL METHODS

Example: SST (Sterile Snail Technique)

- Based on the techniques used for insect (SIT), there is a possibility that the sterile male method can be applied to snail
- Malaysia has the expertise and facility in irradiation technology, so are other countries in this region
- Research toward this sterile male technique can be pursued



Snail has features good for SST:

- Sexes are separate
- Responsive to irradiation, more H_2O
- Less mobile (Little immigration and emigration)

Examples of responses

Egg production and hatchability rate:

- Irradiated snails produced 45 – 63 % lower in eggs number compared to normal snails
- 78 to 100% of normal and Irradiated eggs were able to hatch

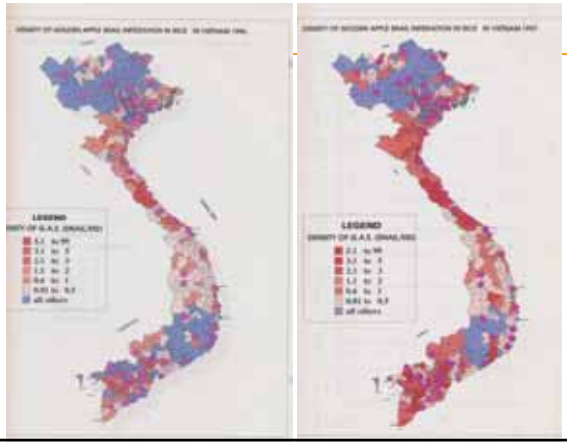
Snail morbidity:

- The irradiated snails found it difficult climbing wall of containers.
- On the ground the irradiated snails moved 43 to 61% slower than the normal snails, which moved about 2.24 cm/min.

MANAGING THE DATA AND INFORMATION

It is recommended that GIS being developed and maintained for long term management of GAS.

- A GIS was developed in Vietnam and an attempt was also done on a smaller scale in Perak, Malaysia. It needs support, fund and manpower to maintain.



. A GIS had been developed for a small rice field (about 7,550 ha) in Chenderong Balai, Teluk Intan, Perak.

Size distribution of Pomacea in Chenderong Balai rice field of Krian –Sg. Manik Project (Total area 7,550 ha)





Population density of snail

REGIONAL AND NATIONAL LEVEL OF COOPERATION/COORDINATION

Good coordination involving relevant departments works in affected countries:

As an example in Malaysia, a GAS Task Force was formed in early 1990s comprising Dept. of Irrigation and Drainage, (DID), Dept. of Fishries, Dept of Vet. Services, Muda Agr. Dev. Auth. (MADA)., Kelantan Agri. Dev. Auth.(KADA), Fed. Land Consolidation and Dev. Autho. (Felcra), and other agencies, eg. Universities which was coordinated by Dept. of Agriculture.

Smaller working Committee at district level were also set up. Reports were submitted to Plant Protection and Quarantine Section of DoA for management of GAS.

Regionally, in the past , little cooperation or coordination took place. Now it is beginning to change. Eg. APPPC's effort today , thank you.