

INTEGRATED "KUHOL" MANAGEMENT

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- *Increase seeding rate*
- *Pasture ducks in the rice field*
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- *Install screens in water inlets*
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Integrated Kuhol Management ¹
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I. INTRODUCTION

Origin

The golden apple snail (*Pomacea* sp.), locally known as the golden kuhol was introduced in the Philippines between 1982 and 1984 (Santos, 1987) .It came from South America (Brazil and Argentina) via Taiwan as an inexpensive source of protein for the Filipino families. Its cultivation was first promoted by well-organized local institutions as a way of improving life in the rural areas. The ease at which this idea was accepted by the local folks initiated the widespread production of this organism. With time, it is a common sight in places near waterways and bodies of water.

However, over the years, the golden kuhol was observed attacking the rice plants in irrigated paddies. Farmers first reported the snail as a major pest of newly transplanted rice seedlings in 1986 in Isabela, Region II, when about 300 hectares of rice farms were heavily damaged. Four years later, almost all of the irrigated paddies were affected by the golden kuhol. Thus, the Crop Protection Division of the Philippine Rice Research Institute compiled this information for the Filipino rice farmers to abate this awful organism.

Life cycle

Eggs. About 50 300 eggs are laid in clusters which are usually oval in shape. Newly laid eggs are bright pink in color and turn light pink when about to hatch. The eggs start hatching 7 -14 days after laying.

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Hatchling -Adult. The newly hatched kuhol cling to any nearby surfaces like pond walls, plants or larger kuhol. They grow very fast and mature in short time. They bury themselves in moist mud, digging deeper as the dry season goes on. They can aestivate for over 6 months hidden in soil, then become activate when the soil is flooded again. They complete its life cycle in 60 days.

Host range and feeding habits

They fed on a wide range of plants such azolla, duck weed, water hyacinth, rice seedlings, decomposing organic matter, and other succulent leafy plants and vegetables. They feed very well on young rice seedlings, remaining rice just below water level.

Predators/Natural Enemies

The natural enemies of kuhol include ducks, ants, birds, spiders, rats, mites, snakes, bacteria and lizards.

II.MANAGEMENT OF GOLDEN KUHOL

A. Transplanted rice crop

A1. Increase seeding rate and raise seedlings through wetbed method

Sow one-half cavan more than the usual seeding rate per hectare. Extra seedlings will be used for replanting hills damaged by kuhol. Wetbed-raised seedlings are less vulnerable to kuhol attack than seedlings raised by “dapog” method because they are older, bigger and tougher.

A2. Pasture ducks in rice fields after harvest

Pasture ducks in wet rice paddies after crop harvest up to one day before the last harrowing for the next crop. Release ducks to the rice fields 30-35 DAT for early maturing and 40-45 DAT. This will reduce remaining kuhol population in the rice paddies after other control measures are employed.

Remember, avoid molting ducks as these tend to make the paddy water itchy or irritating to the skin of farm workers.

A3. Hand-pick kuhol and destroy egg clusters before final harrowing

This will reduce the kuhol population and thus avoid serious economic damage on the newly transplanted crop. This practice should be continued until 3 weeks after transplanting.

A4. Construct depressed strips

This should be constructed next to bund and across paddies by pressing the harrow during the last round of final harrowing. Kuhol will converge on these strips that keep water even after paddies are drained. It is easier to collect the kuhol from these strips after they are concentrated. Depressed strips should also be planted with rice seedlings.

If kuhol damaged is observed, drain paddies to confine kuhol in the depressed strips for easy hand-picking and/or spot pesticide application. If spot pesticide application, keep the water level at 2-3 cm in the strips and apply only the recommended molluscicide. Reflood the field 2 days after spraying.

A5. Transplant older seedlings

Transplant 25-35 days old seedlings for early maturing varieties and 30-35 days old seedlings for late maturing varieties at a distance of 20 cm x 20 cm with 3-5 seedlings per hill so that, the remaining seedlings compensate for plants destroyed or damaged by kuhol.

A6. Install screens in water inlets

Immediately after transplanting, install screens in water inlets to prevent the entry of kuhol from the irrigation canal to the paddies. Plastic net bags, split bamboo "bobo" traps, plastic sacks and other local materials can be used.

A7. Place stakes along bunds

Place stakes about 1 meter long and 1 inch wide at the depressed strips at a distance of 3-4 meters after transplanting and near water inlets. The kuhol will lay their eggs on these stakes. This makes collection much easier.

AB. Intermittent irrigation

Employ good water management by flushing the field two weeks after transplanting and repeat it twice at one week interval. Four (4) weeks after transplanting up to two (2) weeks before harvest, maintain a water depth of 3.5 cm.

B. Direct seeded rice crop

B1. Increase seeding rate

Use the usual rate of seeding and raise extra seedlings by wetbed method using one-half cavan of seeds. Sow the seeds 5-7 days before scheduled direct-seeding of the field. The extra seedlings raised will be used for replanting patches damaged by kuhol.

B2. Pasture ducks in rice field after harvest

This should be done until a day before the last harrowing for the next crop.

B3. Hand-pick kuhol and their eggs

It is essential that through hand-picking of the kuhol and eggs be done before the last harrowing to prevent heavy damage on the crop during its most vulnerable stage (up to 50 days after seeding).

B4. Construct “canalets” next to bunds and across paddies

The “canalets” are 20-25 cm wide, 5-6 cm deep and 5-6 meters apart within the paddy. The “canalets” can be constructed by pulling a sack containing a stone or pulling a banana trunk at designated places in the paddies immediately after the last harrowing. Besides their use for drainage, kuhol converge on “canalets” when paddies are drained making hand-picking and/or spot-application of pesticides easier.

B5. Install screens in water inlets

This should be done immediately after broadcast of seeds to prevent the entry of kuhol from irrigation canals to the paddies. The materials that can be used are plastic net bags, plastic sack and split bamboo prepared as screen or trap (like “bobo”). The screens may be installed at the time of first flooding provided that these are protected from being clogged and damaged by debris carried by irrigation water at the time of its initial release.

B6. Intermittent irrigation

Employ good water management by flushing the field one week after seeding and repeat it twice at one week interval. Four (4) weeks after seeding up to two (2) weeks before harvest, maintain a water depth of 3.5 cm. If kuhol damaged is observed, drain paddies to confine kuhol in “canalets” for easy hand-picking and/or spot pesticide application. If spot pesticide application, keep the water level at 2-3 cm in “canalets” and apply only the recommended molluscicide. Reflood the field 2 days after spraying.

III. OTHER ALTERNATIVES

These alternatives can be used under transplanted or direct seeded rice crops, depending on the availability of resources.

CI. *Use of botanical pesticides/molluscicides*

The following are plants with molluscicidal properties:

1. Tubli - *Derris elliptica*
2. Nami - *Dioscorea hispida*
3. Tobacco - *Nicotiana tabacum*
4. Tigao - *Vitex trifolia*
5. Lagtang - *Menispermum cocculus*
6. Sambong - *Conyza balsamiifera*

C2. *Use of synthetic pesticides/molluscicides*

1. Bayluscide = Niclosamide
2. Snailkil = Metaldehyde
3. Porsnail = Metaldehyde
4. Cupren =

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