Utilization Of Golden Snail As Alternative Liquid Organic Fertilizer (LOF) On Paddy Farmers In Dairi, Indonesia

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Abstract: Golden snail, Pomaceae canaliculata is a pest of rice plants, and used as a food source to be processed into satay, seasoning spices, biscuits, pastry, candy, crackers, animal feed, and fertilizer. In Lae Parira village, the golden snail is very diverse. Because of this reason, the preliminary study and utilization of golden snail used for of liquid organic fertilizer called (LOF) or and microorganisms local (MOL). The golden snail is obtained from a livestock that is still alive and then washed, boiled and removed from its shell. The golden snail meat is cut into small pieces, separated from the intestine and other visceral organs. Flesh of golden snail give coconut water, dilute brown sugar, EM4 and fermentation until 10-14 days. The use of mashed LOF can be sprayed on the surface of the soil or all parts of the plant. For fertilization in rice plants the recommended dose of 250 ml/15 liters of water is sprayed on the rice age 10 days after planting and repeated again at interval distance of 15 days. Fertilization on the plant recommended 200ml /15 liters of water sprayed on leaves and soil 7 days after planting and repeated every 7 days. The golden snail is potensial used for fertilizer in paddy plantation environmentally.

Index Terms: Utilazation, golden snail, LOF (Liquid Organic Fertilizer), MOL (Microorganism Local), Paddy, Farmer, Dairi.

1 INTRODUCTION

This pest, with called a mulberry slug (golden snail, Pomaceae canaliculata) feed on the stems and leaves of rice while paddy aged 15 days. The stricken rice plants can be exhausted from the leaf buds to the young rice stalk. As a result the plant becomes miserable even experiencing crop failure. The development of these pests is very fast, from eggs to hatches only takes 7 - 4 days. In addition, a single female of golden snail can produce 15 egg groups during one life cycle (60-80 days), and each egg group contains 300 - 500 grains. An adult golden snail is capable of producing 1000-1200 eggs per month. New rice planted up to 15 days after planting easily broken caused of golden snail, can even consume all young plants in one night. Other specific signs of this pest-stricken rice plant are the missing clumps and the leaves that float on the surface of the water [1]. Golden snail feed on newly planted young rice crops and can destroy crops during initial growth. Massive golden snail attacks can result in newly planted rice being totally depleted. Important moments for controlling the golden snail are in the first 10 days for transplanted rice and before the 21-day-old plant on the tabela system. After this age, the growth rate of the plant is usually higher than the level of damage caused by the golden snail [2]. The benefit of golden snail (P. canaliculata) can used as fertilizer, source of food, animal feed, seasoning spices, biscuits, pastry, candy, crackers, and games for children. According to [3] and [4], in agricultural such as paddy plantation, P. Canaliculata can collected by some steps,such as:

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1. Fetching the golden snail directly by hand from the fields in the morning and afternoon when the golden snail is active and easy to take. Furthermore, this golden snail can be used for making Mol of golden snail material.
2. Using plants that contain toxins for the golden snail. For example, the leaves of sembung (Blumea balsamifera), the leaves of tuba roots, the water hyacinth leaves (Monochoria vaginalis), the tobacco leaves (Nicotiana tabacum), calamansi or citrus leaves (Citrus microcarpa), mabuhay leaf (Tinospora rumphii), and red peppers. In addition, some other plants that can also be used to eradicate the golden snail mas are starflower (Calotropis gigantis), neem (Azadirachtha indica), and asyang (Mikania cordata) containing ingredients that can kill the golden snail. Various herbs are recommended applied before planting rice. A small channel is made for the golden snail inside the channel and then on top of the channel place the above mentioned plants.
3. Using attractants such as taro leaves (Cococasia esculenta), banana leaf (Moses paradisiaca), papaya leaves (Carica papaya), trumpet flowers, and old newspapers, to easily collect the golden snail. The leaves as attractiveness are placed in rows of paddies in a row, within 1-2 meters between baits, made before harvest to 5 weeks after planting. The amount of attractant as required feed is about 40 kilograms per hectare. The water level in the rice field is suggested about 5-10 centimeters [5].
4. Plastic fence can be used to prevent the inclusion of golden snail into the rice field area.
5. Plugging bamboo pedicure as an egg trap in the rice fields that are always stagnant or on the irrigation channel to pull the adult of golden snail lay eggs.
6. Maintain water to be not too high (2-3 centimeters) starting 3 days planting.
7. Using varieties that have large and less favored the golden snails such as PSB, Rc36, Rc38, Rc40, and Rc 68.
8. Some of the predominant of golden snail are birds and ducks, turtles, fish and insects. Duck grazing in paddy fields, is an effective control, with no damage to the rice that has been planted. This system is known by the public as ISG (duck shepherd system). Distribution of certain

types of fish that can eat the golden snail (and also eggs) will provide benefits in controlling the golden snail population. Types of fish that can eat the golden snail or egg golden snail, among others Botia sp; Tetraodon sp; Bunocephalus sp., and Leiocassis sp (a type of catfish); Cichlidae group, carp group (gurami, sepat), beta, and others. This system has long been known to the people of Indonesia with the name of mina-padi. In this system, water management to provide the possibility to eat eggs should also be done, so the chances of hatching and breeding golden golden golden snail can be decided. Then [6], [7], said the golden snail can live up to 2-6 years old and has pink eggs like mulberry fruit placed in groups both on the plant and on the farm road. Each group of egg of golden snail can reach 235-860 grains and the egg golden snail can drip after the age of 8-14 days. That's why the golden snail is difficult to control because of its rapidly growing to growth up and development. To be able to control the golden snail can do several ways including:

- Using natural enemies such as ducks released in the rice fields before planting and after harvest to eat young saplings and golden snail population can be pressed.
- Use traps. The trap you can use is a used bamboo or gunny sack placed on a puddle of waterlogged fields, then from the beans we give the favored food like coconut, papaya leaf, stem or banana leaf, rice and vegetable waste for golden snail. The golden snail trap you can install in the afternoon, then on the next day usually golden snail pest has gathered in the trap you make, then you live lift the trap is the land.
- Use the way of drying the rice water. If the golden snail attack is high enough try the area of land that you planted dry rice, because the golden snail attack cannot be separated from the availability of water in your rice crops, then try to dry in the area of your rice crop until the condition of tracing or can be complete if the water source in the area easy to get.
- Make traps egg of golden snail. We can stick a log or bamboo along the rice field, because the golden snail will lay eggs in a location that is not in contact with water, so use this trap to facilitate the collection of eggs and the golden snail attached to the stick you plug.
- Provision of plants containing vegetable pesticides. Use plants that use vegetable pesticides placed on rice water such as: tobacco leaves, tuba roots, areca nut, wet gadung, neem leaf pouch, and mindi leaf, this is done as a protection from pest of golden snail.
- You can also sprinkle ash. Sprinkle rough ash powder and wood sareah diareal where masked mas, if absorbed into the shell will cause death

Besides known as rice pests, which farmers can use pests of golden snail can be a source or material to make organic fertilizer. Mask and shell meat of golden snail has many contents such as vitamins, proteins, fats, carbohydrates, lime and other nutrients that can be absorbed by our plantation so it is suitable for the manufacture of liquid organic fertilizer called (LOF) or and microorganisms local (MOL). For the availability of raw materials is not feared golden snail because it has a very fast breeding ability. Preparation of golden snail flour is preceded by processing golden snail meat, then process is done. The soaking process is intended to remove any dirt and mucus remaining. Drying aims to reduce water content, so that the golden snail meat becomes more durable. The golden snail flour can be used up to 30% in feed to substitute the use of fish meal as a protein source [8] and [9]. The golden snail is obtained from a livestock that is still alive and then washed, boiled and removed from its shell. The golden snail meat is cut into small pieces, separated from the intestine and other visceral organs. Flesh of golden snail dried by dried in direct sunlight for approximately 3 days. The dried mashed dried meat is then weighed and finely ground to serve as a golden snail flour. From 7 kg of golden snail meat in the form of wet produced dried flour as much as 1.9 kg [10].

How To Make MOL of golden snail (P. caniculata)

The materials used consist of:

1. 1 kg of surviving community members.
2. 4 liters water rice grandson.
3. 2 liters of coconut water (waste of coconut water from market).
4. ams Red sugar / white sugar - 4 liters of clean water.
5. 160 mm activator, microbial or other material.

Tools used consist are:

- 1 Piece of plastic bucket size 20 liters.
- 1 Fruit Bottle of drinking water mineral 1 liter.
- 0.5 meters Small plastial hose.
- One pair of pounding tools.
- 1 Fruit. Filter or clean cloth

How To Make MOL of golden snail (P.canicuilata) follwed the step such as:

- Take rice mixed rice water with a decomposer or a kind of microbe that serves to accelerate the fermentation process as much as 160 ml (can Use Trichoderma as decomposer) and overnight.
- Mash the golden snail dried meat with the shell until soft.
- Dilute brown sugar, mix with clean water, and coconut water in one place.
- Mix all the ingredients together, stirring evenly.
- Cover the bucket with plastic and fasten. The top given a hole according to the size of the hose and then inserted a small tube into the bucket connect with a bottle of mineral water that is filled with half the water. The purpose of this treatment to know the process of fermentation is berlangsunng try the air gap out through the hose. If the temperature in a sealed place is too high, the air will come out through the hose and issue an air bubble.
- Wait for the fermentation process for 10-15 days.
- Treatment will be successful if the fermentation will produce a distinctive fresh smell. Fermentation results are said to fail when it smells like a carcass.
- The fermentation results are filtered and stored in tightly sealed containers.

How to use of MOL

- The use of mashed MOL can be sprayed on the surface of the soil or all parts of the plant.
- For fertilization in rice plants the recommended dosage of 250 ml/15 liters of water is sprayed on the rice age 10 days after planting and repeated again on the interfal distance of 15 days.
- Fertilization in recommended vegetable crops 200 ml/15 liters of water sprayed on leaves and soil 7 days after

planting and repeated every 7 days.
- As for plantations such as palm dosage recommended is 250 ml/15 liters of water sprayed on soil surface and roots every 2 weeks.
- In addition to the use is also good for crops such as food, horticulture and perennials.

Benefits obtained from MOL of golden snail or the benefits of golden snail mole according to the results of field observations include the following:
- Can restore and improve soil fertility.
- In paddy fields fertilized MOL of golden snail seems more fertile, soil more loose, there are develop of worms and microorganisms more.
- Plant production
- The nutrient content contained in the golden MOL is quickly absorbed by the plant.
- Improve the quality of plant growth.

Environmentally Harmless to Livestock

According to [11] and [12], if farmers want to implement and use the golden snail as organic fertilizer (MOL) of golden snail, it will reduce the production costs that farmers spend, and of course the natural balance will be maintained, over time pests can be controlled and not be the main enemy and to be beneficial to farmers, and actually not just a golden snail mask that we can use to MOL in there are still many we can take advantage of one of the bamboo shoots or bamboo is still filthy, from this bamboo shoot you can also make MOL bamboo shoots, and certainly very useful for organic farming.
0020An animal that has a high protein content that can be utilized to create MOL or Micro Local Organisms for the purposes of fertilizing plants in the vegetative phase. Utilization as MOL is usually called MOL of golden snail.
- Help us to clean the fish ponds moss, by maintaining of the golden snail in the fish pond, especially the wall/concrete, but it is also possible for the ground pool. The golden snail will clean up the moss or grass that usually grows floating on the water.
- For livestock feed, especially duck, giving regular golden snail will accelerate the growth of duck, if laying duck will increase the production of eggs.
- As a snack. Can be fried, sautéed, in bottom or other cooked (Nb. For those who are accustomed to consume).
- As fertilizer and loosening of paddy fields indirectly. In paddy fields there are many golden snail populations of his mass will trigger ducks/ducks to hunt the place. If we do not realize it, we will spontaneously expel the duck because it causes unpleasant odor in the field and cause itchy feet if stepped on the land of the rice fields, it's because of duck left in the fields. But the positive impact is certainly greater, among others.
- With the design of the duck's feet such that it will make the soil more muddy again in other words improve the texture of the soil.
- Ducks at the time of paddy is a free organic fertilizer without having to buy difficulties spread and bring to rice field.
- Population of golden snail in the rice fields will be exhausted because eaten by ducks, this also reduces the energy to be spent to control the golden snail either by golden snail or with the application of pesticides.

Liquid Organic Fertilizer (LOF) on Plants

In general, golden snail is a pest of rice plants, and used as a food source to be processed into satay, or used as animal feed. In the meat and the shell of golden snail contains macro nutrients of 12.2 mg protein, phosphorus (P) 60 mg, elements of Kaliun (K) 17 mg, and various other nutrients such as C, Mn, Cu and Zn. Golden snail used as liquid organic fertilizer is very useful to fertilize agricultural crops and plantations (Yudi, 2013). MOL golden snail contain proteins, Azotobacter, Azospirilium, phosphate solvent microbes, Staphylococcus, and Pseudomonas. Another benefit of maso-based MOL of golden snail is to degrade cellulose. In addition, this liquid organic fertilizer can enrich nutrient content in soil, improve soil physical properties, improve soil structure, produce quality plants. The composition which is often recommended in some references used to utilize the liquid bioactivator MOL as a liquid organic fertilizer is by mixing bioactivators with water with a ratio of 1 liter bioactivator: 15 liters of water without chlorine so that the microorganism does not die. If the comparison is presented to 6.67% MOL fluid concentration [3,14]. Making bioactivator of local microorganism (MOL) golden snail is done by using fermentation technique. The method of making coconut as bioactivator according to [13] is by mixing 10 liters of coconut water, 5 kg of mashed golden golden golden snails and ± 2kg maja fruit flesh (2 pieces of maja fruit) which has been scraped into 1 bucket. The bucket mouth is covered with a plastic that has been perforated as the end of the hose. The end of the hose is glued with a hole on the plastic using a plastic glue or insulation. Then the other end of the hose is connected to a mineral water bottle to keep the air pressure. Fermentation is done for 15 days until the smell of tape. After 15 days bioactivaor is ready for use [4]. The golden snail (Pomacea canaliculata) is the enemy of the farmer during the vegetative period at the age before 30HST, the golden snail attacked the young rice stalk by eating it, there is actually a technique to avoid the golden snail attack by making small trenches along the embankment . The development of golden snail very fast, egg to hatches only takes 4-7 days. while a single female of golden snail can produce 15 egg groups during one life cycle of about 60-80 days, and each group of eggs contains 300-500 grains and an adult golden snail can produce 1000-1200 eggs per month, with very rapid development this golden snail are pests are very feared farmers. in the development of agricultural technology, now golden snail can be used as one of liquid organic fertilizer (LOF)) by making it MOL of golden snail with gook principal is expected to inhibit or even eliminate the nuances. as for how to make MOL of golden snail is by the way Raw materials: golden snail: 3 kg: brown sugar: 1 kg; water washing rice: 6 liters. How to make: mashed puree by pounding, slices of brown sugar until smooth and then dissolved in a solution of rice laundry water. Then mashed soft mix into red brown sugar and rice laundry, stir until evenly, store for 15-30 days or more if it produces good results. If it smells foul, add back slices of brown sugar. How to use? Firstly, one liter Mol of golden snail mixed with ordinary water or 2 litre/tank, then spray application at 15HST rice age interval 2-3 times a week. Spraying time hours 06.00 to 08.30 am. Benefits MOL of golden snail are to decompose straw, to repel pest golden snail, as MOL. Golden snail contains a very high amino acid useful for leaf fertilizer in paddy plantation. Pinang (Areca catechu L) is a wild plant, a palm, tall to 20 meters. Nutmeg contains an alkaloid-like substance similar to

nicotine, a metal-tetrahydromethyl-nicotinic ester in which hard-base oils are toxic and cause paralysis and respiratory arrest [15]. The results of [16] the application of dose of areca seeds has been able to cause golden snail pest mortality up to 87.49%.

How to make of MOL golden snail Materials used
o 1 kg of surviving golden snail
o 4 liters Water rice grandson
o 2 liters Coconut water (waste of coconut water from market)
o 400 gr sugar red / white sugar
o 4 liters of clean water
o 160 mm sctivator, microbial or other material.

Tools used
- 1 Fruit the size of 20 liters of plastic bucket
- 1 Fruit bottle of drinking water mineral 1 liter
- 0.5 meters small plastic tube
- One pair of pestle

Ways of making
 Pick up mixed rice laundry water with an activator or similar material to accelerate the 160 ml fermentation process and overnight.

Mash the golden snail still live during the meat and shell until soft. Dilute brown sugar, mix with clean water, and coconut water in one place. Combine all the ingredients together, stirring evenly. Cover the bucket with plastic and fasten. The top given a hole according to the size of the hose and then inserted a small tube into the bucket connect with a bottle of mineral water that filled half of clean water. The purpose of this treatment to know the process of fermentation is going and try the air gap whichout through the hose. If the temperature in a sealed place is too high, the air will come out through the hose and issue an air bubble. Wait for the fermentation process for 10-15 days. Treatment will be successful if the fermentation will produce a distinctive fresh smell. Fermentation results are said to fail when it smells like a carcass. The fermentation result is filtered and stored in a sealed container.

How to use
The use of mashed LOF can be sprayed on the surface of the soil or all parts of the plant. For fertilization in rice plants the recommended dose of 250 ml/15 liters of water is sprayed on the rice age 10 days after planting and repeated again at interpal distance of 15 days. Fertilization on the plant recommended 200ml / 15 liters of water sprayed on leaves and soil 7 days after planting and repeated every 7 days. As for plantations such as palm dose recommended is 250 ml/15 liters of water sprayed on the soil surface and roots every 2 weeks. Besides the use is also good for the type of plant such as paddy, soja, corn, , horticulture and perennials. Benefits obtained from LOF golden snail according to the results of field observations are as follows:
- Can restore and improve soil fertility.
- In rice field areas fertilized LOF of golden snail appear more fertile, the soil is more loose, there are develop of worms and microorganisms more.
- Plant production
- The nutrient contained in the golden snail of LOF is quickly absorbed by the plant.
- Improve the quality of plant growth.
- Environmentally harmless to livestock.

If the farmers want to implement and utilize the golden snail as organic fertilizer, it will reduce the cost of production, the balance will be maintained, over time pests can be controlled and not become the main enemy and become beneficial to farmers.

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