

BIOECOLOGY AND MANAGEMENT OF WILDBOAR (*Sus scrofa vittatus*) AND PORCUPINE (*Hystrix javanica*) ON OIL PALM PLANTATION IN INDONESIA

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ABSTRACT

Wild boar (*Sus scrofa vittatus*) and porcupine (*Hystrix javanica*) are two species of vertebrate pests which are commonly found on oil palm plantation in Indonesia, although the main habitat of those animals is in secondary forest. On oil palm plantation, both species usually destroy seedling which is newly planted in the fields, particularly at the shoot or the growing point. Monitoring to the population level and damaged due to these creatures is necessary, before they were managed effectively and efficiently. Among several methods of the population management to vertebrate pests, it seems mechanical control (mechanical barrier, repelling, trapping, and hunting) is the most effective and efficient. Chemical control using poison bait seems not effective; moreover it is very risky and danger to human and non target species around the area.

Keywords: Bio-ecology, management, wild boar, porcupine

MORPHOLOGY OF WILD BOAR

Wild boar (hog) is a medium mammal, with 750 – 1.000 mm height, 1.250 – 1.500 mm head and body, and 50 – 125 kg weight. Head size about a third of the size of the body, the boundaries of the neck is not clear, with relatively small eyes. Truncated cone-shape head, with a relatively long snout, use to dig the ground looking for feed, in addition to the use of their legs. Wild boar has a short tail, thick-skinned, with a blackish colored hair, tip of the hair usually yellow or whitish. Hair is coarse, stiff, and short. The longer hair could be found at the crest, back, shoulder, and hip. In a condition of fear and dangerous, this hair will stand. The front legs are stronger than the back, which serves to hold the weight on the front of the body, especially when running down the hill. Wild boar are even-toed ungulates, reduces the first finger, finger-2 and -5 short and hanging (not touch to the ground), finger-3 and -4 normal and touch to the ground. The dental formula is 3 1 4 3 at the upper jaw and 3 1 4 3 at the lower jaw, total number of teeth 44. Length of canine 250 mm, canine at upper and lower jaw grows continuously like incisors of rats, particularly on male. The mammary formula is 6 pair of nipple located on the ventral. The distribution geography of wild boar is Western part of Europe, Northern part of Africa, South Asia, South East Asia, and East Asia, expanding to Russia.

BIOLOGY AND ECOLOGY OF WILD BOAR

Reproduction.

Pregnancy in 120 days (4 months) and lactating in 4 – 5 months. The number of young per litter varies from 2 to 12 individual. After 8 months of birth, wild boar could produce another young, because at the end of lactating, female could do a copulation. Female could produce litter twice per year. Sexual maturity in two years, reaching full adult at the age of 5 – 6 years. Longevity in the field 10 – 12 years, while in captivity is 20 – 25 years. Classification of wild boar population by age is 0 – 6 months is juvenile, 6 – 24 bulan is young/sub-adult, and more than 24 months is adult. The development of wild boar: (1) Juvenile, which is still nourish by the parent, black body color with stripes across the body. (2) Young or sub adult, which is characterized by loss stripes and a change of baby teeth become permanent teeth. (3) Adult, which is characterized by permanent teeth or complete, and ready to mate.

Feed.

In general, feed of wild boar could be divided into three groups, based on the concerned with human interest, namely: (1) Agricultural commodities such as food crops are tubers (cassava, sweet potatoes, etc.), grains (rice, corn, and other cereals), and beans (soybean, peanut, green bean, etc.), and plantation crops (roots, stems, and shoots, of coconut, rubber, oil palm, cocoa, and sugar cane); (2) Forest commodities consisting of tubers/roots, leaves, young stems, barks, and fruit that fall; (3) Animal protein, i.e. earthworms, mollusks, crabs, soil insects, bird eggs, and animal carcasses.

Activity.

Wild boars are active at night. Activities usually carried out at dawn (4 – 6 am) and at dusk (17 – 19). Feed activity during that time related with safety factor to the animal, because the main natural enemies (human) are still living or had returned home. Other natural enemies, such as tigers and snakes do not actively foraging. This feed activity could change to the middle of the night, when the time mentioned is not safe enough to wild boar. During the day, at 11 – 13, wild boars wallow in the river, lake, pool, or water in the hole of the soil. The purpose of wallow is to decrease the body temperature during the day and remove ectoparasite attach to the skin surface by scrub their body with grass or bushes after wallowing. Outside of the hours mentioned above, the wild boar usually takes a rest (doing no activity).

Nest.

Basically, wild boars do not make a nest to rest and feed store, however the female boars will give a birth, need a nest to the process of birth. In the process of making its nest, female boar was assisted by others in the group. First, they make a hole in the ground that will be

place for female produce the litter. Depth of the hole is 30 – 50 cm, with a length and width according to the size of her body. Then, the female boar come inside the hole, and her body was covered with leaves, twigs, and part of plant that have been prepared in advance by the wild boar.

Territorial.

Wild boars have a fix runway, which is seem safe for passes in order to look for feed and spouses. In a day, wild boars are able to move 5 to 12 km, the longest distance ever recorded was 16 km.

Habitat.

The habitat of wild boar is forest (primary or secondary forest), bush, grassland, and abandoned plant. Habitat selected by wild boar is mainly related to the availability of feed and water resources as a place to wallow. Wild boar wallow everyday and relatively resistant to sun's heat. Habitat displacement by wild boar related to two things, the feed is not available anymore and the dwelling that was dry.

Social Group.

Wild boar is a social animal. This animal always in group in the activity of looking for feed. In general, group of wild boar is divided into three parts, namely (1) Family group, which consists of an adult female with her offspring, that usually consist of 5 to 10 individual. Offspring who are still in this group are usually fed by its mother. (2) Youth group or group of young boars are the largest group, numbering around 50 individual. This group is a combination of children after weaned by its mother. The activity of this group, pose the greatest damage in the agriculture. (3) Solitary male boar group, usually consists of 1, 2, or 3 individual. This solitary male boar will join to the family or youth group during the mating season. The mating season will last for a few days, at that time female boar produce pheromone and distinctive voices. The estrus phase of wild boar will last for three days. This group is the most feared by humans because of fierce and not afraid to humans.

Communication.

Communication among wild boar is common in accordance with its role as a social animal particularly at certain moments. Based on the sounds that issued by wild boar, human divide it into several parts. (1) Pleasure Call, the feeling of pleasure associated with the presence of feed. (2) Alarm Call, there is a danger; there are predators or other animals being competitors, or human. (3) Mating Call, the female animal during estrus in mating season, which is usually lasts for several days. (4) Fighting Call, when a fight broke out between groups, this is usually occurs in the sub adults population.

Damage.

Wild boar is the most important pest in agricultural, particularly in the newly planted or expansion area, up to 3-year-old plant, especially in locations adjacent to the forest. Similarly, the food crop belongs to the farmers, particularly those directly adjacent to forest or adjacent to abandoned land. The damage caused by wild boar are: (1) Direct damage, i.e. the damage caused by wild boar because this animal consume plant parts. In oil palm plantation, oil palm seedling consumed at the growing point (shoot). Wild boar consumes grain of rice and corn, and tubers of sweet potato and cassava. (2) Indirect damage, i.e. damage caused by digging activity of wild boar in the soil around the roots of oil palm crops in an attempt to find earth worms and soil insects.

Management

In the management of wild boar, several factors need to be considered in order to reach the successful of result: (1) The state of environment or habitat of wild boar; (2) Population level of wild boar and damage caused by this creature; (3) Social and economic situation of local communities; and (4) Well organized in management, because of the mobility of this animal. Managing the organization in wild boar management must involve government officials and private companies.

Cultural technique management and sanitation more focused on cleaning activities to areas favored by boar for hiding, resting, foraging, and wallow, particularly to the abandoned land and area that much overgrown by weeds and shrubs. Sanitation can also be conducted in ponds where wild boar bathing.

Physical and mechanical management could be used with several ways:

- (1) Obstructing boar entered the plantation by creating physical barrier. Efforts to stop wild boar entering into plantation could be conducted by two ways, i.e. (a) Make a strong fence surrounding the plantation. It would be better if the fence is in the form of a living fence. Plant relatively more powerful because its roots plunged deep into the soil; and (b) make a trench wide and deep enough surrounding the plantation. Two meter width of trench and one meter depth of trench is enough to deter the boar entered the area.
- (2) Capturing wild boar. Efforts to catch wild boar can be performed using several traps, live traps (net/trap) and death traps. Live trap is a trap used to catch wild boar alive, and take advantage of the boar, suppose to be placed in a zoo, or a bio-ecological research. The use of nets/traps also intended to get the boar alive. While the deaths trap is a trap to catch the boar dead, either for immediate burial or for consumption (for those interested).

- (3) Killing wild boar directly with the tools. Attempt to kill wild boar directly is using the tools such as spears, arrows, machetes, and guns. Hunting wild boar is usually done together between local people and outsiders (eg. Perbakin), and is often assisted by the use of hunting dogs, that have been trained to find the existence of the wild boar.
- (4) Repelling wild boar from the total area. Efforts to repel wild boar can be conducted using the sounds and rumbling sound will make the boar running. It can be used a chemical repellent.
- (5) Hook bait that contains hard and sharp object. Preparing the hook bait with the lure favored by wild boar (cassava, sweet potatoes, banana, cempedak, and jack fruits), in which have been given the hook. Therefore it can damage the digestive systems of will boar and turn it off. Laid the bait hook on the track of boar, a little bit over the edge. The distance of bait, between 10 – 20 m and the number of baits more than 20 points/ha. In the handling of hook bait, it should not be touched directly by human hands, because the smell of the wild boar is very sharp will recognize the human scent. If within the three days the bait is not touched by wild boar, while the crop is still being attacked, the hook bait should be replaced with the new ones. Efforts in physical – mechanical control is usually conducted together, put net/trap on the run-way of wild boar, releasing the hunting dogs, a crowded sound, and hunting wild boar.

Biological management could be used to wild boar are predator, i.e. tiger (*Panthera tigris*), leopard (*Panthera pardus*), bear (*Helarctos malayanus*), and python (*Phyton reticulata*), and human itself. Utility the natural enemies such as pathogen still difficult to be conducted, because pathogen of wild boar is very dangerous to human or to animal wildlife (conservation animal).

Chemical management to wild boar are using poisoned bait. The poison used is aldicarb or zinc phosphide, both are acute. Aldicarb is not actually poison for wild boar, but insecticide and nematicide. Because wild boar are consuming this poison (which was apply to the roots of the trees) can also die, therefore this toxin can be used to control wild boar. Bait (sweet potato or banana or cempedak) drilled first, then put the poison as much as 1 – 1.5 tea spoon, and bait are closed. Bait is placed on the run way to the edge, as a group (10 – 15 pieces), and camouflage with leaves. Installation of a bait should be done in the afternoon with the distance between the bait 50 – 100 m. If needed, be provided preliminary feedback (pre-baiting), bait without poison to eliminate suspicion in wild boar. Wild boar that died after eating poisoned bait, must be buried to avoid being eaten by predators, that can harm them. Chemical control is very risky or harmful to non-target animals or to human.

PORCUPINE (*Hystrix brachyura*)

ORDER RODENTIA, FAMILY HYSTRICIDAE

BIOLOGY

Morphological character of porcupine is dark brown (dorsal), whitish (ventral), long spines at posterior, and short at anterior. Porcupine modify its hair into spines, the size of spines is short at the front (anterior), and long at rear (posterior). Length of head and body 590 – 630 mm, tail length 95 – 130 mm, tail less than half length of the body. The length of the hind foot 80 – 95 mm. Body weight 8.000 – 10.000 g. Large body, short, and stout. Short legs, with five fingers on the front legs and five fingers on the hind legs, and smooth feet. Dental formula is 1013 at the upper jaw and 1013 at the lower jaw, total of 20. These animals have 2 – 3 pairs of nipples, located on the lateral body. Distribution geography in Thailand, Malaysia, Sumatera, Kalimantan, Jawa, and West Nusa Tenggara with elevation up to 1.000 m above sea level. Other species, *H. javanica* (Java Porcupine) have the same morphological characteristic with *H. brachyura* however more uniform in color spines, spines size smaller and slimmer, with similar distribution.

Habitat of porcupine is desert, savanna, to forest. Porcupine live in burrow, which were made under the bushes, in caves, the broken soil, or holes dug by other animals and widened by porcupines. Porcupines are terrestrial animal. Except in Trichis, when moving porcupine wiggled thorns, and when dangerous come porcupine lifted its spines. Porcupines have been reported as an agricultural pest on oil palm, cassava, and sweet potatoes. The destructive of porcupine on oil palm is by eating the shoots of seedling, porcupine dig soil until they see the roots, and then consumed.

Agricultural land with high grade of limestone will have a more severe attack, because porcupine require lime element for the grow of spines, or to replace the lost of spines. The main feed of porcupine are plants, such as roots, shoots, bark, fall fruits, sometimes porcupine consume carcasses and gnaw bones, especially to fulfill the need of calcium. Porcupine actively seek the feed at night (nocturnal). Sense of vision is less develop, but sense of hearing and smell develop well. Porcupine can run backwards or sideward rapidly, to protect themselves from predators. Porcupine are gregarius, live in groups up to 10 individual in a single hole. Behavior of porcupine in captivity varies depending on the species and individual, ranging from shy, nervous, to tame.

Reproduction of porcupine has not been known, producing 1 – 2 individual per birth, breeding once a year. At birth, eye of the children are open, with short and soft hair. A few

weeks later, the hair begins to harden, and children begin to leave the nest together with their parent. The maximum age ever achieved in captivity is 27 years. In addition to reproduction, other factors need to be observed from this animal. Habitat, population dynamics, and influence of physical – biological factors to their live.

MANAGEMENT

Management effort that have been done are mechanically by scraping or disassembling or fumigating hiding hole with sulfur, therefore this animals out of the burrow. Then, hunted with banana stems banged into spines. The main natural enemies of porcupine are tiger. Porcupine relatively resistant to poison used to kill pest. Poison (tuba) that usually used to kill pest not kill porcupine. The flesh of porcupine have been exploited by some people in Java, therefore in the future this may be utilized of the possibility to breed this animal, to take the benefit.

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