

Control of Rat Damage in Oil Palm Plantation Using Local Hunting Dogs - IOI Kahang Estate's Experience

SARAVANAN K, IDRUS M A AND PRAKASH A

IOI Group Kahang Estate, P O Box 14, 26 Miles, Kahang – Mersing Road, 86700 Kahang,
Johor Darul Takzim, Malaysia

Kahang Estate, situated in the south eastern part of Johor state is known for severe rat damage on oil palm fruits for more than two-and-a-half decades. The main species is Rattus tiomanicus and the current practice of poison baiting with high number of rounds per campaign was found to be short lived in controlling the rat damage on fresh fruit bunches. A coincidental observation on one of the harvester's hungry mongrel dog hunting a running rat in the field gave the idea and prompted the estate management to train and establish a rat hunting dog team since 2017. The current paper shares this first of its kind experience of Kahang Estate management in controlling the rat population by dogs in a consolidated area of 364 hectares of 2009 replants.

Keywords: *Rattus tiomanicus, bait shyness rats, mongrel dogs.*

Rat is one of the major pests in oil palm plantations, which causes significant damage to palms of all ages and substantial economic losses to the oil palm industry. In Malaysia alone, a loss of 165 kg of palm oil per hectare per year is expected, if the damage and population proliferation of rats are not controlled adequately (Turner & Gillbank, 2003). *Rattus tiomanicus* (Malaysian field rat) is responsible for the very high damage of fresh fruit bunches in Kahang Estate.

Many commercial rodenticides of second generation were applied in Kahang Estate for at least two campaigns per year for two-and-a-half decades; all of which have been inadequate in controlling rats. The estate management further observed that the establishment of barn owl boxes at a ratio of one unit for every 4 hectares of oil palm planting with 57 per cent of occupancy rate was unable to control the rat population, perhaps due to the high population of rats (Internal IOI Report,

2017). This was evident in the studies conducted later on the catch, marked and release (CMR) technique with an estimated 411 rats per hectare (Internal IOI report, 2018). Presence of wild feral cats and snakes too control the rat population by biological means (Turner & Gillbank, 2003). However, with the complete conversion of the surrounding forest land to the cultivation of oil palm and other crops, the control of rats from such wild animals were not observed.

In the last two-and-a-half decades the estate management was desperately looking for methods other than the conventional methods to control rats by poison baiting campaigns and biologically by barn owl. The rat stays under pruned frond stacks. In 2008, search and hunting of rats using workers was tried. It required high labour for such hunting. Later in the same year rat traps using cages were tried unsuccessfully, as it was a time consuming method. In 2009, the tractor

mounted mechanical pulverising of pruned frond stacks was tried. Although a few rats got killed under the pulveriser, the control of damage by rats on oil palm fruit was not successful at that time (IOI internal management report, 2009). In another occasion, the estate management personnel witnessed a hungry mongrel belonging to a harvester catching a rat running from under the pruned frond heap and shaking it to death instantly. It was then that they realised that the local mongrels have their natural instinct to catch and kill the rats. Since then, the estate management set up a small team of seven dogs and initiated catching rats using mongrels on a small scale. The company group chief executive chairman, the late Tan Sri Lee Shin Cheng observed the local dog catching rats during one of his visits to Kahang Estate. He had foreseen and instructed the estate management to use dogs to catch rats in a large scale as the solution to control rats in Kahang Estate (Prakash, 2020). The estate management was committed to the implementation, although it took some time to rear the local dogs and develop the method. Rat hunting using dogs is an uncommon method especially in the oil palm plantation and Kahang Estate has implemented the method for the first time at the plantation level successfully and in an effective manner.

METHODOLOGY

Dog assisted rat hunting

The estate initiated the first rat hunting in 2017 with a team of seven local mongrels and two workers as dog masters. The dogs stayed close to their masters and responded to his unique calls. The group of dogs were quick to respond to the master's call as a group working companion. This initial small team was

successful in the control of rats. Later, the estate management encouraged more local dogs to be rescued or transferred from neighbouring local villages and allowed the increase of the population of the dogs in 2019 (*Figure 1*). Initially, some of the rescued stray puppies and dogs remained distant from their masters. The management sheltered the rescued dogs for a couple of weeks, before they merged into the existing small group of hunting dogs. The large-scale implementation of the method was initiated only from 2019 onwards.

Pruned frond stacks or heaps forms the breeding ground for the *Rattus tiomanicus* in the oil palm estate. The two dog masters use their 7 ft long aluminum poles to lift the frond heap simultaneously. While raising the frond stack, the dogs surround the heaps and catch the rats that run out from it (*Figure 2*). As the rats try to run out of the raised frond heap, one of the dogs will grab it instantaneously, kill and consume the rat. Furthermore, the dogs have the ability to sniff the burrows of rats under the frond heaps and warn the masters of the presence of rats in it. It is amazing to note the way the dogs communicate with their masters on the presence of rats in burrows through their whimpering sound and restlessness. The master understands it and use the pole to disturb the burrows to let the rats emerge. The canines will not move away from the burrows until they seize the emerged rats from the burrows. All the rats caught for the day are counted using tele-counter by the masters.

Features of the dogs

These mongrels have the similar physical features of Malaysian native bred Telomian. These mongrels could be a cross breed of Telomians from nearby indigenous Malayan aboriginal villages (*Figure 3*). The size of the dog is small and it is highly agile, which could



Figure 1 Increased population of group of local dogs ready for rat hunting



Figure 2 Aerial view of hunting dogs searching for rats under frond heap

be a good feature to catch rats. Telomians were originally bred as hunting dogs by the indigenous people of Malaysia. This breed was named after the Sungai Telom River in Pahang. Telomian is a small dog breed with short smooth furs. The pure bred Telomions socialise better and show a stable dominance in a larger pack (Terry *et al.*, 1980). These mongrels are extremely alert, intelligent and highly adaptable dogs. Their high amount of energy enable them

to hunt the rats for over 6 hours per day with their masters in the plantation. Not all breeds or dogs of all ages, make good rat hunting dogs.

RESULTS AND DISCUSSIONS

Dog assisted rat damage control

The 2009 replanting comprising of 364 hectares was highly affected by rat damage. Generally,



Figure 3 A Telomian crossbred rescued from a nearby Malayan native Kampung Sungai Peroh

the outer fruits of all bunches on the palms were affected by rat damage. The damage affects right up to the kernel of the fruits. After the development of the dog population, procedure and training since 2017, dog assisted rat hunting was commercially initiated in February 2019 (Figure 4). Prior to implementation, almost all the bunches were affected by rat damage. The 364 hectares field is bordered with the neighbouring estate fields, where rat damage on oil palm is high and high migration of rats to Kahang Estate fields which were replanted in 2009 was expected. The details of implementation of dog assisted rat hunting and the results of hunting is given in Table 1.

There was considerable reduction of fresh rat damage on fresh fruit bunches after the first round of hunting. Prior to the implementation of dog assisted rat control, almost all the palms and bunches were affected by rats. In the first round of hunting of almost 3 months damage reduced to 37 per cent. By the second round the rat damage symptom had tremendously reduced to 7.5 per cent. In the second to fourth round the difference of

7.5 per cent and 5.5 per cent of damage symptom on the bunches of palms was not significant. Based on the present study as shown in Table 1, it appears that it takes only two or three rounds i.e. 5 to 8 months to control rat damage on the palms. By the fourth round, a total of 134 780 rats were caught by the dogs in 364 hectares, which translate to 370 rats per hectare. The control of rats was effective using dogs, although continuous migration of rats is expected from the neighbouring estates. It is noteworthy to observe that even the male inflorescences were intact without damage from rats and the pollinating weevil larvae were safe. More barn owl boxes were occupied with barn owls in the dog assisted rat hunting fields due to lack of secondary poisoning of bait on owls. High activity of barn owls was observed in the field by the presence of fresh rat bones at the base of the barn owl boxes.

It was observed that the female dogs are more aggressive in catching rats than the males. The rats caught by female dogs were shared with their puppies. The puppies born were later fed with rats by the mothers, thus,

TABLE 1
EFFECTS OF DOG ASSISTED RAT HUNTING IN KAHANG ESTATE, AREA 364 HECTARES

Hunting rounds	Date of hunting	Total rats caught (Rats per round)	Post hunting fresh rat damage census on fresh fruit bunch (%)
1	03/02/2019 to 01/05/2019	46 800	37.0
2	02/05/2019 to 24/07/2019	37 400	7.5
3	25/07/2019 to 14/10/2019	28 080	6.0
4	15/10/2019 to 31/12/2019	22 500	5.5
Total		134 780	

the rats became their diet. Although dogs killed the rats of all ages, they preferred to eat young rats. On average, an adult dog can kill eight to twelve rats per day. It is important to take note that the fields treated with dog assisted rat hunting are not baited with rat poison. This is to avoid any secondary poisoning of dogs from rat poison.

Costings

The comparative cost of hunting rats by dogs is compared with the conventional poison baiting carried out in 2007 replanting in Kahang Estate as given in *Table 2*.

Generally, the cost of dog assisted rat hunting for four rounds is about RM165.73 per hectare per year. The main cost is for the master's wages who lead the rat hunting. The dog's main diet is rats. The local mongrels need little or minimal veterinary care. Every dog is prone to accidents like rat bites during hunting, pricks from pruned frond thorns and rarely snake bites. Snake bite can be fatal, especially when the bite is on the dog's head. Minor injuries are treated with neem oil and veterinary medical aero sprays, which costs about RM1.65 per hectare per year. Thus, the total cost of dog assisted rat hunting in a year is about RM165.73 per hectare per year, which was 27 per cent

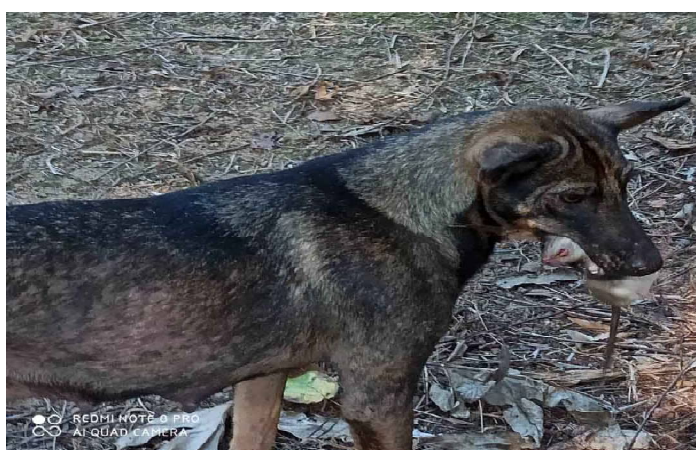


Figure 4 A dog with her successful catch

TABLE 2
COMPARATIVE COSTS OF DOG ASSISTED RAT HUNTING AND CONVENTIONAL POISON BAITING
PER HECTARE PER YEAR

<i>Cost (RM) per hectare per year</i>			
<i>Dog assisted rat hunting</i>		<i>Conventional poison rat baiting</i>	
Cost of 4 rounds of dog hunting per year ^{1/}	164.08	Labour	40.00
Veterinary material cost	1.65	Material (baits)	90.36
Total	165.73	Total	130.36

Note: ^{1/} Team of 2 workers with dogs covered 2.25 hectares per day. Manpower cost is RM46.15 per person per day i.e. a total of RM92.30 for 2.25 hectare which is equivalent to RM41.02 per hectare per round.

higher than conventional poison baiting which costs about RM130.36 per hectare per year with eight rounds of baiting in two campaigns. The benefit of dog assisted rat hunting is that the rat damage was better controlled than the conventional poison baiting. After conventional poison baiting for two-and-a-half decades, there were no satisfactory control over rat damage in Kahang Estate. This was the main reason for Kahang Estate management to depend on dog assisted rat hunting. As shown in *Table 1*, the control of rat damage was successfully carried out in three rounds, hence the costs can be reduced to RM123.06 per hectare per year, 5.4 per cent lower than conventional baiting.

After a long day of hunting the dogs are left in the field. The dog master will delegate an area in the field by placing his hunting tools (aluminium poles) at a particular location. The trained dogs will stay around the pole and wait for their master until the next hunting day (*Figure 5*). High number of dogs roaming around the labour quarters could be a nuisance. They bark all night and disturb garbage bins in search of food. They cause motor bike accidents on the estate road as the biker and dogs in large numbers simultaneously cross the road. To avoid these disturbances, the working

dogs were trained to stay in the oil palm field after work. Lately temporary shift tents have been built for the dogs to stay at night in the fields. By doing so, it served as an advantage for the estate management as the dogs chase away the wild boars while resting in the newly replanted fields.

CONCLUSIONS

Dog assisted rat hunting is commercially viable in plantations with a good control of rats in a cost-effective manner than the conventional approach of yearly poison baiting campaigns. The dogs when trained well can be a form of alternate biological method of controlling rat population in the estate. The new method helps to increase the barn owl population, an established predator of rats in the fields. This new method is a success in Kahang Estate especially as the rat damage was severe for almost two-and-a-half decades. Lately, it was found that the rat control can be extended for more than 6 months and hence the possibility of reducing the number of rounds of hunting from four to two or three per year, thereby reducing the cost further. Experience of dog assisted method gathered from 364 hectares will be immediately extended to another



Figure 5 Dogs are resting around the hunting tool (aluminum pole) after a day of hunting

600 hectares, thus totalling 964 hectares to cover a division of the Kahang Estate. Plans are in place to include the method for the entire Kahang Estate and other neighbouring estates surrounding Kluang region. Plans to include veterinary aspects of monitoring health and necessary treatments to dogs through a professional veterinary doctor are in place.

ACKNOWLEDGEMENT

The authors wish to thank and acknowledge agronomist, Encik Amirul Asraf Bin Tumin for conducting the work on catch, marked and release technique to quantify the rats in the estate. The authors also wish to thank General Manager of Research, Mr Joshua Mathews for the comments and editing of this manuscript. Our appreciation to the Plantation Director, Mr N B Sudhakaran of IOI

Corporation Berhad for granting permission to publish the paper in *The Planter*.

REFERENCES

- IOI GROUP INTERNAL REPORT. 2009. Manager's outcome report of different methods tried in Kahang estate.
- IOI GROUP INTERNAL REPORT. 2017. Barn owl and rat damage census, Kahang Estate.
- IOI GROUP INTERNAL REPORT. 2018. Trial Report for Rodent Population and Identification Study of IOI Kahang Estate.
- PRAKASH, A. 2020. Personal Communication. Group Executive Chairman's visit to Kluang and Kahang region in 2017.
- TERRY, F. P., KENNETH, L. D. and JOHN, P. S. 1980. Influence of living area space on agonistic interaction in Telomian dogs. *Behavioral and Neural Biology* 28, 343-349
- TURNER, P. D. and GILLBANK, R. A. 2003. Oil palm cultivation and management. In: *Field Pests of Oil Palm*, Chapter 9, 527-538.