

Evaluation of the effectiveness of mongoose-proof fence by using rhodamine B on the front line of the Yanbaru forest region on Okinawa Island, Japan

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1. Our aim

Many endangered native species inhabit the northern part of Okinawa Island, i.e. Yanbaru. The mongooses have extended their habitat and invaded the Yanbaru region. The mongoose-proof fence was set on the southern boundary of Yanbaru in order to prevent the invasion of mongooses to Yanbaru from the southern regions in 2007. A large number of mongooses inhabit the southern area of the fence. This mongoose-proof fence prevents the intrusion of mongooses into the Yanbaru region. We had evaluated and confirmed the effectiveness of mongoose-proof fence in our rhodamine B-intake field study.

2. Baits with rhodamine B

The appropriate concentration of rhodamine B was determined on the basis of the results of studies in which rhodamine B was fed to animals in captivity. The results indicated that 150 g of minced bits containing 0.05% of rhodamine B was the most appropriate bait for the mongooses.

3. Rhodamine B-intake field studies

Minced meat containing rhodamine B as the biological marker and its 258 bait boxes were set at every 50 or 100 m in the 1.5-km² study area located on the southern part of the fence. The bait boxes containing rhodamine B were inspected everyday to ensure their good condition.

All the bait boxes were collected after 2 weeks, and live traps were set at every 50 or 100 m at 611 locations in the rhodamine B-intake study area, 319 locations in the southern area of the fence (1.5 km²) and 292 locations in the northern area of the fence (1.5 km²).

4. Result

A total number of 242 mongooses were trapped. Ninety six mongooses were fluorescently marked by rhodamine B on their textiles. The marked mongooses were captured in the southern area of the fence. Seventy two marked mongooses were trapped in the region where the bait boxes were set. Twenty four marked mongooses were trapped in the farther southern region where no bait boxes were set. However, no mongooses marked by rhodamine B were trapped in the northern area of the fence. These results indicated that no mongoose crossed the fence from this side. However, the fences could not be set up on the bushy roads that crossed the fence. Therefore, we need to develop mongoose-proof contraptions that can be set on the blank fence line to prevent mongoose invasions.

This research was supported by the Environmental Technology Development Fund from the Ministry of Environment.

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沖縄島におけるローダミンBを用いたマンゲース北上防止柵の有効性の評価

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1. Our aim

The living region of the mongoose imported to the Okinawa island in 1910 has extended even to the Yanbaru region in the Okinawa island northern part where a lot of rare animals live now. It is feared that the SF line south that connects the Fukuchi dam from the Shioya bay is an invasion route to which the living density of the mongoose is very high, the individual group goes north, and the living region has been expanded.

Therefore, the going north prevention hedge was set up on the SF line as one method of preventing the mongoose from the SF line south from going north in 2005. However, there is a part where the hedge cannot be set up because the going north prevention hedge crosses the road and the river, especially Taiho river along the hedge is feared mongoose's invasion route because of lowering of the water level when running short of water the edge and the river of the hedge. This time, it aimed to verify the effectiveness of the movement controlling effect to the mongoose by investigating the movement decentralization of the mongoose that lived in the south of the going north prevention hedge.

What is "Rhodamine B"?

Rhodamine B is a non-toxic dye used to colour textiles, pharmaceuticals, cosmetics such as lipstick and agricultural products such as herbicide sprays.

RB is also used as a stain in the microscopy of tissue and immunology. The dye is produced as greenish to maroon crystals and as a red or pink powder.

Materials and Methods

1 Rhodamine B and Bait box

In the actual experiment, Rhodamine B from which the marking continuation period of 42 days was confirmed in the experiment under breeding of Ryukyu University was used to examine the movement decentralization of the mongoose.

- Rhodamine B was used for the pig minced meat of 150g to become 0.05% in the density.
- Food with Rhodamine B was put in the bait box, and left in the outdoors (fig.1).
- The bait box was left in the same point for two weeks.
- Food with Rhodamine B was exchanged once the second (fig.2).

2.2 Installation of bait box

The range of 750m in the south of the going north prevention hedge was set up in 258 points per three block (RB1~3) in division total (Table.1).

When beginning from RD1 from October 15, 2007 to

November 24, 2007, it set it up respectively for two weeks.

Food was exchanged once on the second.

2.3 Mongoose capture work

Capture was executed from November 13, 2007 to December 23,

2007 after 2 weeks when the bait box had been collected. The capture area executed capture within the range of about 750m in the bait box installation area and the south.

A part of range in the north side and the south of the hedge was inspected, and because Okinawa Prefecture and the northern part dam office executed capture, the Mongoose that had been captured at the capture performance period was offered and inspected.

2.4 Rhodamine B reaction inspection

Because the most suitable part that confirmed Rhodamine B reaction from the result of the experiment under breeding was Mongoose's feeler, the feeler was gathered and inspected from the capture.



fig.1 A bait box



fig.2 Exchanging of food

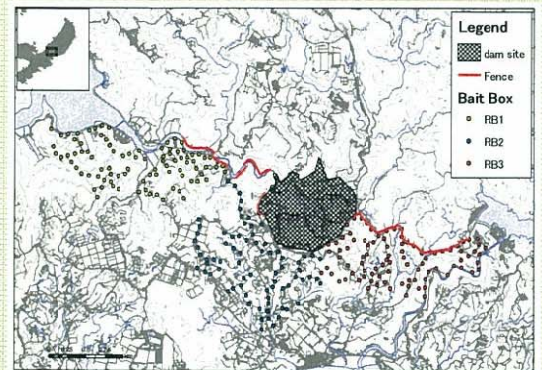


fig.3 Installation of bait boxes

Table.1 Number of bait boxes

Area	Number of bait boxes	Period of bait boxes set up
RB1	91	2007/10/15~2007/10/27 (2weeks)
RB2	77	2007/10/29~2007/11/10 (2weeks)
RB3	90	2007/11/12~2007/11/24 (2weeks)
Total	258	2007/10/15~2007/11/24 (6weeks)

Table.2 Number of captured mongooses

Area	Number of captured mongooses			
	♂	♀	not clear	Total
RB area of northern (Fence of northern)	35	29	0	64
RB area (Fence of southern 0~750m)	37	49	0	86
RB area of southern (Fence of southern 750~1500m)	72	83	0	155
TOTAL	144	161	0	305

Table.3 Rhodamine B reaction inspection result

Area	sex	Rhodamine B reaction inspection result		Total
		+	-	
Fence of northern	♂	0	35	35
	♀	0	29	29
Fence of southern	♂	42	67	109
	♀	54	78	132
Total		96	209	305

3. Result

In the actual experiment, it was captured 241 mongoose in the south of the hedge, and 64 on the north side (fig.4 and Table.2). It was 96 to show the reaction by having taken rhodamine B, and the one that everything was captured in the south of the hedge (Table.3).

The numbers of 72 was an individual that had been captured in the bait box installation area (Table.3). Remainder of 24 was an individual that had been captured in surroundings (south of the hedge) in the bait box installation area.

On the north side of the hedge, Okinawa Prefecture is executing the mongoose control business, and there was no reaction though it inspected by 64 individual (35 males and 29 females) captured on the hedge north side between November 13, 2007 and December 31, 2007 (fig.5 and Table.3).

In the actual experiment, the individual that exceeded the hedge by the Mongoose and went north was not confirmed.

However, it was shown that a lot of Mongoose did not frequently move the long distance, because the movement was hardly seen a reactive individual is high capture in the bait box installation area with 75 percent.

In this experiment, it is difficult to detect the movement of small number of Mongoose. Therefore, to confirm whether the Mongoose had exceeded the hedge, the sufficient ground was not obtained.

It is necessary to investigate period and the experimental material are examined again, and it will be necessary to investigate continuously.

In addition, it is necessary to develop the technology about the place where the hedge cannot be set up on the line of the going north prevention hedge.

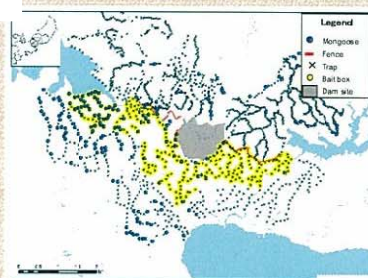


fig.4 Mongooses capture point

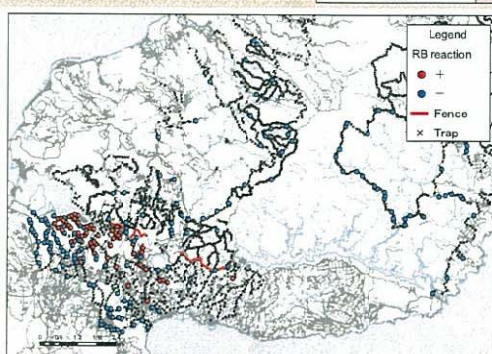


fig.5 Point of Rhodamine B reaction