

STUDIES ON *RATTUS NORVEGICUS* BERKENHOUT IN KERALA*

C, M. GEORGE, P. J. JOY and C. C. ABRAHAM

Department of Entomology,

College of Horticulture, Vellanikkara, Trichur - 680654, Kerala

The occurrence of *Rattus norvegicus* in the Kuttanad area of the Kerala State as a serious pest of the rice crop was reported by George *et al.* 1980.

Precise information on the distribution and nature of burrowing pattern of this species is essential for devising successful management methods. In order to study the distribution fossorial and food habits of *R. norvegicus* Berkenhout (Murinae: Muridae: Rodentia) in Kerala, a survey was conducted during September 1978 to February 1979 and the results are presented in this paper.

Materials and Methods

For the survey work, the State was divided into eight agroclimatic zones, viz., (a) Trivandrum and Quilon districts; (b) Kottayam and Alleppy districts; (c) Idukki and Ernakulam districts; (d) Trichur and Malappuram districts; (e) Palghat district; (f) Attappady in Palghat district; (g) Wynad district and (h) Cannanore district. In each zone, four centres were chosen to represent the different physiographic conditions and cropping patterns.

Distribution of *R. norvegicus* was studied by capturing them in traps set in each centre at regular intervals and by collecting them from the burrows. To collect the rats from the burrow, all the burrow entrances other than the main one were closed by packing with soil and rubble and smoke generated by burning dry coconut leaves fanned into the burrows through the open entrance for about 15 minutes. This killed the rats within the burrow by suffocation. Thereafter, the net-work of the burrow was opened out by gently working with crow-bar and spade and the rats collected. The burrow pattern and the nature of chambers were studied after exposing the systems.

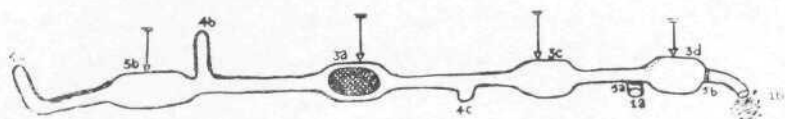
The nature of damage caused by *R. norvegicus* to crops was ascertained by examining the crops around the burrow system. Remnants of food materials observed within the burrow were collected and examined to ascertain the food habits of the species. Food preference of the species was confirmed by feeding the rats in cages with the materials observed in the burrow.

Results and Discussion

R. norvegicus was found to be distributed in all the agro-climatic zones mentioned above. The rat which inhabited the farm lands had its burrows in field bunds in places like Trichur and Idukki and in stone embankment walls in localities in the Palghat District.

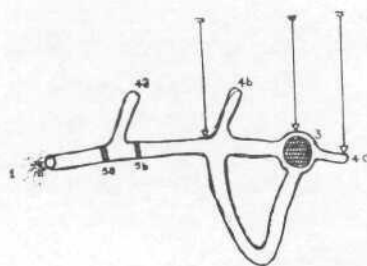
It constructed two types of burrows. One type had an elongated system which got partially submerged during rainy seasons. The other type was of a

* Part of the M. Se. (Ag.) Thesis submitted to the Kerala Agricultural University, 1979 by the first author.



- 1a. main entrance
- 1 b exit for soil Jag out while constructing burrow.
- 3a. brood chamber
- 3b to 3d. extra chambers.
- 4a to 4c. blind alleys.
- 5a & 5b. soil plugging
- ↓ depth from the soil surface.

Fig. 1. Elongated system of burrow constructed *Rattus norvegicus*



- 1. entrance
- 3. brood chamber
- 4a to 4c. blind alleys
- 5a & 5b. soil plugging
- ↓ depth from the soil surface.

Fig. 2. Short system of burrow constructed by *Rattus norvegicus*

Table—1

Comparison of the features of the two types of burrows of *R. norvegicus*

Feature	Long system	Short system
	Partly subme- rged in water	Do not get subme- rged in water
1	2	3
Soil type	Clay	Sandy loam
No. of openings	two	one
No. of soil pluggings at the openings	one	two—20 cm apart
Mean horizontal profile	6 x 0.5m	2 x 0.75 m
Mean length of the burrow system	6.431 m	3.22 m
Burrow width range	11-30 cm	7-20 cm
No. of chambers	four	one
Maximum width of brood chamber	30 cm	20 cm
Depth of brood chamber from ground level	40 cm	60 cm
Maximum depth of the entire burrow system	40 cm	75 cm
Shape of brood chamber	cylindrical	sub-spherical
Nesting materials	hay	dry grass
No. of blind alleys	three	three
No. of rats inhabiting the burrow	mother rat and 12 young ones	mother rat and three young ones
Food materials hoarded in the burrows	Paddyheads and dead snails	nil

short system and away from submersible levels. Detailed observation made on the features of the two types are presented in Table 1 and depicted in Figures 1 and 2.

The basic structure of the burrows was in general conformity with the system described by Pisano and Storer, 1948 (quoted by Barnett and Prakash, 1975).

R. norvegicus damaged paddy crop by cutting the plants at the base, Maximum damage to rice crop was observed in the booting stage and the plants which had passed this stage were not damaged by the rat.

In India, *R. norvegicus* had been known mainly as commensal occurring in port areas, large towns, villages and along banks of navigable rivers and also along highways in inhabited places (Ellerman, 1961; Pingale et al. 1937; Deoras, 1936). In the temperate regions, however, this was the principal species inhabiting farm lands, causing damages to food crops (Barnett and Prakash, 1975)

Summary

In a survey conducted during 1978-79, *Rattus norvegicus* Berkenhout was found to be widely distributed in Kerala. This rat constructed two types of burrows, one with long system and the other of shorter nature. A comparison of the features of these two types are given. This species inhabits farm lands and cause damage to paddy crop upto the booting stage by cutting the plants at the base.

സംഗ്രഹം

കേരള സംസ്ഥാനത്തിൽ 1978-79ൽ നടത്തിയ ഒരു സർവ്വേയിൽ നിന്നും രാറാസ് നോർ വെജിക്കസ് എന്ന എലി എല്ലാജില്ലകളിലും കാണപ്പെടുന്നതായി മനസ്സിലായി. കൃഷിയിടങ്ങളിൽ മാളങ്ങൾ ഉണ്ടാക്കി അവയ്ക്കുള്ളിൽ വസിക്കുന്ന ഇവ, നെൽകൃഷിക്ക് സാരമായ നാശം ചെയ്യുന്നുണ്ട്. നെൽച്ചെടികൾ ചുവട്ടിൽ വെച്ചു മുറിച്ചുതള്ളുകയാണ് ഇവ ചെയ്യുന്നത്. ഇവ നിർമ്മിക്കുന്ന rasrsj തരത്തിലുള്ള മാളങ്ങളുപറ്റിയുള്ള താരതമ്യ പഠനവും നടക്കുകയുണ്ടായി.

Acknowledgement

The Zoological Survey of India Calcutta, has identified the various rat species collected during the survey work We are greatly indebted to Dr. V. S. Agrawall, Superintending Zoologist, Dr. Sujit Chakraborty, Zoologist and Dr. P. K Das, Officer-in-charge, Mammal and Osteology Section for identifying the specimens.

References

Barnett, S, A. and Iswar Prakash, 1975 *Rodents of Economic Importance in India* Arnold Heimann Publishers (India), New Delhi, pp. 114-116.
Ellerman, J. R. 1961, *The fauna of India including Pakistan, Burma and Ceylon.* Mammalia 2nd edition, Vol. 3, p 610.
George, C. M., Joy, P. J. and Abraham, C. C. 1980. On the occurrence of different Species of rats in Kerala *Agri; Res. J. Kerala*, 18. 242-245.
Pingale, S. V., Krishnamurrhy, R. and Ramakrishnan, T. 1967. *Rats*, Food grain Technologists Research Association of India, Hapur (U. P.) p, 13.