



WEEKLY EPIDEMIOLOGICAL REPORT

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Facts about Rats

Plant Protection Centre is the focal point in the Department of Agriculture for promoting pest control methods including rat control in agricultural crops. The interest and attention of rat control in paddy fields and other agricultural settings has been increased with the current leptospirosis outbreak in Sri Lanka. The knowledge on rodent behaviours and their control would be useful for healthcare staff too.

This article describes some facts about rodents. Rodent control methods will follow in the next issue.

Rodents are a group of gnawing mammals including rats, mice, voles and hamsters. More than 42 percent of the world's known mammalian species i.e. about 1700 are rodents. The majority play an important role in maintaining ecosystems. They bear an important position in the food chain too.

Rodents are extensively used in scientific research. Guinea pigs are one of the classic examples. Their use in scientific experiments dates back at least to the 17th century. Guinea pigs played a major role in the establishment of 'germ theory' in the 19th century. They were most extensively implemented in research and diagnosis of infectious diseases, to standardize vaccines and antiviral agents, production of antibodies, and research in pharmacology and irradiation. They also were used several times in space research.

Some rodent species are also popular as pets. In some countries rodents are used as a source of food. They are rich in protein and breed rapidly, making an advantage over other livestock productions.

However, despite these benefits, some rodent species play a significant role in disease trans-

mission and as agricultural or urban environmental pest. About 150 species have been identified as pests out of which around 20 are most important.

Rodents and their parasites are implicated in the transmission of a number of diseases. Plague, one of the oldest diseases in human history is spread to humans by rat fleas. Leptospirosis, currently one of the public health problem in Sri Lanka is also mainly transmitted by rodents. Hantavirus pulmonary syndrome, tick-borne relapsing fever, salmonellosis, and rickettsialpox are several other diseases that can be transmitted by rodent species. Bacterial food poisoning can occur when foods are contaminated with infected rodent droppings. Tapeworms and roundworms of rodents also can be infectious to pets and humans.

Apart from causing illnesses, rodents are responsible for enormous economic losses due to their destruction of properties, and crops - both stored and in-field. It is calculated that in Asia alone, in each year rodents consume grain in rice fields that would provide enough to feed 200 million people for a year. During feeding, rodents destroy and waste as many fold as crops what they have actually consumed. In fact, the greatest loss is due to this waste and contamination they cause than what they eat. Their food contamination is about ten times greater than what is eaten. Nevertheless, it is very difficult to place a monetary value on human suffering and the damage caused by rodents.

Rodents derive their name from their gnawing

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behaviour (rodere in Latin means gnaw). Their incisor teeth grow continuously and if not used, will grow back into the cheek disabling proper feeding. They can cause an enormous structural damage either by gnawing or by burrowing. They gnaw wooden structures and even thin metal. They also undermine buildings by burrowing, which eventually causes structural failure and collapse. Electrical wiring gnawed could be the reason for many fire outbreaks in houses and buildings, yet listed as “cause unknown”.



Figure 1: Cross sectional sketch diagram of a common rat burrow

The main culprits in rice field damage in Asian countries are Rice field rat (*Rattus argentiventer*), Field rat (*Rattus mindanensis*), Pacific rat (*Rattus exulans*) and the Black rat (*Rattus rattus*). In Sri Lanka species of Lesser Bandicoot rat (*Bandicota bengalensis*) and Greater Bandicoot rat (*Bandicota indica*) are seen in rice fields.

population can fluctuate considerably throughout the year. This depend on the stage of growth of the rice plants they feed on. As the rice begin to grow, rats move in to fields and chop it down. As their food source increases with rice plants begin to flower and fill, the reproductive rate of rats also increases (a breeding season). Immigration and birth are major factors affecting the increase in rat population. If crops are planted more than two weeks apart then the rats will move to the late planted field (immigration) and continue breeding. Many rodent pests by their behaviour are very mobile and able to disperse rapidly. This allows them to move quickly and take advantage of new areas with favourable conditions. It is known that bandicoot rats, and others, will move from surrounding fields into villages at harvest time, that is when fields no longer provide enough food.

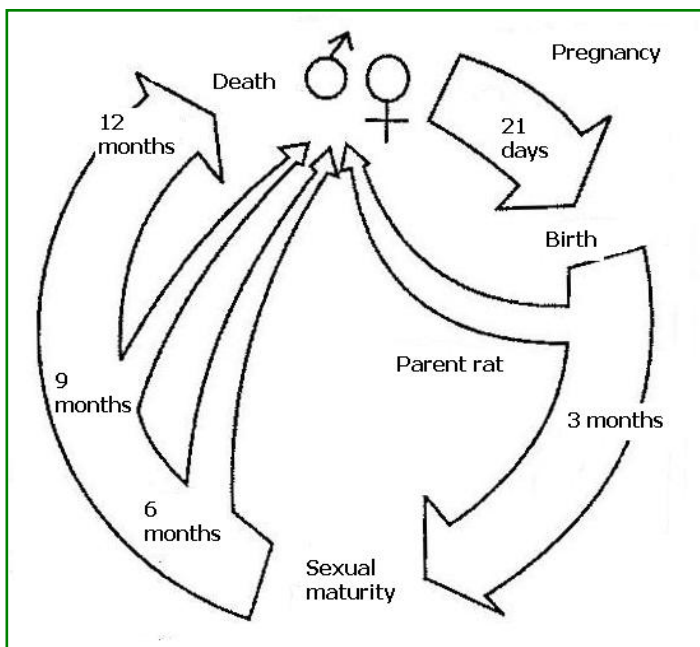


Figure 2: The breeding cycle

Rats commonly construct complex underground tunnels with numerous entrances. Figure 1 illustrates a cross section of a rat burrow. They make these burrows to breed in, storing food in large amounts and for protection against their predators and to avoid extreme climatic conditions. In the case of bandicoot rats these burrow systems may be 100 cm deep and very extensive. Lesser Bandicoot Rat is very aggressive in behaviour, even against individuals of the same species. Therefore, the large burrow systems made by these rats are normally occupied by only one adult each.

Lifespan of rats is usually short, ranging from four to 20 months. Although they live for only a short period, they multiply rapidly if conditions are favourable. A female rat may have up to five litters in her lifetime. The size of a single litter is usually five to six. The gestation period is 21 to 23 days. Young rats are weaned in about 21 days, and females can mate at about 35 to 49 days. A female bandicoot rat may share a burrow with a weaned litter, have a litter suckling and be pregnant at the same time.

During land preparation and paddy cultivation seasons, rats usually live in burrows in surrounding lands especially along channel banks and in village gardens. The density of Rat

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 Proctor D L (Ed.) 1994. Grain storage techniques. Evolution and trends in developing countries. Food and Agriculture Organization of the United Nations (FAO), Rome.
 Rodent control. Online Information Service for Non-Chemical Pest Management in the Tropics. http://www.oisat.org/pests/other_pests/rodents.html
 Figures adapted from: Control of Damage Caused by Rats. Office of Deputy Director - Agriculture, Matara.

This article was prepared by Dr Sudath Samaraweera, Consultant Community Physician

Table 1: Vaccine-preventable Diseases & AFP

18th - 24th Oct 2008 (43rdWeek)

Disease	No. of Cases by Province									Number of cases during current week in 2008	Number of cases during same week in 2007	Total number of cases to date in 2008	Total number of cases to date in 2007	Difference between the number of cases to date between 2008 & 2007
	W	C	S	N	E	NW	NC	U	Sab					
Acute Flaccid Paralysis	00	01 KD=1	00	00	00	00	00	00	00	01	01	83	69	+20.3%
Diphtheria	00	00	00	00	00	00	00	00	00	00	00	00	00	00.0%
Measles	00	00	00	00	00	00	00	00	00	00	01	100	66	+51.5%
Tetanus	00	00	00	00	00	01 KG=1	00	00	00	01	00	33	31	+06.5%
Whooping Cough	00	00	00	00	00	00	01 PO=1	00	00	01	01	44	38	+15.8%
Tuberculosis	132	04	08	04	05	14	00	01	16	184	308	6972	8141	-14.4%

Table 2: Newly Introduced Notifiable Disease

18th - 24th Oct 2008 (43rdWeek)

Disease	No. of Cases by Province									Number of cases during current week in 2008	Number of cases during same week in 2007	Total number of cases to date in 2008	Total number of cases to date in 2007	Difference between the number of cases to date between 2008 & 2007
	W	C	S	N	E	NW	NC	U	Sab					
Chicken-pox	18	10	08	00	05	10	06	11	22	90	25	4576	2829	+61.8%
Meningitis	04 GM=2 CB=2	01 ML=1	01 HA=1	00	02 BT=2	03 KR=2 PU=1	01 PO=1	00	02 RP=1 KG=1	14	15	1102	571	+93.0%
Mumps	03	04	08	02	01	04	05	01	03	31	17	1116	1830	+39.0%

Key to Table 1 & 2

Provinces: W=Western, C=Central, S=Southern, N=North, E= East, NC=North Central, NW=North Western, U=Uva, Sab=Sabaragamuwa.

DPDHS Divisions: CB=Colombo, GM=Gampaha, KL=Kalutara, KD=Kandy, ML=Matale, NE=Nuwara Eliya, GL=Galle, HB=Hambantota, MT=Matara, JF=Jaffna, KN=Killinochchi, MN=Mannar, VA=Vavuniya, MU=Mullaitivu, BT=Batticaloa, AM=Ampara, TR=Trincomalee, KM=Kalmunai, KR=Kurunegala, PU=Puttalam, AP=Anuradhapura, PO=Polonnaruwa, BD=Badulla, MO=Moneragala, RP=Ratnapura, KG=Kegalle.

Table 3: Laboratory Surveillance of Dengue Fever

18th - 24th Oct 2008 (43rdWeek)

Samples	Number tested		Number positive *		Serotypes									
					D ₁		D ₂		D ₃		D ₄		Negative	
	GT	AH	GT	AH	GT	AH	GT	AH	GT	AH	GT	AH	GT	AH
Number for current week	00	00	00	00	00	00	00	00	00	00	00	00	00	00
Total number to date in 2008	124	138	09	23	00	00	06	08	01	08	00	00	02	00

Sources: Genetech Molecular Diagnostics & School of Gene Technology, Colombo [GT] and Genetic Laboratory Asiri Surgical Hospital [AH]

* Not all positives are subjected to serotyping.

NA= Not Available.

Data Sources:

Weekly Return of Communicable Diseases: Diphtheria, Measles, Tetanus, Whooping Cough, Human Rabies, Dengue Haemorrhagic Fever, Japanese Encephalitis, Chickenpox, Meningitis, Mumps.

Special Surveillance: Acute Flaccid Paralysis.

National Control Program for Tuberculosis and Chest Diseases: Tuberculosis.

Table 4: Selected notifiable diseases reported by Medical Officers of Health
18th - 24th Oct 2008 (43rd Week)

DPDHS Division	Dengue Fever / DHF*		Dysentery		Encephalitis		Enteric Fever		Food Poisoning		Leptospirosis		Typhus Fever		Viral Hepatitis		Human Rabies		Returns Received Timely*
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	%
Colombo	14	1408	05	227	01	15	02	135	00	112	24	875	00	06	01	99	00	00	77
Gampaha	11	855	06	190	00	20	00	49	00	103	11	710	00	07	01	159	00	06	71
Kalutara	00	417	05	279	02	13	00	61	00	26	15	551	00	03	00	41	00	02	75
Kandy	10	253	12	278	00	07	00	57	00	98	06	430	01	91	05	119	00	02	64
Matale	05	141	03	182	00	04	00	48	00	13	06	671	00	02	00	27	00	00	75
Nuwara	00	27	03	240	00	03	01	236	00	166	02	58	01	37	00	106	00	01	77
Galle	01	93	02	173	00	20	00	17	00	43	12	373	00	14	00	08	00	05	82
Hambantota	00	87	02	95	01	06	00	07	00	12	02	95	00	90	00	16	00	01	64
Matara	07	291	00	189	00	13	00	35	00	15	03	427	04	216	00	14	00	01	82
Jaffna	00	57	00	140	00	04	00	249	00	17	00	01	01	154	00	37	00	00	25
Kilinochchi	00	00	00	35	00	00	00	01	00	04	00	02	00	00	00	01	00	00	00
Mannar	00	25	00	21	00	06	01	156	00	00	00	00	00	01	01	15	00	00	50
Vavuniya	00	12	00	58	00	03	00	13	02	22	00	05	00	01	00	05	00	00	75
Mullaitivu	00	00	00	22	00	00	00	16	00	13	00	00	00	01	00	09	00	01	00
Batticaloa	00	86	03	156	00	07	00	26	00	29	00	09	00	00	00	91	02	11	55
Ampara	00	31	00	254	00	00	00	09	00	283	00	23	00	00	00	13	00	00	29
Trincomalee	00	177	01	104	00	01	00	13	00	14	00	30	01	17	00	13	00	00	80
Kurunegala	04	308	04	205	00	14	00	52	00	23	02	597	00	29	03	72	00	06	53
Puttalam	00	277	02	102	00	08	02	153	12	39	02	61	00	37	01	30	00	05	56
Anuradhapu	00	118	04	108	00	10	00	12	00	10	00	237	00	11	00	14	00	03	58
Polonnaruw	00	62	07	128	00	01	01	26	00	23	03	68	00	01	01	20	00	00	100
Badulla	01	85	09	442	00	06	00	121	00	96	02	63	00	108	04	142	00	01	87
Monaragala	02	55	01	335	00	03	00	40	00	121	01	91	00	98	01	48	00	00	82
Ratnapura	01	252	07	356	00	32	01	51	09	77	02	195	00	78	01	52	00	00	72
Kegalle	03	389	05	279	00	26	02	73	02	14	22	492	01	64	04	481	00	01	82
Kalmunai	01	37	06	248	00	02	01	12	00	16	00	03	00	03	00	25	00	00	62
SRI LANKA	60	5543	87	4846	04	224	11	1668	25	1389	115	6067	09	1069	23	1657	02	46	67

Source: Weekly Returns of Communicable Diseases (WRCD).

*Dengue Fever / DHF refers to Dengue Fever / Dengue Haemorrhagic Fever.

**Timely refers to returns received on or before 01 November, 2008 Total number of reporting units =309. Number of reporting units data provided for the current week: 207

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