

# POPULATION DYNAMICS OF LABORATORY ANIMALS IN VETERINARY RESEARCH INSTITUTE (VRI) FROM YEAR 2005 TO 2010

LILY ROZITA M.H., CHANDRAWATHANI P. AND RAMLAN M.

Veterinary Research Institute, 59 Jalan Sultan Azlan Shah, 31400 Ipoh, Perak

Corresponding author: rozita@gmail.com

**ABSTRACT.** This paper reports on the laboratory animal population in the Laboratory Animal Unit, Veterinary Research Institute (VRI), Ipoh from 2005 to 2010. Laboratory Animal Unit is a complementary unit which serves to supply laboratory animals to all diagnostic and research units in VRI. The objective of this unit is to breed and produce laboratory animals such as rabbits, mice, rats, guinea pigs and hamsters for research projects as well as diagnostic and biological activities. The unit also supplies laboratory animals to private agencies, universities and schools. There are 6 species of laboratory animals in VRI namely rabbit (New Zealand Breed), guinea pig (Hartley Strain), hamster (Golden Syrian), white mice (Swiss Albino), BALB/c mice and Sprague Dawley Rat. Management of the animals includes breeding, fertility, production and disease monitoring. Generally, white mice bred well and had a high population from 2005 to 2010 compared to the other laboratory animals due to their short gestation period and large litter size. With the higher current demand for laboratory animals, the production of the unit is expected to increase.

*Keywords:* laboratory animal, population, production

## INTRODUCTION

The Laboratory Animal unit in VRI functions as a complementary unit to produce laboratory animals for research purposes. There are 6 species of laboratory animals namely white mice (Swiss Albino), guinea pig (Hartley Strain) and rabbit (New Zealand White), hamster (Golden Syrian), Sprague Dawley rat and BALB/c mice. This paper reports the general management and population of laboratory animals in VRI from 2005 to 2010. Data for this purpose was obtained from detailed daily and weekly records on management, feeding, breeding and production parameter of the various species. The annual population data is compiled based on the number of animals produced (born) plus total stock of laboratory animals in the past year.

Management of parent stock is of high priority to produce quality stock. Due to this, systematic feeding and cleaning of facilities with good sanitation is of utmost importance. The frequency and quantity of feed given to the animals is shown in Table 1. The feed given to all the species is

**Table 1:** Feeding and watering for laboratory animals in VRI, Ipoh.

Species	Feeding rate	Watering
Rabbit	40 g feed / 2 times per day + fresh vegetable	<i>Ad lib</i>
Guinea Pig	35 g feed / 2 times per day + fresh vegetable	<i>Ad lib</i>
Hamster	7 g / 2 times per day	<i>Ad lib</i>
White mice	6 g / 2 times per day	<i>Ad lib</i>
BALB/c mice	5-6 g / 2 times per day	<i>Ad lib</i>
Sprague Dawley rat	12 g / 2 times per day	<i>Ad lib</i>

a commercial feed pellet obtained locally and water is given *ad lib*. Fresh vegetables are also given to rabbits and guinea pigs as a feed supplement and as a source of Vitamin C.

Regular cleaning and changing of bedding of the laboratory animals is conducted as shown in Table 2. Their steel cages are washed once a week with disinfectant (Trigene 1%), air dried and stored in a cage store till used. For rabbits and guinea pigs, iron wire cages coated with aluminium paint is used to safe cost. Good sanitisation standards such as changing footwear from outdoor to barrier point are maintained to control diseases and to maintain environment stability. Foot dips are provided at the entrance of the building.

Breeding management is monitored closely to maximise the productivity of each species. Table 3 illustrates the average litter size of each species from 2005 to 2010. Parent stock are evaluated based on the productivity and quality of progeny produced (Poole and Robinson, 1987). All laboratory animal parent stocks are renewed after five breeding session and culled. However, rabbits are kept as blood donors after the five breeding sessions. White mice show the highest litter size, hence their higher annual population. They also seem to have a higher survivability (about 95%) from birth to adulthood. Guinea pigs and rabbits have a 90% survivability, rat 88% and hamster 87% respectively.

**Table 2:** Type of bedding and frequency of bedding change for laboratory animals in VRI, Ipoh.

Species	Type of bedding	No. of times changed per week
Rabbit	No bedding	3
Guinea Pig	No bedding	3
Hamster	Sawdust ; dried & disinfected	2
White mice	Sawdust ; dried & disinfected	2
Balb-C mice	Sawdust ; dried & disinfected	2
Sprague Dawley rat	Sawdust ; dried & disinfected	2

**Table 3:** Average litter size of laboratory animals from 2005 to 2010.

Species	2005	2006	2007	2008	2009	2010
Rabbit	6	6	5	5	5	5
Guinea Pig	3	3	3	3	3	2
Hamster	5	3	4	6	6	-
White mice	11	11	11	10	9	9
BALB/c mice	-	-	-	-	-	4
Sprague Dawley rat	-	-	-	-	8	10

**Table 4:** Total population and usage of laboratory animals in VRI, Ipoh annually from 2005 to 2010.

Species	2005		2006		2007		2008		2009		2010	
	Total Population	Total usage	Total Population	Total usage	Total Population	Total usage	Total Population	Total usage	Total Population	Total usage	Total Population	Total usage
Rabbit	117	36	122	44	98	49	77	52	109	42	130	43
Guinea pig	501	55	551	224	468	196	498	34	589	286	530	283
Hamster	57	20	37	0	51	22	87	9	106	8	68	10
White mice	2170	358	1842	803	1875	819	2728	1339	2329	752	2210	1164
BALB/c mice	-	-	-	-	-	-	-	-	-	-	56	2
Sprague Dawley rat	-	-	-	-	-	-	-	-	59	20	150	53

Table 4 shows the population and usage of laboratory animals in VRI from 2005 until 2010. These laboratory animals were either sold or given to other VRI units, private agencies, universities and schools. Generally, white mice were highly productive with an annual population of 1,842-2,728. This was followed by guinea pigs, rabbits and hamsters. Sprague Dawley rats and BALB/c mice were introduced

into the unit in 2009 and 2010 respectively. These were obtained from the Institute of Medical Research (IMR), Kuala Lumpur.

Laboratory animals in VRI are used for a variety of activities as shown in Table 5. More than 90% of them are used for diagnostic purposes, production of biologicals such as antiserum, in training and research. A small number of them are donated to schools, or used for exhibitions

**Table 5:** Uses of laboratory animals in VRI, Ipoh.

Species	Used for
Rabbit	<ul style="list-style-type: none"> <li>• Production of haemolysin, hyper-immune serum for Antispecies Tests and Melamine Conjugate Tests (using polyclonal antibody), for media preparation and to evaluate Safety and Potency Tests for the HS Vaccine.</li> <li>• Rabbit blood donors are used for the production of plasma and <i>Leptospira</i> Culture.</li> </ul>
Guinea Pig	<ul style="list-style-type: none"> <li>• Production of complement for fixation tests for the diagnosis of Melioidiosis, Johne's disease and Brucellosis.</li> </ul>
Hamster	<ul style="list-style-type: none"> <li>• Culturing <i>Leptospira</i>.</li> <li>• Exhibitions.</li> </ul>
White mice	<ul style="list-style-type: none"> <li>• Production of antibodies, for the diagnosis of <i>Trypanosome evansi</i> and safety tests for Fowl Cholera vaccine, Double Haemorrhagic Septicemia (HS) Adjuvant vaccine and Duck Pasteurellosis vaccine.</li> </ul>
BALB/c mice	<ul style="list-style-type: none"> <li>• Monoclonal studies.</li> </ul>
Sprague Dawley rat	<ul style="list-style-type: none"> <li>• Toxicology studies.</li> </ul>

**Table 6:** Annual mortality rate (%) of laboratory animals in VRI, Ipoh from 2005 to 2010.

Species	2005	2006	2007	2008	2009	2010
Rabbit	0	0	1	1	13	22
Guinea Pig	0	2	1	3	16	11
Hamster	0	0	8	3	22	31
White mice	1	1	0	1	8	0
BALB/c mice	-	-	-	-	-	5
Sprague Dawley rat	-	-	-	-	12	8

and recreational activities organised by the institute.

The health of the laboratory stock is maintained by careful daily observation on feeding and drinking as well as behaviour. Regular quarterly health screening is conducted by sacrificing 1% of the population to conduct postmortem and detailed laboratory diagnosis. Culling of some animals is conducted based on physical examination; for example on runts

or weak animals. Approximately, 1% of the animals are culled annually.

Table 6 shows the mortality rate of the laboratory animals from 2005 to 2010. Hamster mortality rate was higher in 2009 (22%) and 2010 (31%). One of the reasons for this was because the breeders were old and had a decreased productivity. To overcome this, new hamster breeders were substituted in the year 2011.

With the high demand for laboratory animals, the laboratory unit in VRI is expected to increase its production and will continue to maintain a high standard of animal production in order to supply these animals for research and other activities in VRI and related agencies.

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