Strategic Sampling Plan for Livestock Disease Surveillance in Mithun Population

Keerthana G S [1] , Raaga R [2], Nandan A S [3], Suresh K P [4]

1,2,3 and 4: Spatial Epidemiology laboratory, ICAR-National Institute of Veterinary Epidemiology & Disease Informatics, Bengaluru.

Introduction

All form of epidemiological investigations requires a scientific sampling plan for the collection of data on health problems. In sampling, we ensure that animals are typical of the target population and that the estimate of disease frequency is unbiased and precise (low standard error). Simple random sampling and systematic or stratified random samplings are the most commonly used sampling methods in which an animal is a sampling unit, providing precise estimates of disease frequency.

Sampling plan

In this case, the sampling plan is devised according to judgement-based, population-based, or instance-based criteria. The Judgement Sampling is the non-random sampling technique wherein the choice of sample items depends exclusively on the investigator's knowledge and professional judgment. In other words, the investigator chooses only those sample items which he feels to be the best representative of the population with regard to the attributes or characteristics under investigation. Select districts with high number of Mithun population from each state according to the resource availability or professional judgment for sampling and then select a village to sample the animal from this selected district. The villages with larger Mithun population are assigned greater importance, used for sampling more number of samples, and while those with a smaller Mithun population are assigned lower weightage and less number of samples are taken from these villages.

Here, we employed simple random sampling where districts are selected randomly for Mithun populations in different states. The input requirements of the sampling plan were (1) animal level prevalence is 30% (2) cluster level prevalence of 20% (3) sensitivity of 80% and specificity of 80-100%. Simple random sampling plan was generated using an in-house developed epi-calculator (https://nivedi.res.in/Nadres_v2/Epical/stratified/random_sampling.php). The Sampling plan will provide the guidelines for selecting villages, proportion of Mithun population to be sampled in each selected village. The summary of the sampling plan generated using simple random sampling is presented in Table1.

Table 1: Summary of Sampling Plan using simple random sampling

States	Total population	No of districts	Proportion of animal population	No of districts to be sampled	No of Villages to be sampled	No of Animals to be sampled
Nagaland	34871	11	11.76	2	4	27
Arunachal Pradesh	247650	16	83.52	2	27	193
Manipur	10131	9	3.42	1	1	8
Mizoram	3857	11	1.3	1	1	3
Total	**296509**	**47**	**100**	**6**	**33**	**231**

Guidelines for collection of samples within the village

Given below is the example provided by us to the coordinating unit for sample collection.

We can hypothetically divide the village into four quarters and pick the requisite number of samples from households as shown below. The sampling plan entails allocating a greater number of samples to the portion with a higher population of animals, and conversely, assigning a smaller number of samples to the portion with a lower population of animals.
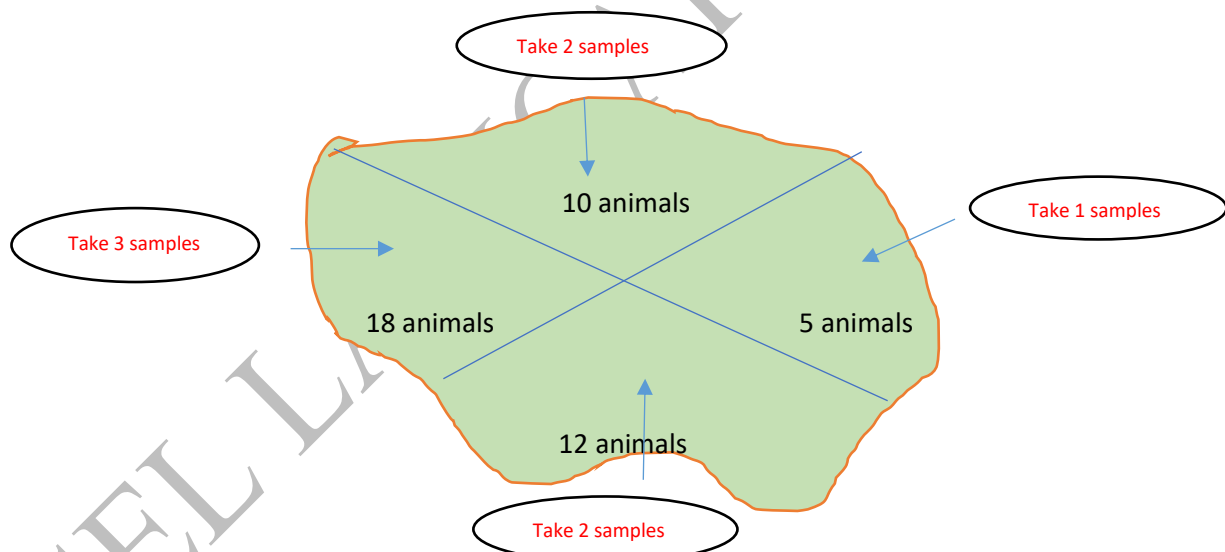
Reference

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