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Studies on the techniques of continuing control of rodent pests on grassland

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Since 1958 , the number of pest rodents has risen increasingly on grassland in China . The results of many studies showed that the rise of pest rodents was because of the degeneration of the grassland(Zhong Wenqin *et al .* , 1991) . To control pest rodents effectively on grassland , we chose the following methods :

Establishing a long term monitoring station To learn the biological and ecological characteristics of main rodent species , understand the laws of population dynamics and provide feasible measures of control , three long-term monitoring stations were established in 1984 .

Studies on the main rodent species and the laws of population dynamics of those rodents The biological characteristics of ten rodent species were analysed and the population dynamics of those species were examined . This provided the scientific basis for control measures .

The population of clawed jird(*Meriones unguiculatus*) underwent a cycle of 14-16 years and was divided into four phases . The population increased for 2 years , was at a peak for 1 year and then decreased for 2 years , before stabilizing at low levels for 9-11 years . The population of striped hamster(*Cricetulus barabensis*) underwent three phases . The peak phase was 1 year followed by a decrease for 2 years . The steady phase has been longer than 19 years , as it is still occurring . The population numbers of these dominant rodents was significantly and negatively correlated with that of Mongolian five-toed jerboa(*Allactaga sibirica*) .

The population numbers of bradt's vole(*Micotus brandti*) , striped hairy-footed hamster(*Phodopus sungorus*) and ground squirrel(*Citellus dauricus*) were all studied between 1987 and 1998 . The number of bradt's vole has undergone a cycle for 12-18 years . The peak phase was 1 year followed by a decrease for 2 years . The steady phase was known to be zero for 9 years . The low numbers of striped hairy-footed hamster and ground squirrel has hampered efforts to define the dynamics of these populations .

The population numbers of desert hamster(*Phodopus roborovskii*) , little Chinese jird(*Meriones meridianus*) , northern three-toed jerboa(*Dipus sagitta*) and house mouse(*Mus musculus*) was studied from 1991 to 1998 . Again the length of the study has not enabled the researchers to define the dynamics of these populations during this period .

Establishing models of prediction and predicting population numbers Prediction models were established in 1990 and prediction started in 1991 . Between 1991 and 2006 , the reports of prediction of different rodent population mentioned above were totally done for 48 terms . The coincident rate between theoretical value and actual value was more than 85% .

The technique of continuing control of pest rodent on grassland Grassland degeneration can be prevented if we use comprehensive ecology methods to create an environment that is not fit for rodent survival and reproduction . This may naturally decrease rodent populations without killing them . This would include protecting and attracting natural enemies of rodents . This will ensure that the population density of rodents be controlled below a threshold of harm in the long term and provide continuing control of pest rodents on grassland without any harm to public health .

Reference

Zhong Wenqin , Zhou Qingqiang , Wang Guanghe , 1991 . The design for the ecological management of brant's vole pest and its application . *Acta theriologica sinica* 11(3) : 204-210 .

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