

## Characteristics of Soil Weed Seed Bank in Alfalfa Fields Among Different Fore Crops

YY. Guo<sup>1</sup>, JG. Wang<sup>1</sup>, QZ. Sun<sup>2</sup>, YQ. Wang<sup>2</sup>

<sup>1</sup>Inner Mongolia Agricultural University, Ecological Environment Institute, Hohhot, 010019, China.

<sup>2</sup>Institute of Grassland Research of CAAS, Hohhot, 010010, China.

**Key words:** alfalfa field, fore crop, seed bank

**Abstract:** Effect of fore crops upon alfalfa (*Medicago sativa* L.) field was studied based on soil seed bank of weed using germination method. Three different fore crops (*Zea mays* L., *Lespedeza hedysaroides* (Pall.) Kitag. and *Astragalus adsurgens* H. C. Fu) were designed in Linxi. The results showed that density of soil weed seed bank had significant difference between *L. hedysaroides*. and other two fore crops ( $P < 0.05$ ).

### Introduction

Alfalfa (*Medicago sativa* L.) is significant legume forage species in China, which is harmed seriously by weed in seedling stage. Weed seed bank is dynamic weed seeds retained in the soil surface and in soil (Roberts 1981), which is the origin of weeds. The purpose of this study was to understand the influence of weed seed bank changes in alfalfa field. The density of soil weed seed bank showed weed seed quantity and distribution in soil and revealed the regularity of weed population. It provided a further theoretical basement for weed management in alfalfa field.

### Materials and methods

Materials were cultivated in Linxi (118.02N, 43.62E, 900 m altitude) located in Inner Mongolia of China in June 30, 2009. Soil samples were collected by diagonal five point sampling using five cm diameter cylindrical soil sampler at second growing years, then packaged the soil samples in three layers (0–5, 5–10 and 10–15 cm), and mixed the same layer of the soil sample together, repeated three times. The method of inducing germination was used to investigate the weed seed of soil samples. Data was processed and analyzed by Microsoft Office Excel 2003 and ANOVA.

### Results

Density of soil weed seed bank had significant difference between *Lespedeza hedysaroides* (Pall.) Kitag. and other two fore crops ( $P < 0.05$ ), also the density of soil weed seed bank had significant difference among different sampling time. Density of soil seed bank had significant difference between July, August, September and April, October ( $P < 0.05$ ), and it had a significant difference between October and April ( $P < 0.05$ ). The results suggested that fore crops and sampling time had influence on density of soil weed seed bank. Density of seed bank had significant difference between *Zea mays* L. and other two fore crops in July and *Astragalus adsurgens* H.C.Fu and other two fore crops in October. It is showed that fore crops and sampling time had effect on density of soil weed seed bank.

### Discussion

Research showed that density of weed seed bank generally ranged from 0 to  $1.0 \times 10^6$  grains  $m^{-2}$ , density of alfalfa weed seed bank ranged from 1,247 to 6,190 grains  $m^{-2}$ . Density of soil seed bank had significant difference between *L. hedysaroides* and other two fore crops ( $P < 0.05$ ), which meant fore crops had effect on density of soil weed seed bank. The influence mechanism of effect on density of weed seed bank among fore crop was not clear. Moreover, the change of weed seed quantity in soil had close relation with germination and species, but also easily influenced by the external environment, which need further research.

### Conclusion

The results showed that density of soil seed bank had significant difference between *L. hedysaroides* and other two fore crops ( $P < 0.05$ ).

### References

Roberts HA (1981) Seed banks in soils. *Advances in Applied Biology*, 6: 1–55.