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Jinpeng Zhang
Beijing Forestry University, China

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Study on root system morphology of creeping-rooted alfalfa and related analysis of soil physical factor

ZHANG Jin-peng

College of Turfgrass and Grassland Science, Beijing Forestry University 100083 China.

E-mail zoho1984@163.com

Key words : Creeping-rooted alfalfa, root system morphology, soil physical factor

Introduction Creeping-rooted character was very important for breeding and selection of the new variety of creeping-rooted and grazing alfalfa. In this paper, the author discussed the ontogenesis of creeping-rooted character and its performance in the BFU grassland experimental land. Through the research on effects of physiological and ecological factors of creeping-rooted Alfalfa, the influence of physiological and ecological effects on the performance of creeping-rooted character could be analysed.

Materials and methods The materials come from our experiment lands which is in Shunyi of Beijing, seeded on May 2004, including three grazing-type alfalfa, that is creeping-rooted material, main-rooted material, side-rooted material. The varieties of alfalfa includes Travois, Zhongmu No.1, Grassland No.2, Baoding alfalfa, Kazakhstan wild alfalfa. The methods mainly focus on three points: the plants modality survey, the plants root system survey, the soil condition survey. The plants modality survey includes plant height, material expansion, cluster quantity, branches quantity; and plants root system survey focus on the root expansion, the stem primordia; The soil condition data were collected by three level: 0-10cm, 10-20cm, 20-30cm. The data are dealt with the multianalysis, including square error analysis, simple factor analysis, variance four group data, correlative coefficient matrix and so on.

Results The results of these studies were as follows: the underground horizontal root of creeping-rooted alfalfa could form root expansion part and stem primordia on the root through whole growth season. The appearance of creeping-rooted plant was better during the second and third years than during the first and later of the fourth year in the creeping-rooted varieties. The development of creeping-rooted seedlings and the range of expansion of root turion node were influenced by marginal effect. The percentage of creeping-rooted plant was a little higher in marginal rows than in inner rows, and the range of expansion of creeping-rooted seedlings was obviously larger in marginal rows than that in inner rows. Compared with the other materials, the expansion of horizontal roots of the creeping-rooted alfalfa are 30% farther than the side-rooter material, but not better on the index of plant height and branches quantity which are compared with the side-rooted material and the main-rooted material. Compared with the 10-20cm level, under the 0-10cm level the root diameter are bigger both the horizontal roots and the vertical roots. Under the 0-10cm level, the vertical root diameter of main-rooted material > the vertical root diameter of side-rooted material > the vertical root diameter of creeping-rooted material. Soil condition has a great influence on the development of creeping-rooted alfalfa, especially on the index of soil moisture. The weight content of CR and NCR are similar, the creeping-rooted alfalfa has a strong tolerance to the stiff environment.

Reference

Gao Zhensheng, Wang Pei, Hong Fuzeng. Studies on Ontogenesis and Ecological Adaptability of Creeping-rooted Character of Alfalfa (*Medicago media Pers.*). *Acta Agrestia Sinica*.

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