

Analysis on factors affecting alfalfa survival of overwintering seedlings in the east of southern Daxinganling ,China

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Introduction The research areas lie in Dongli under the control of Balinzuoqi in inner Mongolia . It is located south of Daxinganling ,the middle east $118^{\circ}44'00''$ - $119^{\circ}48'2''$ and north latitude $43^{\circ}36'53''$ - $44^{\circ}48'22''$,and is one of the 33 nomadic areas confirmed by Central government . In recent years ,a lot of areas in our country have been converted to grassland agriculture . This increase has occurred with the increase in awareness of agricultural and ecological environmental status . One of the main species suggested for cultivation is alfalfa ,and the area in which it is planted has expanded rapidly . However ,seedlings sometimes have problems overwintering in the cold and dry northern areas . This reduction of seedling is crucial because it can restrict stand development of alfalfa . To better understand the effect of unfavorable climatic conditions on overwintering alfalfa seedlings ,and provide basis for rational Culture and Management ,a 5 year study was conducted from 1998-2002 ,to study the main factors affecting overwintering of alfalfa seedlings .

Materials and methods The Materials were introduced alfalfa species-Rambler ,Golden Empress ,Algonquin ,Medicago varia Martin and Medicago Sativa Lcv . According to planting alfalfa from 1998 to 2002 ,analysis precipitation ,late spring cold ,soil texture , species ,cultivation and management techniques etc . factors to alfalfa Survival of Overwintering .

Table 1 Effect of precipitation on alfalfa' overwintering .

Species	Time	Whole year(mm)	Oct .to Mar .(mm)	Over-wintering rate(%)
Rambler	1998	677 .5	29 .2	85
Golden	2000	265 .0	26 .3	90
Algonquin	2001	357 .9	4 .9	<10
Medicago varia Martin	2002	297 .7	4 .5	40
Medicago Sativa Lcv	2002	297 .7	4 .5	<10

Conclusions According to the results ,precipitation ,late spring cold ,and differences between species are the main factors which restrict survival of overwintering alfalfa seedlings . To be assured safe overwintering of alfalfa ,one needs to select species adapted to the local environment and soil . Utilization of proper cultivation ,planting ,and management techniques is also important . Especially during years having dry autumns and few snow events in the winter ,alfalfa should be protected from withering and freeze injury caused by unfavorable climatic conditions like dry weather ,by using the measures of covering soil ,watering in winter etc . to strengthen their ability to resist cold .