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CERTIFICATE

In accordance with section 44 (1) of the Patents Act, No. 57 of 1978, it is hereby certified that:

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Has been granted a patent in respect of an invention described and claimed in complete specification deposited at the Patent Office under the number

2022/04227

A copy of the complete specification is annexed, together with the relevant Form P2.

stimony thereof, the seal of the Patent Office has been affixed at Pretoria with effect from the 29th day of June 2022

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54 Title of invention
A Kind of Double-Layer Method of Planting Alfalfa in Arid Mountainous Area

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A Kind of Double-Layer Method of Planting Alfalfa in Arid Mountainous Area

TECHINICAL FIELD

The invention involves a kind of double-layer method of planting alfalfa in arid mountainous area. in particular to a kind of double-layer method of planting alfalfa in mountainous areas in desert grassland areas of middle and high altitude on that northern slope of Kunlun mountain in southern Xinjiang.

BACKGROUND

Xinjiang is a big province of animal husbandry. Because it is located in the hinterland of Asia-Europe continent and influenced by continental arid climate, Xinjiang desert grassland accounts for more than 42% of grassland area in pastoral areas. The desert grassland area in southern Xinjiang accounts for 17.45% of the available grassland area in Xinjiang, and is mainly distributed at the altitude of 1800-3000m on the northern slope of Kunlun Mountain, which is an important local winter pasture. Desert grassland is not only the material basis for all ethnic groups in Xinjiang to engage in animal husbandry production, but also plays an important role in water conservation, wind and sand fixation, soil and water conservation, runoff regulation and oasis ecosystem stability. In recent years, the surge of oasis population and the high price of livestock products have stimulated the predatory demand of animal husbandry for biological resources of desert grassland. The development trend of grassland ecosystem degradation and desertification is very serious, which directly affects the local animal husbandry production and the stability of oasis ecosystem, and further aggravates the contradiction between man and land in southern Xinjiang.

With the implementation of the national herdsmen's relocation and settlement project, the construction of artificial high-efficiency forage land and grassland restoration and improvement have become the most important links in the herdsmen's settlement project. The desert grassland in mountainous areas has become an important area for grassland restoration and improvement and artificial grassland construction because of its photothermal conditions and geographical location. The restoration and control of desert vegetation can not only improve the carrying capacity of grassland, increase the output of livestock products and increase the income of herdsmen, but also have great significance for improving the ecological environment quality of oasis in southern Xinjiang, changing the production and living conditions of poor villages in southern Xinjiang pastoral areas, changing backward production methods and accelerating the process of herdsmen's relocation and settlement and new rural construction in pastoral areas.

In the distribution area of desert grassland in mountainous areas, because of the special geographical environment in mountainous areas, winter sowing is not conducive to the overwintering of alfalfa seedlings, and spring sowing is conducive to the improvement of alfalfa rooting and drought resistance. However, the intense irradiation and sandstorm in spring have become the key factors that endanger the survival of alfalfa seedlings. Traditional alfalfa planting methods can hardly solve the problem of high mortality of alfalfa seedlings in mountain areas, especially in the spring planting process. The high mortality of seedlings leads to low efficiency of grassland restoration and improvement and artificial grassland construction, which not

only wastes a lot of manpower, material resources and financial resources, but also makes it difficult to achieve the expected improvement and construction effect. The high mortality rate of seedlings also makes the yield of alfalfa obviously low, and it is difficult to produce due economic benefits in the current year.

Alfalfa is a perennial plant species. In the process of planting alfalfa in mountainous areas, as long as the seedlings in the first year are successfully planted, the plants in the second year will have strong environmental adaptability. According to the environmental characteristics of mountain areas and the biological characteristics of alfalfa, the invention utilizes the fast growth of specific annual plants, provides concealment and protection for alfalfa seedlings by researching and developing the double-layer planting technology of alfalfa in mountain areas, and improves the survival rate of alfalfa seedlings, so as to realize the success of planting high-quality pasture alfalfa in desert grassland improvement and artificial grassland construction.

SUMMARY

The invention aims to provide a kind of double-layer method of planting alfalfa in arid mountainous area, The method takes Hotan Medicago.Sativa.L. as the main planting variety, selects annual companion plant species such as rape, oat or highland barley, and adopts the technical measures of orthogonal test design, sowing order (position), planting spacing, planting depth and fertilization amount, etc. The double-layer planting method of alfalfa in mountainous areas is used to conceal and protect the formation of alfalfa seedlings, so as to improve the survival rate of alfalfa seedlings in the current year. Promoting the success of desert grassland improvement

and artificial grassland construction in arid mountain environment has become the best combination of technologies for planting alfalfa at middle and high altitude in arid mountain areas, which has greatly improved the survival rate of alfalfa seedlings and increased the output of planting alfalfa in the same year in the middle and high mountain areas with an altitude of 3000-1800 in arid areas.

The invention relates to a kind of double-layer method of planting alfalfa in mountainous areas of arid areas, which comprises the following steps:

a. Selection of companion plant species: Screening annual plants such as rape, oat or highland barley as double-layer companion species;

b. Trenching planting: Taking Hotan Medicago.Sativa.L. as cultivated species, In the first ten days of April, under the condition of good soil moisture, planting ditches were opened. The furrow width is 8cm, the furrow depth is 5cm, and the spacing between planting furrows is 22cm;

c. Drill and sow: And planting alfalfa and associated plant species on both sides of the ditch, adopting the mode of high associated plant and low alfalfa, and then covering the soil and burying it flat;

d. The sowing order of alfalfa and associated plant species: Trenching in the east-west direction, annual companion plant species are planted in the south side of the trench, and alfalfa is planted in the north side; Trenching from north to south, with accompanying plant species planted on the east side of the trench and alfalfa planted on the west side, forming a double-layer planting pattern;

e. Fertilization: According to the soil condition, 45-60 kg of urea and 120-240 kg of

phosphate fertilizer are applied to each hectare of chemical fertilizer.

f. Stubble: At the end of September and the beginning of October, mow the alfalfa to leave 5-8cm stubble.

In step c, the companion plants are planted on the sunny side of the planting ditch.

Compared with the prior art, the double-layer planting method of alfalfa in arid mountainous area is characterized in that:

According to the biological characteristics and mountain environmental conditions of alfalfa, the invention screens annual plants as companion species of alfalfa, establishes a double-layer planting technology of alfalfa, creates protection conditions for survival of alfalfa seedlings in the current year from the biological characteristics of plants, and effectively improves the success rate and effectiveness of planting alfalfa in the current year.

Compared with the existing alfalfa planting technology, under the same conditions in mountainous areas, the invention effectively reduces the influence of irradiation and sand damage on the lethal factors of alfalfa seedlings. The survival rate and preservation rate of alfalfa seedlings are greatly increased, and the reseeding is reduced, which reduces the sowing cost and saves manpower. At the same time, the planting of annual plants also effectively increased the biomass of grassland in the current year, which had better economic benefits.

Using the fast-growing characteristics of the selected annual companion plants, a double-layer planting pattern (companion plants, high; Alfalfa, low mode), forms shade and protection for the perennial forage alfalfa seedlings that germinate in the

current year, effectively reduces the influence of strong radiation and wind and sand hazards in mountainous areas on the survival of alfalfa seedlings, improves the survival rate and biological yield of alfalfa seedlings in the current year, saves the cost of grassland improvement and restoration, and improves the efficiency of artificial forage land construction.

Annual plant species suitable for mountain environment are selected as companion plants for planting. At present, the selected species are rape, oat or highland barley, which are planted on the sunny side of the planting ditch. Accompanying plants, as the top layer of double-layer planting mode, only play a hidden and protective role in alfalfa seedlings in the first year, so as to improve the survival rate of alfalfa seedlings in that year.

DESCRIPTION OF THE INVENTION

Embodiment 1:

Sayi Township, uruk, Cele County, Hotan District, Xinjiang, with an altitude of 2,450 meters, selected local Hotan Medicago.Sativa.L. varieties as the main planting varieties and rape as the companion varieties;

Select seeds

Select suitable varieties. Alfalfa is a perennial plant. After one sowing, at least it will be used for 2-3 years and at most it will be used for 4-5 years. Seed selection is the first step of successful alfalfa planting, and it is necessary to select large-leaf alfalfa seeds that meet the first and second national standards. The purity of seeds should reach 90%, the germination rate should reach 85%, the purity should reach 98%,

seeds should be mixed before sowing, and the amount of seeds per mu should be controlled at 0.8-1.0 kg;

Land preparation:

The planting site is a place with gentle slope in front of the mountain area, flat terrain and small slope fluctuation, and the ground is raked flat, and the soil on the northern slope of Kunlun Mountain is sandy, and no turning is needed.

Trenching planting:

Taking Hotan Medicago.Sativa.L. as cultivated species, In the first ten days of April, under the condition of good soil moisture, planting ditches were opened along the east-west direction. The furrow width is 8cm, the furrow depth is 5cm, and the spacing between planting furrows is 22cm;

Drill and sow:

Mixed planting before sowing, sowing by drilling, planting alfalfa and associated plant species on both sides of the ditch, adopting the mode of high associated plant and low alfalfa, planting annual associated plant rape on the south side of the ditch, planting alfalfa on the north side of the ditch, and then covering the soil and burying;

Fertilization:

According to the soil condition, 45 kg of urea and 120-240 kg of phosphate fertilizer are applied to each hectare of chemical fertilizer.

Stubble:

At the end of September and the beginning of October, mow the alfalfa and leave a stubble of 5cm.

Embodiment 2

Bostam Township, Cele County, Hotan District, Xinjiang, with an altitude of 3,000m, chooses local Hotan Medicago.Sativa.L. varieties as the main planting varieties and highland barley as the companion varieties.

Select seeds

Select suitable varieties. Alfalfa is a perennial plant. After one sowing, at least it will be used for 2-3 years and at most it will be used for 4-5 years. Seed selection is the first step of successful alfalfa planting, and it is necessary to select large-leaf alfalfa seeds that meet the first and second national standards. The purity of seeds should reach 90%, the germination rate should reach 85%, the purity should reach 98%, seeds should be mixed before sowing, and the amount of seeds per mu should be controlled at 0.8-1.0 kg;

Land preparation:

The planting site is a place with gentle slope in front of the mountain area, flat terrain and small slope fluctuation, and the ground is raked flat, and the soil on the northern slope of Kunlun Mountain is sandy, and no turning is needed.

Trenching planting:

Taking Medicago.Sativa.L. as the cultivated species, in early April, under the condition of good soil moisture, planting ditches were opened along the north-south direction. The furrow width is 8cm, the furrow depth is 5cm, and the spacing between planting furrows is 22cm;

Drill and sow:

Before sowing, mixed planting is carried out, sowing by drilling, planting alfalfa and associated plant species on both sides of the ditch, adopting the mode of high associated plant and low alfalfa, planting the associated plant species highland barley on the east side of the ditch, and planting alfalfa on the west side to form a double-layer planting mode, and then covering the soil and burying it flat;

Fertilization:

According to the soil condition, 50 kg of urea and 200 kg of phosphate fertilizer are applied to each hectare of chemical fertilizer.

Stubble:

At the end of September and the beginning of October, mow alfalfa and leave 7cm stubble.

Embodiment 3

Qiaha Township, Cele County, Hotan District, Xinjiang, with an altitude of 1,800 meters, selected local Hotan Medicago.Sativa.L. varieties as the main planting varieties and oat as the companion varieties;

Select seeds

Select suitable varieties. Alfalfa is a perennial plant. After one sowing, at least it will be used for 2-3 years and at most it will be used for 4-5 years. Seed selection is the first step of successful alfalfa planting, and it is necessary to select large-leaf alfalfa seeds that meet the first and second national standards. The purity of seeds should reach 90%, the germination rate should reach 85%, the purity should reach 98%, seeds should be mixed before sowing, and the amount of seeds per mu should be

controlled at 0.8-1.0 kg;

Land preparation:

The planting site is a place with gentle slope in front of the mountain area, flat terrain and small slope fluctuation, and the ground is raked flat, and the soil on the northern slope of Kunlun Mountain is sandy, and no turning is needed.

Trenching planting:

Taking Medicago.Sativa.L. as the cultivated species, in early April, under the condition of good soil moisture, planting ditches were opened along the north-south direction. The furrow width is 8cm, the furrow depth is 5cm, and the spacing between planting furrows is 22cm;

Drill and sow:

Before sowing, mixed planting is carried out, sowing by drill sowing, alfalfa and associated plant species oat are planted on both sides of the ditch, adopting the mode that the associated plant species oat is high and alfalfa is low, the associated plant species oat is planted on the south side of the ditch, alfalfa is planted on the north side, forming a double-layer planting mode, and then covering the soil and burying it flat;

Fertilization:

According to the soil condition, 60 kg of urea and 240 kg of phosphate fertilizer are applied to each hectare of chemical fertilizer.

Stubble:

At the end of September and the beginning of October, mow the alfalfa and leave 8cm stubble.

The invention relates to a kind of double-layer method of planting alfalfa in arid areas and mountainous areas, which takes Hotan Medicago.Sativa.L. as the main planting variety, Screening annual companion plant species such as rape, oat or highland barley, through orthogonal experimental design, sowing sequence (position), planting spacing, planting depth and fertilization amount and other technical measures, using the hidden and protective effects of mountain alfalfa double-layer planting method on alfalfa seedlings formation, improving the survival rate of alfalfa seedlings in the current year and promoting the success of desert grassland improvement and artificial grassland construction in arid mountain environment, It has become the best technical combination for planting alfalfa at middle and high altitude in arid mountainous areas, and achieved a significant increase in the survival rate of alfalfa seedlings in the middle and high mountainous areas with an altitude of 3,000-1,800 in arid areas, the restoration of desert grassland and the construction of artificial forage land, and the increase in the output of planting alfalfa that year.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS

1. A kind of double-layer method of planting alfalfa in arid mountainous area is characterized by the following steps:

a. Selection of companion plant species: selecting annual plants such as rape, oat or highland barley as double-layer companion species;

b. Trenching planting: Taking Hotan Medicago.Sativa.L. as cultivated species, In the first ten days of April, under the condition of good soil moisture, planting ditches were opened. The furrow width is 8cm, the furrow depth is 5cm, and the spacing between planting furrows is 22cm;

c. Drill and sow: And planting alfalfa and associated plant species on both sides of the ditch, adopting the mode of high associated plant and low alfalfa, and then covering the soil and burying it flat;

d. The sowing order of alfalfa and associated plant species: Trenching in the east-west direction, annual companion plant species are planted in the south side of the trench, and alfalfa is planted in the north side; Trenching from north to south, with accompanying plant species planted on the east side of the trench and alfalfa planted on the west side, forming a double-layer planting pattern;

e. Fertilization: According to the soil condition, 45-60 kg of urea and 120-240 kg of phosphate fertilizer are applied to each hectare of chemical fertilizer.

f. Stubble: At the end of September and the beginning of October, mow the alfalfa to leave 5-8cm stubble.

2. The method according to claim 1, characterized in that in step c, the companion plants are planted on the sunny side of the planting ditch.

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REPUBLIC OF SOUTH AFRICA
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COMPLETE SPECIFICATION
[Section 30(1) - Regulation 28]

FORM P7

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TITLE OF INVENTION

54	A Kind of Double-Layer Method of Planting Alfalfa in Arid Mountainous Area

ABSTRACT

The invention relates to a double-layer planting method of alfalfa in arid areas and mountainous areas, which takes Hetian big-leaf alfalfa as the main planting variety, Screening annual companion plant species such as rape, oat or highland barley, through orthogonal experimental design, sowing sequence (position), planting spacing, planting depth and fertilization amount and other technical measures, using the hidden and protective effects of mountain alfalfa double-layer planting method on alfalfa seedlings formation, improving the survival rate of alfalfa seedlings in the current year and promoting the success of desert grassland improvement and artificial grassland construction in arid mountain environment, It has become the best technical combination for planting alfalfa at middle and high altitude in arid mountainous areas, and achieved a significant increase in the survival rate of alfalfa seedlings in the middle and high mountainous areas with an altitude of 3,000-1,800 in arid areas, the restoration of desert grassland and the construction of artificial forage land, and the increase in the output of planting alfalfa that year.