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THE IMPORTANCE OF THE ALTERNATION SYSTEM IN THE CULTIVATION OF CALENDULA OFFICINALIS

1E.T. Ahmadov, 2Kh.E. Tursunboev, 2G. Abdiniyazova, 2T. Myrzabayev
1Tashkent State Agrarian University,
2Karakalpak State University named after Berdakh

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Abstract:

The article describes the importance of the rotation system when growing medicinal plants. It is indicated that the rotation system has a positive effect on the growth and development of plants. It was noted that without alternating intermediate crops, plant productivity was 612-655 kg/ha; when using intermediate crops for 1 year (alternation), these indicators were noted in the range of 707-712 kg/ha, which is comparatively 8-9% higher, and with constant alternation, plant productivity can increase up to 20-24%.

Keywords: rotation, agriculture, farming, productivity, marigold, resource-saving technologies, intercropping, Hordeum vulgare L., Vicia villosa Roth., Prunus dulcis Mill. agroforestry, economic efficiency, etc.

INTRODUCTION. It is known that the alternation system in agricultural farming is one of the resource-saving technologies that will successfully serve to ensure the properties and fertility of the soil.

Many scientists point out that in the process of developing agricultural land, the use of catch crops before sowing and planting the main crops is considered promising. This cultivation system, in turn, has a positive effect on plants [4-5].

B.E. Tukhtaev [6] notes that the use of corn as an intermediate crop in the development of saline lands yields positive results. The author believes that due to the rapid growth of corn, the top layer of soil is completely closed and forms a shade, as a result of which evacuation is reduced and due to the decrease, evaporation of moisture in the soil, the salinization process is reduced.

In scientific studies of foreign (Spain) scientists, it is noted that the sowing of agricultural crops (*Hordeum vulgare* L. and *Vicia villosa* Roth) in the rows of cherry plantations (*Prunus dulcis* Mill. [D.A. Webb]) gives effective results. It was revealed that plants sown in the aisles (common barley - *Hordeum vulgare* L. and hairy vetch - *Vicia villosa* Roth), cherry (*Prunus dulcis* Mill. [D.A. Webb]) soften the surface layer of soil, contribute to nitrogen retention, and in addition, increase soil fertility [7].

According to Chinese scientists, wheat is better grown in the aisles of a plantation of common almonds than by monoculture. According to the authors, this method is important not only for the effective use of land resources in the agroforestry system, but also for increasing the economic efficiency of farms and other farms, as well as for biodiversity conservation [8].

OBJECT AND METHODS OF RESEARCH. Calendula officinalis L. Calendula officinalis L. Calendula *officinalis L. 1-2-year-old herbaceous plant, belongs to the* Asteraceae family. The plant grows naturally in the Circumboreal, Iranian-Turanian and Mediterranean floristic regions. medicinal plant in the Krasnodar Territory, Poltava and Moscow regions of the Russian Federation [2].

Experiments on the cultivation and creation of industrial plantations of marigold were carried out in the specialized state forestry named after Abu Ali Ibn Sina in the Chodak forestry.

The soil conditions of this area are fertile and belong to typical gray soils. The humus content in them is 0.6-0.7%. Typical serozems in these areas are almost irrigated and are occupied by the cultivation of some forestry and agricultural crops.

Field experiments were carried out on the basis of the methodological guidelines developed by the SPC "Shifobakhsh" in 2014 and on the basis of the guidelines developed by specialists of the Main Forestry Department of the Republic of Uzbekistan, the Botanical Garden of the Academy of Sciences of the Republic of Uzbekistan. and the Agency for the Development of the Pharmaceutical Industry of the Republic of Uzbekistan in 2015 [1].

To determine the yield of plants, a diagonal weighing method was used. At the same time, samples of model plant raw materials at 1 p/m were weighed wet in three repeats, and then the dried material was re-weighed and the average dry yield per 1 ha was determined [3].

RESEARCH RESULTS AND DISCUSSION. The above data show that the alternation system has a positive effect on the growth and development of plants. Based on the above, we have studied the alternation systems in calendula officinalis plantations.

In order to use intermediate crops as a system of alternation in plantations, this plant was carried out in the conditions of Uzbekistan and the experiments were carried out in 3 versions;

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- experimental plots (for 1-4 years) without alternating intermediate crops (1 var.).
- Experimental plots (for 2 years) were used for planting coriander, in the 3rd year beans were sown, and in the 4th year coriander was sown again (1 brew).
- the experimental plots were sown alternately (1st year - coriander, 2nd year - common beans, 3rd year - corn and the last year repeated - coriander) in different years (3 vars).

Preliminary experiments have shown that the use of catch crops on coriander plantations had a positive effect on the growth and development, as well as on the yield of plants. In particular, during spring sowing, the germination rate of seeds was 83-87%, while during autumn sowing, these indicators did not exceed 72-76%, depending on weather conditions. Therefore, in the analysis, we limited ourselves to the data of spring crops.

Experiments have shown that the use of catch crops on coriander plantations had a positive effect on the growth and development, as well as on the yield of plants.

It was found that with constant sowing of chamomile without alternation (1-option), the height of the plants averaged 38.7±2.7 cm, the number of leaves was 16.6±1.8 pcs, the number of shoots of the first order was 8.0±1.3 pcs, the length was 3.6±1.1 cm; the number of leaves was 19.7±2.9 pcs, the number of shoots of the second order was 5.2±0.9 pcs, the length was 7.4±1.2 cm, the number of leaves is 6.0±1.1 pcs, the number of buds is 14.0±0.9 pcs., the number of flowers is 12.4±0.7 pcs. and the number of seeds is 14.2±0.7 pcs. The yield of the plant was about 650-660 kg/ha (Table).

And on the experimental plot (2nd version), where coriander was sown for two years and the next year, white beans were sown as an intermediate crop, and then coriander was sown again. The indicators did not change, the average height of the plant reached 42.8±2.9 cm, and the number of leaves was 19.6±1.8 pcs, the number of first-order shoots was 12.0±2.2 pcs, their length was 5.4±1.2 cm, the number of leaves is 23.1±2.0 pcs, the shoots of the second order are 9.6±1.2 pcs, their length is 10.4±1.5 cm, the number of leaves is 9.0±1.3 pcs, the number of buds is 18.0±1.2 pcs, the number of flowers is 16.4±2.7 pcs, the number of seeds is 16.4±1.2 pcs.

Significant growth and development, as well as yields, were found in the 3rd variant (i.e. in experimental plots, alternations with the use of intermediate crops were constantly introduced), in which the average height of the plant reached 47.1±1.4 cm, the average number of leaves was 23.7±1.3 pcs., and the number of first-order shoots was 15.8±1.8 pcs., their length was 7.4±1.9 cm, and the number of leaves was 26.2 ±1.5 pcs., The number of shoots of the second order was 14.1±1.6 pcs., their length reached 14.1±1.1 cm, the number of leaves 13.7 ±1.3 pcs., the number of buds 23.1±1.2 pcs., the number of flowers 19.7±1.5 pcs., seeds 32.7±1.1 pcs, and the degree of plant yield reached about 800-833 kg/ha (Table).

In the conditions of Uzbekistan, the optimal sowing dates for common beans were determined in the spring (late April-early May) period, and as an intermediate crop in the summer-June period [9].

Common beans were planted on experimental plots in early July (07.07.2013) to a depth of 3-5 cm at the rate of 50-60 kg/ha. The flowering phase of plants was observed in early August (03.08.2013) at an air temperature of up to 30-350C, and during the period of mass flowering, observations were carried out at an elevated air temperature of up to 41-450C. The fruiting period lasted until September, and the ripening of seeds is observed in October. The yield of seeds of the plant was 1000 kg/ha, shavings 150 kg/ha, and stems (hay) 1000 kg/ha.

For the Central regions of Uzbekistan (Tashkent, Syrdarya, Jizzakh, Samarkand and Fergana regions), the corn sowing dates are set in mid-April (10-15) April and for the Southern regions 2 weeks (March 25-30) earlier, and for the Northern regions 2 weeks (April 25-30) later [9].

Soaked corn seeds were sown on experimental plots at the beginning (03.07.2014) of July at a depth of 5-6 cm at the rate of 24-25 kg/ha. At the same time, the soil temperature was 22.50C, and sprouts were noted in 6-8 days.

In sown plants, the growth and development of vegetative organs continued until the flowering phase and the flowering phase was observed from the second (11.08.2014) decade of August. During the flowering period, plant growth was relatively reduced. The fruiting process in plants was observed in the last days of September, and the ripening of seeds was observed in early October. The yield (seeds, grains) of the plant is 1200 centners per hectare and the stigma is about 50 kg/ha, and the above-ground part (hay) was 1302 centners per hectare.

In general, the vegetation period of a catch crop depends on climate and soil conditions (2013, 2014, 2015) and is about 110-120 days with an increase in irrigation capabilities. And with limited irrigation opportunities, the growing season is reduced to 90-100 days.

Thus, the use of intermediate crops (alternation system) in the cultivation of marigold officinalis gives positive

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results. In particular, without alternation of catch crops, the yield of plants was 612-655 kg/ha. When using catch crops for 1 year, the yield index was noted in the range of 707-712 kg/ha, which is relatively 8-9% higher than without rotation. It has been revealed that with constant alternation, these indicators can increase to 20-24%.

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