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EVALUATION OF THE DEPENDENCE OF INTERPHASE PERIODS ON FILM TYPE IN THE DEVELOPMENT OF MELON SEEDLINGS

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Abstract: This study investigated the effect of mulching melon seedlings with different types of films - transparent and black polyethylene films - on the duration of vegetation and interphase growth stages. 25-day-old seedlings of the “Kichkintoy” and “Kok tinni 1087” melon varieties were grown in 2020–2022 under different mulching conditions. While the phases lasted longer in control (without film) conditions, it was found that the duration of vegetation was reduced by 9–12 days when transparent and black films were used. Mulching accelerated the growth of melon seedlings, keeping the moisture and temperature in the soil stable, and ensured an earlier fruiting period. These results show that the use of film mulching technologies is important in improving the productivity of melon production.

Key words: Melon seedlings, mulching, transparent film, black film, vegetation period, agrotechnology, interphase growth, fruiting, soil moisture, soil temperature.

Introduction

Melon (Cucumis melo L.) is one of the most widely grown and economically important vegetable crops in Uzbekistan. Its importance is increasing due to its high yield, richness in nutrients, and marketability, even in the arid and semi-arid regions of the country. However, climate change in recent years, in particular, irregular rainfall, high temperatures, and rapid loss of soil moisture, complicates the production of stable and early harvests in melon cultivation.

In order to combat these problems, various innovative approaches are being introduced in agricultural technology. One of them is the technology of mulching using polyethylene films. The mulching method makes it possible to stabilize soil temperature, retain moisture, limit the growth of weeds, and improve plant growth conditions. This is especially effective for crops with a root system located close to the surface and demanding on heat and light.

To date, some of the advantages of film mulching have been studied, but its effect on the vegetation phases for individual varieties in the conditions of Uzbekistan has not been sufficiently studied. Therefore, it is of particular importance to study the effect of using transparent and black films on the duration of the main stages of “blooming”, “flowering”, “fruiting” and “ripening” in sections of different varieties. The main goal of this study is to analyze the effect of mulching the melon varieties “Kichkintoy” (var. bucharica Pang.) and “Kok tinni 1087” (var. ameri Pang.) in open ground with transparent and black polyethylene films on their growth phases, flowering and fruiting, and the duration of the overall vegetation period. The experiments were conducted during 2020–2022, and the effectiveness of mulching was determined by comparing the duration and results of each stage.

Materials and methods

The research was conducted in 2020–2022 in open field conditions, on a farm located in Surkhandarya region. Two varieties of melon were used in the experiment - “Kichkintoy” (var. bucharica Pang.) and “Kok tinni 1087” (var. ameri Pang.). When selecting varieties, their adaptation to local climatic conditions, early ripening characteristics and marketability were taken into account.

Experimental scheme and options

The experiment was organized based on three agrotechnical options:

1. Without film (control) option - seedlings were planted without mulching.
2. Mulching with transparent polyethylene film - a transparent film 20–30 microns thick was used.
3. Mulching with black polyethylene film - 30 microns thick ultraviolet-resistant black film was used.

All options were used 3 times for each variety on a replicate basis. In each plot, 25-day-old seedlings were grown in only one condition - large plastic pots, and healthy seedlings were selected. Three replicates of 20 seedlings were prepared for each planted option.

Measurement parameters and observations

During the experiment, the following vegetation stages were determined and recorded in days: the period of "blooming - formation of pollen flowers"; the period between "male flowers - seed flowers"; the period of "seed flowers - fruiting"; the period of "fruiting - ripening".

The beginning and end of each phase were recorded based on visual observations, which were recorded at intervals of 2-3 days. The average duration (in days) ± standard deviation was determined for each growth stage in the samples. Data were obtained from an agrometeorological station for temperature, humidity, and sunlight.

Statistical analysis methods

The collected data were processed using Microsoft Excel. Differences in the variance were estimated using ± standard deviation (SD). Simple analysis of variance (ANOVA) was used to determine the level of confidence.

Results and Discussion

Our research investigated the effect of growing conditions on the duration of the interphase periods “blooming - pollen flowers”, “male flowers - female flowers”, “female flower formation - fruiting”, “fruiting - ripening” of melon varieties mulched with various polyethylene (transparent and black) films.

The same 25-day-old seedlings of the melon varieties "Kichkintoy" and "Kok tinni 1087" were grown in the following conditions: without film (control), with transparent film, and with black film. The duration of the "bloom-pollen flowers", "male flowers-female flowers", " female flower formation-fruiting", "fruiting-ripening" and the first harvest period were studied experimentally in the cross-section of the two varieties. In the 25-day-old seedlings of the "Kichkintoy" variety, the "bloom-pollen flowers" stage was observed after 8 days in the control conditions, and earlier, i.e. after 5 days, in the transparent and black film conditions.

Pollinator and seed setter flowers were also produced after 8 days in the control variant, 5 days in the transparent film variant and 4 days in the black film variant.

Table 1. Duration of interphase periods of development of melon varieties planted under various films, 2020-2022.

Options	Interphase periods, in days					
	seedling age	“blooming - pollen flowers”	“male flowers - female flowers”	“female flower formation - fruiting”	“fruiting - ripening”	first harvest period
“Kichkintoy” (var. bucharica Pang.)						
Without film (control)	25	8±1,0	8±1,3	7±2,0	32±2,0	80
Transparent film		5±1,2	5±1,0	4±1,6	33±2,0	72

Black film		5±1,5	4±1,2	4±1,9	32±1,0	70
“Kok tinni 1087” (var. ameri Pang.)						
Without film (control)	25	10±2,0	9±1,8	9±1,0	33±2,0	86
Transparent film		7±1,6	6±1,0	6±1,1	33±1,9	77
Black film		6±1,4	6±1,5	6±1,3	32±1,0	75

In this case, it was found that the process lasted longer in the control option than in the rest of the samples. When the stage of "formation of female flowers - fruiting" was compared in the section of the options, it was observed that it was formed in 7 days in the control option, and in 4 days in the options with 2 different types of films. When comparing the duration of the period of "fruiting-ripening" in the baby variety between 3 different options, it was observed that it took place in the period of 33 days in the option without film (control) and 32 days in the options with black film.

When comparing the duration of the first harvest period by options, it was found that the duration of the phases was significantly higher in the option without film (control), that is, 81 days, and 72 days in the seedlings grown in transparent film, and even shorter - 70 days in the seedlings grown in the black film option. In general, it was found that the duration of the phases was relatively short due to the fact that the seedlings planted in the field mulched with transparent and black film had a high level of sunlight transmission, sufficient temperature and humidity were created for the plant.

During the observations, 3 different variants were also carried out on the melon variety “Kok Tinni 1087” between 2020 and 2022, and 25-day-old seedlings were used for the study. In this case, in the non-film (control) variant.

It was found that this process occurred in 7 days in seedlings with a transparent film and in 6 days in the black film variant. When the phase control was continued on the seedlings, it was observed that “male flowers - female flowers” were formed in 9 days in the control variant, and in the remaining 2 film variants in a shorter and identical period - 6 days. It was found that the process of “the formation of female flowers and fruiting” also proceeded based on the same indicators. The “fruiting-ripening” stage occurred in the same period of time in the non-film and transparent film variants, 33 days, while the seedlings planted in the black film field, with a slight difference, occurred after 32 days. At the end of our experiment, when the interphase periods were finally compared, it was found that the seedlings in the control variant carried out their life cycle for a very long time, 86 days, the samples planted in the transparent film field - 77 days, and the first harvest period of melon seedlings in the black film was 75 days.

When considering the final results, it was found that growing seedlings of two different melon varieties with mulching through transparent and black films, compared to planting without mulch, the duration of vegetation was 9-12 days earlier. It can be seen that mulching created the necessary conditions for the growth of melon seedlings (air temperature, heat and soil moisture), significantly increased the efficiency of the cultivation process, shortened the period between phases, and allowed to grow seedlings while protecting them from negative factors of the external environment.

Conclusions

As a result of studies conducted in 2020–2022, it was proven that mulching with various types of films (transparent and black polyethylene) has a positive effect on the development of melon varieties. In particular, it was found that growing seedlings of the “Kichkintoy” and “Kok tinni

1087" varieties under mulch led to a reduction in interphase periods, earlier fruiting and ripening of the plant.

Compared to the control (without film) variant, in seedlings under transparent and black films: the phases "blooming - pollen flowers" and "Male - female flowers" were reduced by 3–4 days; In the "Fruiting - ripening" period, a difference of one day was observed in most cases; The first harvest period was 80–86 days in the control, while in the mulched variants it was reduced to 70–77 days.

On this basis, it can be concluded that mulching with polyethylene films: Reduces the duration of melon growth phases; Creates favorable temperature and humidity conditions for the plant; Is an effective method for saving resources in agriculture and ensuring early ripening of fruits.

The results of the experiment confirm the need to introduce the mulching method as an agrotechnical innovation in melon growing technology. This will help increase productivity, effectively use land, and improve product quality in the melon growing sector.

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