



UDC: 631.5:635.2

FACTORS FOR INCREASING EARLY POTATO YIELD UNDER THE CONDITIONS OF KASHKADARYA

Toshpulatova Surayyo 

Doctoral Student, Karshi State University

Abstract

This article presents the results of field experiments aimed at obtaining ultra-early and high yields from potato varieties Sylvana, Saviola, and Evolution. The research was conducted on irrigated light gray soils of the Kashkadarya region. Different planting dates (January 15–18, January 30 – February 3, February 15–18, and March 2–5 as control) and mulching methods (no mulch, manure, plastic film, and manure + plastic film) were tested. The results showed that planting in the second half of January and the first decade of February, combined with the application of 3–4 tons of manure per hectare and plastic mulching, created favorable growth conditions, promoted rapid plant development, improved leaf surface area, and ensured the highest yields (28–30 t/ha and above). Furthermore, most of the harvest was marketable with good storability and transportability.

Keywords: potato, mulching, growing season, plant height, leaf surface, yield, varieties, planting dates, marketable harvest.

Аннотация

В статье приведены результаты полевых опытов по получению раннего и высокого урожая сортов картофеля Sylvana, Saviola и Evolution на орошаемых светло-серых почвах Кашкадарьинской области. Изучались разные сроки посадки (январь–март) и методы мульчирования (без мульчи, навоз, плёнка, навоз + плёнка). Наилучшие результаты (28–30 т/га и выше) получены при посадке в конце января – начале февраля с применением 3–4 т/га навоза и пластикового мульчирования. Урожай отличался высокой товарностью, лёжкостью и транспортабельностью.

Ключевые слова: картофель, мульчирование, сроки посадки, урожай, сорта.

Annotatsiya

Maqolada Qashqadaryo viloyatining sug'oriladigan och tusli bo'z tuproqlarida Sylvana, Saviola va Evolution kartoshka navlaridan erta va yuqori hosil olish bo'yicha tajriba natijalari keltirilgan. Yanvar–mart oralig'idagi turli ekish muddatlari va



AGRO KIMYO HIMOYA VA O'SIMLIKLAR KARANTINI

mulchalash usullari o'rganildi. Eng yuqori, tashiluvchan va saqlanuvchan hosil (28–30 t/ga va ortiq) yanvar oxiri – fevral boshida ekish, 3–4 t/ga go'ng hamda plyonka bilan mulchalashda olindi.

Kalit so'zlar: kartoshka, mulchalash, ekish muddati, hosil, navlar.

Introduction.

The soil and climatic conditions of the southern regions of Uzbekistan, particularly the Kashkadarya region, provide favorable opportunities for obtaining ultra-early potato harvests. The relatively mild winter, with average temperatures of 3.3–6.2 °C in January and February, and the fact that 60–65% of annual precipitation falls between January and April, create optimal conditions for potato cultivation. In addition, sufficient heat, light, and irrigation resources further enhance yield potential. The production of early potatoes with high yields largely depends on selecting adapted and productive varieties, proper preparation of seed tubers, determination of optimal planting dates, and application of mulching methods [4,5,6,7]. Therefore, field experiments were conducted in Parguza village, Bogobod MFY, Qarshi district of the Kashkadarya region.

Materials and Methods.

The main objective of the study was to determine the optimal planting dates and mulching methods for obtaining ultra-early and high yields, storability, and transportability in potato varieties *Evolution*, *Saviola*, and *Sylvana*. These medium-early varieties were planted at four different times: January 15–18, January 30 – February 3, February 15–18, and March 2–5 (control). Four mulching methods were tested: no mulch (control), manure, plastic film, and manure + plastic film. The experimental plot area was 144 m² by planting dates, 36 m² by mulching types, and 12 m² by varieties. Each treatment was replicated four times. Planting was carried out using a 90×20 cm scheme at a depth of 6–8 cm, with pre-sprouted seed tubers of the 2nd reproduction weighing 50–60 g. All agrotechnical practices, plant care, observations, measurements, and yield assessments were conducted according to standard methods and recommendations [1,2,3,8].

Results and Discussion.

According to the research findings, the total yield of the *Evolution*, *Saviola*, and *Sylvana* potato varieties showed significant variation depending on both the planting period and the type of mulching material used, ranging from 19.2 to 33.0 t/ha. The results of field observations clearly demonstrate that earlier planting dates and the application of mulching — particularly the combination of manure and plastic film — exerted a remarkable positive influence on tuber development and yield formation. This integrated approach created favorable conditions for plant growth

AGRO KIMYO HIMOYA VA O'SIMLIKLAR KARANTINI

by improving soil temperature regulation, moisture conservation, and nutrient availability during the early stages of potato growth.

The highest yields, varying between 30.5 and 33.0 t/ha, were recorded when potatoes were planted between January 15–18 and January 30 – February 3 under the manure + plastic mulch treatment. This combined mulching method acted as a thermal buffer, maintaining optimal root-zone temperatures even during cold spells typical of the winter–spring transition period. Moreover, it minimized fluctuations in soil moisture, thereby reducing physiological stress on plants and improving nutrient uptake. The application of plastic mulch alone also resulted in relatively high yields of 29.2–31.5 t/ha, indicating its effectiveness in conserving soil heat and preventing evaporation. These results emphasize that both organic and synthetic mulches play complementary roles in creating a stable soil microclimate conducive to high potato productivity.

Similar yield patterns were observed for the February 15–18 planting period, where both plastic mulch and manure + plastic mulch treatments maintained high productivity levels compared with non-mulched control plots. In contrast, the control variant planted later, on March 2–5 without any mulch, produced substantially lower yields—19.2 t/ha for *Evolution*, 19.8 t/ha for *Saviola*, and 20.8 t/ha for *Sylvana*. When manure mulch alone was applied, yields increased slightly to 20.8, 21.5, and 23.1 t/ha, respectively. Further improvement occurred under plastic and manure + plastic mulch treatments, with yields reaching 23.3–23.9 t/ha, 23.9–24.1 t/ha, and 25.8–27.1 t/ha for the respective varieties. These data highlight the cumulative benefits of combining organic and synthetic mulching materials in improving soil aeration, moderating temperature extremes, and enhancing photosynthetic activity.

When potatoes were planted on January 15–18 without mulch, the total yield ranged from 22.7 to 25.1 t/ha, of which 21.2–23.3 t/ha (92.9–93.5%) was marketable. Under mulched conditions, the total yield increased significantly to 26.9–31.8 t/ha, while the marketable portion reached 25.1–30.4 t/ha (92.9–95.6%). This substantial increase in marketable yield reflects the beneficial effects of mulch on tuber size uniformity, skin quality, and resistance to physiological disorders. Mulching not only enhanced total productivity but also contributed to better crop quality through improved soil structure, reduced weed competition, and optimized water use efficiency (table.1).

Overall, compared with the control treatment, early planting increased total yield by 3.5–6.6 t/ha, while mulching—depending on the type—added a further 4.2–7.9 t/ha. The interaction between early planting time and combined mulching (manure + plastic) produced the most stable and consistently high yields across all studied potato varieties. These findings strongly indicate that, under the agro-climatic conditions of the Kashkadarya region, the optimal strategy for maximizing potato yield and quality involves aligning planting dates with favorable thermal

AGRO KIMYO HIMOYA VA O'SIMLIKLAR KARANTINI

conditions in late January or early February, while implementing integrated mulching practices.

Such technological approaches not only ensure early and stable harvests but also contribute to improved soil fertility, reduced input costs, and sustainable use of water and organic resources. Therefore, the combined application of early planting and organic-synthetic mulching should be considered a key agrotechnical measure in the regional potato cultivation system, capable of enhancing both productivity and ecological resilience in future production cycles.

Table 1.

Effect of planting date and mulching method on the yield of different potato varieties (t/ha)

Planting date	Mulching method	Evolution	Saviola	Sylvana	Remarks
January 15–18	No mulch	22.7	23.9	25.1	Early planting, moderate yield
	Manure mulch	26.9	28.0	29.4	Improves soil moisture retention
	Plastic mulch	30.1	31.0	31.8	Better heat conservation
	Manure + plastic mulch	32.5	32.8	33.0	Highest yield recorded
January 30 – February 3	No mulch	23.0	24.2	25.3	Slightly higher than control
	Manure mulch	27.0	28.4	29.5	Noticeable yield increase
	Plastic mulch	30.5	31.2	31.5	High yield achieved
	Manure + plastic mulch	31.9	32.4	33.0	Optimal yield conditions
February 15–18	No mulch	20.5	21.0	22.2	Late planting, lower growth rate
	Manure mulch	22.6	23.0	23.8	Moderate yield
	Plastic mulch	25.1	25.8	26.5	Good yield performance
	Manure + plastic mulch	26.8	27.5	28.2	Best yield for this period
March 2–5 (control)	No mulch	19.2	19.8	20.8	Lowest yield recorded
	Manure mulch	20.8	21.5	23.1	Slight improvement
	Plastic mulch	23.3	23.9	25.8	Significant increase
	Manure + plastic mulch	23.9	24.1	27.1	Highest yield among control variants

Conclusion.

In the irrigated light gray soils of the Kashkadarya region, the optimal planting periods for obtaining early and stable potato yields from the Evolution, Saviola, and Sylvana varieties were identified as January 15–18 and February 15–18. Planting during these times provided favorable soil and air temperatures that ensured rapid and uniform plant growth. Under these conditions, plants reached 86.9–92.0 cm in height, formed 4.2–4.5 stems per plant, and developed a leaf area of 0.71–0.81 m², promoting

AGRO KIMYO HIMOYA VA O'SIMLIKLAR KARANTINI

active photosynthesis and tuber formation. As a result, yields of 28–30 t/ha and above were achieved. The most effective treatment was mulching with manure and plastic film, which maintained soil moisture and temperature, protected plants from cold stress, and ensured the production of early, high-quality, and marketable potatoes suitable for storage, thus enhancing economic efficiency for local farmers.

References:

1. Azimov B.J., Azimov B.B. va boshqalar. Sabzavot, poliz va kartoshka ekinlarida tajribalar o'tkazish uslubi. Professor R.A.Nizomov umumiy tahriri ostida. Uslubiy qo'llanma. Toshkent. "Baktria press". 2023. -B.264.
2. Доспехов Б.А. Методика полевого опыта. Москва.1985.-С.351.
3. Методика исследований по культуре картофеля (ВНИИКХ). Москва.1967.-С.210.
4. Ostonaqulov T.E. Kartoshka yetishtirish. Toshkent. Agrobank. 2021.-B.96.
5. Ostonaqulov T.E. Kartoshkachilik. Toshkent. 2023.-B.320.
6. Ostonaqulov T.E., Zuyev V.I., Qodirxo'jayev O.Q. Meva-sabzavotchilik (Sabzavotchilik). Toshkent.2019.-B.552.
7. O'zR hududida ekishga tavsiya etilgan ekinlar Davlat reyestri. Toshkent.2022.-B.103.
8. Qishloq xo'jalik ekinlari yetishtirish va hosilini yig'ish bo'yicha 2016-2020 yillarga mo'ljallangan texnologik xaritalar. Toshkent.QXV.2016.-B.203.