

Importance, Biology, And Cultivation Technology Of Cabbage

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ABSTRACT

This article provides specific information on the cultivation of cabbage, one of the important vegetable crops. Cabbage is widely grown worldwide and plays a significant role in ensuring food security. It is cultivated on 3.2 million hectares globally and is a cold-resistant plant rich in mineral salts and vitamins. In cultivation, the requirements for soil and climate conditions are mainly met by using fertile, medium loamy, and loamy soils, which are considered the most suitable for cabbage.

Keywords: Cabbage, Seedling Production, Soil Fertility, Land Preparation, Fertilization Practices, Crop Rotation, Agricultural Technology.

INTRODUCTION

As a result of human activity on soil, its properties may change, fertility may increase or decrease, salinization and erosion may occur, and the rational use of non-irrigated drylands in agriculture requires greater attention to soil protection than ever before. The correct and rational use of any means of production largely depends on how deeply and comprehensively its important characteristics are studied. Therefore, first of all, this applies to soil: rational use, improvement of soil fertility, understanding its quality, economic value, and protection, scientifically based crop rotation according to soil conditions, proper tillage methods, and high-level fertilization are required.

Cabbage is one of the vegetable crops widely cultivated worldwide and plays an important role in ensuring food security. Currently, cabbage is a widely grown vegetable crop, cultivated from tropical regions to the Arctic Circle. Globally, it is planted on 3.2 million hectares, producing 69.5 million tons of gross yield. Nearly half of this (34.1 million tons) is produced in China, while the rest is grown in India, Russia, Korea, Japan, the USA, and other countries. In Uzbekistan, various varieties and hybrids of cabbage are cultivated, mainly in the regions of Tashkent,

Samarkand, and Surkhandarya. Although cabbage does not contain a large amount of nutrients, it is rich in mineral salts and vitamins, especially serving as a source of vitamin C (see Table 1).

Cabbage is a cold-resistant plant, with seeds germinating at a temperature of 4–5 °C. At 15–20 °C, seedlings emerge within 3–4 days. At higher temperatures with insufficient light, seedlings in nurseries tend to elongate excessively. Cabbage seedlings can withstand temperatures as low as –5 to –6 °C, while mature plants tolerate up to –8 °C.

In Uzbekistan, heat-resistant mid-season varieties are successfully cultivated. Their heat resistance is associated with anatomical characteristics. Early-maturing cabbage varieties are grown under film cover to obtain early harvests. For early-maturing varieties, seeds of class I quality with at least 98% purity and no less than 85% germination are used. To obtain seedlings for one hectare, 350–400 grams of seed is sufficient.

Before sowing, seeds are soaked for 10–12 hours in water or in a solution of growth stimulants and microelements at a concentration of 0.01–0.05%, and then sown.

Biochemical Composition of Different Types of Cabbage

Table 1

Type of Cabbage	Relative to Fresh Weight, %			Vitamins per 100 g Fresh Weight, mg				
	Sugar	Protein	Fiber	Vitamin C (ascorbic acid)	Carotene (provitamin A)	B1 (Thiamine)	B2 (Riboflavin)	B6 (Pyridoxine)
White Cabbage	3-5.3	1.1-2.3	0.5-0.9	11-52.7	0.02-0.04	0.05	0.05	0.12
Red Cabbage	4.1-5.5	1.4-1.6	0.5-1.0	26.1-99.1	0.1-0.2	0.05	0.05	0.23
Brussels Sprouts	4.6-5.4	6.1-6.4	11.2-1.7	10.4-20.7	0.1-0.5	0.13	0.15	0.28
Cauliflower	1.4-4.2	1.7-3.3	0.6-1.1	47-93	0.1-0.2	0.10	0.10	0.16
Kohlrabi	2.9-7.0	1.4-2.1	1.0-1.6	34.7-67	0.02-0.06	0.08	0.10	-

Obtaining high and quality yields largely depends on scientifically preparing the soil before transplanting seedlings. This article highlights the main stages of soil preparation technology for planting cabbage seedlings.

The agrobiological characteristics of cabbage are such that it is resistant to cold, moisture-loving, and demanding in terms of nutrients. Its root system is mainly located in the plow layer of the soil, and therefore the fertility and structure of the soil directly affect productivity. For this reason, the land must be properly prepared before cabbage is planted.

Soil and Climate Requirements and Land Preparation Technology for Cabbage Cultivation. The most suitable soils for cabbage are fertile, medium loamy, and loamy soils. The optimal soil reaction is pH 6.0–7.0. Saline, waterlogged, and heavy-textured soils are considered unsuitable for cabbage cultivation.

Land Preparation Technology

- Autumn Tillage In autumn, the soil is plowed to a depth of 28–30 cm. In early spring, it is harrowed and ridges are formed. If late cabbage is planted as a secondary crop, after harvesting the main crop the soil is irrigated, and once it reaches maturity, it is plowed to a depth of 22–25 cm, harrowed, leveled, and ridges are formed to prepare the land for planting. During plowing, 20–30 tons per hectare of well-rotted manure or compost is applied, which improves the agrochemical and agrophysical properties of the soil.

- Spring Tillage In spring, once the soil is ready, harrowing and cultivation are carried out. These measures help retain moisture, loosen the soil, and eliminate weeds.

Fertilization System Cabbage is a nutrient-demanding crop. Mineral fertilizers are applied at the following rates: Nitrogen (N) 60–90 kg/ha, Phosphorus (P₂O₅) 60–80 kg/ha, Potassium (K₂O) 80–100 kg/ha. Phosphorus and potassium fertilizers are applied during the main tillage, while nitrogen fertilizers are applied in portions throughout the growing season.

Seedling Planting Requirements Seedlings must be planted vertically. In areas prone to wind erosion, soil compaction after planting is required. The deviation from the prescribed sowing rate must not exceed 3%. For grain crops, irregularity should not exceed 3%; for row crops, not more than 4%. The average irregularity between individual sowing devices must remain within these limits. Row spacing deviations should be: ±1 cm for main rows, ±2 cm for adjacent seeders, and ±5 cm for neighboring furrows.

The vertical tilt angle of seedlings must not exceed 30°. Seedlings should be healthy, with 5–6 true leaves. The soil around seedlings must be compacted to ensure proper nutrition. At the same time, irrigation is carried out in the furrow, applying 0.2–0.6 liters of water per plant. The deviation in row spacing should not exceed +4 cm.



Figure 1. Growth period of cabbage in Angor District, Surkhandarya Region

The planting process is one of the most important stages in seedling cultivation technology. Proper execution of this process determines subsequent care and harvesting, all of which ultimately affect the volume of the final product.

During planting, depending on the cabbage variety and planting time, the average row spacing is 60–90 cm and the plant spacing is 30–50 cm. These distances have a significant impact on the further development of the plants.

The kinematics of the planting machine, in general, must ensure compliance with certain agrotechnical requirements. Attention must be paid to placing seedlings vertically in the soil, avoiding damage during planting, and ensuring correct spacing.

The implementation of this technological process depends on several factors, including the design and functionality of the planting machine, its operating mode, and the experience and skill of the operator.

In conclusion, scientifically preparing the soil for planting cabbage seedlings is a key factor in obtaining high and quality yields. Proper soil management, adherence to fertilization systems, and compliance with crop rotation rules can significantly increase the efficiency of cabbage cultivation.

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