

## AGROTECHNICS OF GROWING OF MEDICINAL CHAMOMILLA (*MATRICARIA CHAMOMILLA L.*) AND CARNION (*CALENDULA OFFICINALIS L.*) PLANTS

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**Abstract.** Pursuant to the decree of the President of Uzbekistan dated April 10, 2020 No. PD-4670 “On measures for the protection of medicinal plants growing in the wild, cultivation, processing and rational use of available resources” (*Matricaria chamomilla L.*) research results on the development of agrotechnology for growing plants are presented. As a result of the growing need for raw medicinal plant products in our republic, the amount of their preparation is also increasing. This, in turn, leads to a decrease in the reserves of a number of medicinal plants in nature, as a result of which the preparation of their raw materials is sharply limited or completely stopped.

**Keywords:** medicinal plants, medicinal marigold, medicinal chamomile, collection, distribution, study, character, characteristic, chemical composition, agrotechnology of cultivation.

**Introduction.** The flora of Uzbekistan is distinguished by its plant biodiversity and wealth of medicinal plants. Human life is inextricably linked with the world of plants. Because they performed various tasks in human activity (*food, medicine, construction, etc.*) and served as a source of technical raw materials. The only way to rationally use the resources of medicinal plants is to grow them culturally and establish industrial plantations. In recent years, consistent reforms have been implemented in the republic regarding the protection of medicinal plants, the rational use of natural resources, the establishment of plantations where medicinal plants are grown and their processing. According to the decree of the President of Uzbekistan dated April 10, 2020 No. PD-4670 “On measures for the protection of medicinal plants growing in the wild, cultivation, processing and rational use of available resources” a lot of research is being conducted in our Republic on the basis of research to isolate promising forms and involve them in the selection process, to develop the basics of primary seed production and planting, as well as agrotechnologies of cultivation. As a result of the research, the results of the study conducted at the 2022 UGRITI on medicinal marigold and medicinal chamomile plants are presented.

*Calendula officinalis L.* is an annual herbaceous plant belonging to the *Asteraceae* family.

**Biology.** The stem is hard, erect, branched from the base, multifaceted, and the upper part is covered with glandular hairs. height reaches 75.0 cm. The root is a branched arrow root. The leaf is simple, oblong-inverted-ovate, banded (those above the stem are unbanded and long-lanceolate), flat-edged, arranged in a row on the stem and branches. Yellow or orange tongue-shaped and tube-shaped flowers are located in a large basket (up to 8 cm in diameter) at the ends of stems and branches. There are 25-250 tongue-shaped flowers on the edge of the basket, 2-3 rows, and 2-3 teeth in the upper part. The flowers in the middle of the basket are tubular, five-toothed. The inflorescence is flat, slightly concave and hairless. The fruit is a bent pistachio. It blooms from June to late autumn, fruits are produced in late July-August.

**Geographic distribution.** Typical gray soils are mesophytic plants suitable for flat land areas, water-demanding, and can grow in saline lands, and are distributed in all irrigated areas of our republic.

**Chemical composition.** Inflorescence-baskets contain carotenoids (up to 3%, carotene - 7.6-7.8 mg%), 0.02-0.67% essential oil, 0.33-0.88% flavonoids (quercetin, isorhamnetin, isoquercitrin, etc.), coumarins (esculetin, scopoletin, umbelliferone), organic acids (6.8% malic acid, a very small amount of salicylate, etc.), 1.9% calendula bitter substance, triterpene saponins, up to 4% mucus, 10.4-11.2% will be additives and other substances. The ash of cloves contains salts of potassium, calcium, magnesium, iron, manganese, copper, zinc, chromium, aluminum, barium, vanadium, selenium, nickel, lead, strontium, iodine, boron and other elements. Agrotechnics. Carnation can be grown in all soil and climate conditions of our republic. But it gives a good yield on fertile and sufficient moisture, average mechanical composition soils. Correct timing of fertilizing and watering carnations for better development of carnations and the production of high-quality and abundant flowers.

It will be necessary to focus on pest and weed control. Land preparation. In the autumn, before plowing the land where cloves are planted, 20-30 tons of local fertilizer and 70% of the annual norm of phosphorus fertilizer per hectare are plowed to a depth of 25-30 cm. Carnations are planted in late autumn or early spring. When preparing seeds for planting, it is necessary to comply with the following GOST rules: the seed must be conditioned and must be of I or II class; purity should not be less than 94-96% and fertility should not be less than 70-75%. Planting. Before planting carnation seeds in early spring, the land is leveled and weeded, and when the soil temperature is 20-22°C, the seeds are buried 2-3 cm deep and 10-12 kg of seeds are used per hectare. The seeds are sown at 60 cm spacing with the help of planting equipment and the seeds can germinate after 7-8 days.

**Care.** Carnation care begins with the formation of the first seedling. After the germination of carnations, the beds are planted and planted, and 1-2 plants are left in each nest at a distance of 15-20 cm between the rows. Weeds in the row are cleaned with a hoe or a hoe. Tractor cultivators can also be used between the rows. When carnations are planted in the fall, lawns are formed in April. Egat is harvested when 3-4 leaves appear on each seedling. When the warm autumn is prolonged, some of the seeds turn blue and spend the winter in the form of a stem. He does not get cold very often. Seedlings that have come out of winter begin to bloom in 35-40 days, that is, at the beginning of May. If planted on typical gray soils that are irrigated, carnations may form a crust on the surface in years of high rainfall. This leads to a decrease in the number of seedlings. A rotary mat, a small grinding wheel and needle rollers are used to remove the roughness. If such activities are carried out, the sprouts will not be damaged. In June and July, as a result of the flowering of the carnation, it becomes more difficult to work between its rows and during the growing season it produces a lot of blue mass.

**Planted on** fertile lands, cleaned of weeds and fed with 70-80 kg of phosphorus fertilizer between the rows in the autumn months, it will be possible to save and use deeply cultivated carnation fields for 2-3 years. It does not require replanting. Seedlings grown in winter and spring can be used as a result of annual carnation seed shedding. If carnations are well cared for during the growing season (fertilizing, watering, pest and disease control), they will bloom from May until late fall (until the frost).

Its flowers can be picked 15-20 times during the growing season. The yield of harvested cauliflowers can be 10-18 ts/ha and even more. The first feeding of the plants begins after the germination of the grass, giving 30 kg of nitrogen and phosphorus fertilizer per hectare. Since carnation is very demanding on nutrients, the second feeding starts from the period of plant growth and it is advisable to give 40 kg of nitrogen and 30 kg of potassium fertilizer per hectare. Feeding is recommended before each watering. After watering, the inter-rows of the marigold are softened and cleaned of weeds. The last feeding is completed by giving 40 kg of nitrogen and 30 kg of phosphorus per hectare when the carnation is blooming. During the season, cornflower fields are watered 9-10 times, taking into account air temperature and humidity.

Harvesting of carnation starts from the beginning of flowering. First of all, the newly opened flowers are picked by hand. Due to the frequent opening of flower baskets, they are picked every 3 days, 4-5 days in the evening. The flowers picked from the plant should not be stored in baskets and bundles for more than 3-4 hours so that they do not heat up and their quality does not deteriorate. The harvested product is dried in special dryers (SPK), air dryers (VPT-400, 600) up to 40-45°C, the dried product is stored for 4-6 days in 20 kg bags made of special paper without pressing. The period of storage of the product in dry warehouses should not exceed 2 years.

**Medicinal chamomile (*Matricaria chamomilla* L.)** is an annual herbaceous plant belonging to the Asteraceae family. The plant is 40 cm tall. The stem is one or more, grows upright, branches from the top. The leaves are double feather cut. The basket consists of white, tongue-shaped seed-bearing flowers. The flowers are white, yellow, fragrant. It blooms and seeds in June-July. M. the crop (balls) is harvested several times. Productivity: 3.0-4.0 t/ha of dry pods, 0.8-1.0 t/ha of seeds. The plant is distributed in the south of Europe, the Caucasus, Crimea, Ukraine, the southern regions of Siberia and Central Asia. Medicinal chamomile contains 0.2-0.8% essential oil, guaianolide group lactones, proxamazulen, coumarins, carotene, vitamin C and mucous substances, sesquiterpene carbohydrates and alcohols (bezabolol, keto alcohol) and caprylic acid.

**Agrotechnics.** It is known that the chamomile plant loves light, is not very demanding on soil fertility, likes nitrogen fertilizers, and cannot compete strongly with weeds. Propagated from chamomile seeds. Clean, weed-free, irrigated and dry soils with medium mechanical content in our republic are optimal for growing chamomile. In autumn, 30-40 tons of manure or 80 kg of superphosphate are added to each hectare of the area allocated for planting chamomile, plowed to a depth of 20-25 cm.

The optimal season for planting chamomile medicinal plant is autumn, it can also be planted before winter and in spring. Autumn planting is carried out in dry lands after the first autumn rains, in late October-early November. The purpose of this is to bring the crop out of the winter in the state of the ball. Sowing before winter should coincide with the onset of stable frosts, i.e. late November to early December. Spring planting on dry land does not give good results. However, due to the short growth period of chamomile, a good crop of flowers can be obtained even when planted in early May under irrigated conditions. When planted in early May, chamomile ends its season in late September-early October. At this time, some of the sprouts that have sprouted from the seed may bloom. Most of the self-sprouting seedlings will spend the winter in a ball state, which will be used as a crop the following year. Chamomile can be cultivated continuously for 2-3 years in the same field, but its main enemy is weeds. It is necessary to regularly fight against them. Weedy raw materials are taken from the weedy field of chamomile, the main crop is compressed, and the yield drops sharply. The main factor for the good germination

of small seeds of chamomile is the condition of the top layer of soil where the seeds fall. This layer should be moist and the temperature should be above 5 degrees until the seeds germinate.

Chamomile medicinal plant seeds are sown in a vegetable planter with a row spacing of 50-60 cm. The seed is extremely small, so to plant it evenly, first, the seed is mixed with sand or manure in a ratio of 1/10. The seeds are easily blown away by the wind, so the seeded land is lightly covered with a roller machine. 2.0-2.5 kg of seeds are used per hectare.

Chamomile medicinal plant seeds germinate in 8-10 days in a place with sufficient moisture. When the seed germinates and 2-3 leaves are formed, it is harvested. In this case, it should be considered that since the grass is very small, it can remain under the soil. Therefore, when the weather is dry, small egats are taken. As soon as the grass appears in the spring, weeding is done with a mat or with a hoe, and between the rows with cultivators.

The plant is fed with nitrogen twice during its growth: the first time on 10-15 days after the formation of grass, and the second time - during the period of mowing, at the rate of 30-40 kg per hectare. When watering, water is given slowly so that the crop is not washed away. It is watered 12 times during the season, and the soil is softened after watering 2-3 times until the branches are connected.

The crop blooms 30-40 days after germination. Chamomile flowers are collected in a specially made iron device or chamomile harvesting equipment. How many times to harvest depends on the condition of the plant and can reach from 11 times to 20 times. It takes 180 days of work for one person to pick a flower in one hectare of field. Chamomile seeds are collected in baskets in a specially designated area, when the seeds are fully ripe. The maturity level of the seed is determined by the oblong, conical shape of the basket. The upper part of the plant, where the flower baskets have ripened, is harvested with a sickle in the morning, before the dew rises, and without compaction, it is placed on a tarpaulin and stored in a shed. Here, 2 rows are placed with the stem facing inward, and it is controlled that the gardens do not overheat. Dried gardens are crushed, seeds are cleaned of various impurities, blown and placed in bags. The seed can be stored for up to two years. Collected flowers are taken to a shed with a good wind for quick drying. Here, 1.0-1.5 kg per square meter is spread on the young ones.

External signs of overripeness: hemispherical or cone-shaped flower baskets that are completely or partially bursting, they are without a flower or a remnant of a flower no longer than 3 cm. The baskets consist of rounded tongue-shaped or many medium-shaped flowers. Inflorescence bald, finely pitted, hollow, hemispherical at the beginning of flowering, conical at the end; the basket wrapper is shingle-like, multi-layered, and consists of many long, blunt-tipped and wide-edged leaves. The width of the basket (except for tongue-shaped flowers) is 4-8 mm. The color of the tongue-shaped flowers is white, the tube-shaped ones are yellow, the basket wrapper is yellow-green, fragrant, and the taste is sharp. The underground part is harvested in October-May and removed from the field.

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