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**SCIENTIFIC AND PRACTICAL BASES OF PRIMARY SEED PRODUCTION
AND VARIETAL CONTROL OF A PROSPECTIVE ONION LINE
(*ALLIUM CEPA* L.)**

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Abstract. This abstract formulates a scientific scheme for primary seed production of a prospective breeding onion line (*Allium cepa* L.) based on the bulb-to-seed method. Culling protocols for atypical mother bulbs were developed using UPOV TG/46/7 phenotypic indices (*round shape, yellow skin, low nesting, absence of splitting*). It was established that planting mother bulbs in the 1st-2nd decades of September with spatial isolation (*at least 1000 m*) preserves genetic purity and ensures high seed productivity of the line.

Keywords: *Allium cepa* L., onion, primary seed production, mother bulbs, varietal control, UPOV, spatial isolation, varietal purity.

Introduction. Preserving genetic uniformity, varietal purity, and economically valuable traits of breeding material in onion (*Allium cepa* L.) during propagation is a key task of primary seed production. As a cross-pollinated crop, onion is easily subjected to genetic contamination in the absence of spatial isolation and systematic varietal control. For a prospective line undergoing preparation for State variety testing, developing an effective maintenance seed production protocol is required. The aim of the study was to scientifically substantiate the primary seed production scheme and inspection criteria for selecting mother material of the prospective onion line.

Materials and Methods. The work was carried out in 2016-2024 at the primary seed production nurseries of Research Institute of Vegetable, Melon Crops and Potato (RIVMCP). Primary seed production was conducted using a two-year bulb-to-seed scheme. Varietal inspection and rogueing were performed using international UPOV guidelines (TG/46/7). Morphological uniformity, storability of mother bulbs, bolting resistance, and seed productivity were evaluated.

Results and Discussion. The studied breeding line is characterized by a set of stable UPOV marker traits used for varietal inspection. A two-stage strict protocol for culling atypical forms was established. The first selection stage is conducted during vegetation and

harvest: plants with strong early bolting, thick neck, and downy mildew symptoms are culled. The second (*main*) stage occurs after bulb curing and drying before storage and planting (*table 1*).

Table 1. **Breeding and seed production criteria for selecting mother bulbs of the prospective line according to UPOV (TG/46/7)**

Morphological Trait	Standard Indicator	UPOV Index	Varietal Culling Rule
Bulb shape	Uniform round	3	Removal of elliptical and flat shapes
Dry skin color	Yellow, medium intensity	4	Culling skin with purple/white tint
Bulb splitting	Absent	1	Exclusion of multi-nested bulbs
Nesting (number of centers)	Low (1-2 centers)	3	Culling multi-centered bulbs
Neck width	Medium	5	Removal of thick-necked and uncured bulbs
Bolting tendency	Absent / Weak	1-3	Selection of forms without spring bolting

To prevent xenogamy and cross-pollination with other *Allium cepa* L. cultivars, planting of mother bulbs is carried out in isolated plots with a spatial isolation distance of at least 1000 m in open ground. The optimal planting period for mother bulbs in Tashkent Region is the 1st-2nd decades of September. Early autumn planting ensures strong root development before frost, formation of a well-developed rosette in spring, and high seed productivity.

Conclusions. A primary seed production scheme for the prospective onion line was established based on the bulb-to-seed method and mother bulb selection using 6 key UPOV TG/46/7 indices. Planting mother bulbs in the 1st-2nd decades of September under spatial isolation (*at least 1000 m*) preserves genetic identity and produces high-quality elite seed material.

References

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