

Production technology plan

Information

Deadline for submission: **17th November 2025.**

Submission: e-learning system (**PDF format**)

[TETTD084N - Cultivation of Greenhouse Ornamentals - full-time - BSc - 2025/2026 – Fall](#)
(„SUBMITE and evaluate technology plans [HERE](#)”)

Each student get a dedicated task, specified crop and production date

Own work, length of the essay: 4-5 pages

Consultation possibility:

- during the practical lesson (in room No. 311): **30th October 2025.**
- only if you have specified questions and a prepared plan

Evaluation: adequate / non adequate

Content of the plan (1st + 2nd page)

Student name, NEPTUN identifier, the title of the task

Name of the product

e.g. 10 000 pcs cut chrysanthemum or 5000 pcs pot gerbera

Review of the plastic tunnel/greenhouse used for production

size of the production surface, glazing material of the building, available machinery and equipments, the type and parameters of the soil (if used), geographical location

Review and description of the plant species/variety

appearance, botanical features, cultivar type, technological data (e.g. reaction time, temperature/light/water requirement, pest control etc.)

Details of the production technology process:

name of the working process/step

date of the working process/step

time required for the work process (in minutes or in hours)

name of the materials used in the process

the amount of the materials used

space occupation of the plants in the greenhouse (square meters)

plant protection

type of the work – manual or automated (if automated: specify the machine)

Example (descriptions, reviews, 1st + 2nd page)

1. Product Description

Plant name: *Pelargonium zonale* 'Tango rose splash'

Plant amount: 10.000 pcs

2. About Pelargonium

The members of the Geraniaceae plant family originate from South-Africa. Originally their habitat is dry and savanna-like, therefore the bred varieties have excellent heat tolerance and high illumination needs. Also, geraniums are sensitive to high air humidity and over-irrigation.

3. The greenhouse

The production is done in a gutter-connected 0.5 ha greenhouse from the company ATLAS. This greenhouse has an aluminium frame and is glazed by polycarbonate. The plants are kept on a movable bench system, with an ebb-and-flood irrigation system. The heating system operates with gas and includes under-bench as well as perimeter heating pipes. To provide cooler temperatures and sufficient air circulation, the greenhouse is mounted with a combination of ventilators and evaporation cooling pads. Over the benches there is a shading curtain system as well as misting heads, not only because of the pelargoniums, but other cultures. The cultivation space of the aimed 10.000 plants is going to take up about 400 m² of the greenhouse.

4. The variety

The variety 'Tango rose splash' is compact type of geranium bred by the company Syngenta. It is very suitable for high density and quick turn production. After the rooting period the cuttings can be grown in 10,5-12 cm pots throughout the growing season. The plants have good vegetative growth in short day conditions as well as continuous flowering ability when mature. The wide range of flower colours combined with the dark foliage makes it a favourite on the market. It has an optimum temperature requirement of 18-22 °C.

5. Cultivation time

The unrooted cuttings we are going to buy from a Hungarian retailer Floretum already 1 year in advance. This is because only a certain amount of propagation material can be provided for the buyers. As we aim to finish as many cultivation cycles in a year as possible, we will start the planting in January. The rooting of cuttings usually takes 3-4 weeks, whereas the mature plant development about 6 weeks. This way we can finish one run of pelargoniums in 10-12 weeks and enter the early market by Easter. We count with a 95% success rate on the rooting, so we order 10.500 URC-s.

6. Growing media

As for growing media, pelargoniums require good structural, well-draining soil with a pH of 6-6,5. To stay on a price minimum for rooting the cuttings we use a mixture of peat and perlite (50:50%), to get an aerate environment for root development. After transplanting, the mixture is going to change to a Baltic white peat – Osli black peat mixture in a 20:70% ratio. The Mixing of these substrates we are going to do ourselves by the help of a Javo ecobasic potter machine, which mixes and pots the soil automatically.

7. Heat requirement

The heating of the greenhouse will vary according to the phenological stages of the plants. During the rooting process, temperatures are the following: 15-16 °C at night with bottom heating to 20-22 °C, daily temperatures 23-26 °C. Ventilation against Botrytis is essential. After transplanting in March, we modify the heating as necessary to achieve 23-26 °C at daytime and 18 °C at night. Bottom heating after transplanting helps root development.

8. Plant protection

Due to short culture conditions plant protection is not significant. We treat the URC once during the rooting process against botrytis. We should be careful with irrigation, since Pelargoniums roots are rotting very easily. Protection against aphids, silverleaf whitefly, thrips and worms is only necessary when we find them while monitoring. With a virus and disease-free propagation material as well as growing media we hinder most of the problems.

9. Fertilization

We treat our plants with a complex manure from the company Kwizda, once while transplanting and once more in February. There is two reasons we apply retardants during March, one is that we inhibit vegetative growth and enhance flowering, the other to gain better coloration.



Tango™ Rose Splash

ANNUAL
VEGETATIVE

Variety ID:
70004108

Botanical Name:
Pelargonium zonale

Color:
Rose Splash

Crop:
Zonal Geranium

Series:
Tango™

<https://www.syngentaflowers.com/emea/product/flower/70004108>

Content of the plan (3rd page)

- the technology steps can be presented in a table form (**technology table**)

	Name of the work process	Date of the work process	Time required for the work process (in minutes or in hours)	Name of the materials used in the process	The amount of the material used	Space occupation of the plants in the greenhouse (square meters)	Type of the work – manual or automated (if automated: specify the machine)
1							
2							
3							
4							
5							
6							
7							
8							

Example (technology table, 5000 pcs pot Cyclamen)

	Name of the work process	Date	Time required for the work process (in minutes or in hours)	Name of the materials used in the process	The amount of the material used	Space occupation of the plants in the greenhouse (square meters)	Type of the work – manual or automated (if automated, then specify the machine)
1.	Ordering the seeds	Previous year's 10th Dec.	1 h	-	7000 pcs	-	Choosing the cultivar
2.	Filling the propagation case (tray)	1st Feb.	1 h (24 pcs/h)	1. prop. case (tray) 2. media Stender A260	1. 24 pcs 2. 280 liter	-	Manual filling
3.	Sowing the seeds with peat covering	1st Feb.	8 h (3 case/h)	F1 seeds	7000 pcs	-	Individual sowing manually
4.	Irrigating the prop. cases	2x weekly	0,1 h (50 m2/h)	Irrigation water	-	4,32 m2	Manual irrigation
5.	Putting the cases in the germ. chamber	1st Feb.	1 h (25 pcs/h)	-	-	4,32 m2	manually
6.	Placing the cases on greenhouse benches	22th Feb. (3 wk after sowing)	1 h (25 pcs/h)	-	-	4,32 m2	manually
7.	Substrate mixing	05th April (9 wk after sowing)	1,36 h (0,4 m3/h)	1. Brown peat 2. white peat	1. 136 liter 2. 409 liter	-	Manually in 1:3 ratio
8.	Filling the trays with substrate	05th April (9 wk after sowing)	5,2 h (25 pcs/h)	1. 51 prop tray 2. mixed substrate	1. 130 pcs 2. 545 liter subst.	-	manually
9.	Pricking the seedlings (50 pcs/tray)	05th April (9 wk after sowing)	40 h (163 plant/h)	51 prop tray	130 pcs	19,5 m2	manually
10.	Decreasing the temperature to 18°C	19th April (2 wk after pricking)	-	-	-	-	-

Example (technology table, 5000 pcs potted Cyclamen)

	Name of the work process	Date	Time required for the work process (in minutes or in hours)	Name of the materials used in the process	The amount of the material used	Space occupation of the plants in the greenhouse (square meters)	Type of the work – manual or automated (if automated, then specify the machine)
11.	Substrate mixing	17th May. (6 wk after pricking)	1 h (5 m3/h)	1. brown peat 2. white peat	1. 1200 liter 2. 3600 liter	-	automated
12.	Filling the pots	17th May. (6 wk after pricking)	4 h (1500 pcs/h)	Mixed substrate	4800 liter	-	Pot filling machine (type: Da Ros IVS822 TR1)
13.	Planting into pots (60 pots/m2)	17th May. (6 wk after pricking)	70 h (42 s/plant)	pot size 12 cm	6000 pcs	100 m2 (net bench surface)	manual
14.	Irrigation and phytotechnics	3x weekly	3 h/occasion (manual irrigation: 400 m2/h)	-	-		Automated irrigation on ebb and flow benches, manual cleaning
15.	Spacing out (30 pcs/m2) + cleaning	28th June. (6 wk after planting)	30 h	-	-	200 m2 (net bench surface)	manual
16.	Spacing out (15 pcs/m2) + cleaning	09th Aug. (6 wk after first spacing out)	30 h	-	-	400 m2 (net bench surface)	manual
17.	Sorting before selling and packaging	7-21th Oct.	25 h total (200 pcs/h), selling and transporting (2-3 days)	Paper sleeves, collector trays, CC-container	5000 pcs, 157 pcs of trays	-	manual

Content of the plan (4th page)

Cost estimation table

Used material	Required amount	Net unit price (HUF or €)	Net cost (HUF or €)	Value-added tax, VAT % (HUF or €)	Gross cost (HUF or €)
Total:			(HUF or €)	(HUF or €)	(HUF or €)
Production cost of 1 plant:			HUF/plant		

Example (cost estimation table, 6600 pcs potted *Dracaena reflexa* var. *angustifolia*)

<i>Used Material</i>	<i>Required amount</i>	<i>Net unit price (HUF)</i>	<i>Net cost (HUF)</i>	<i>VAT % (HUF)</i>	<i>Gross cost (HUF)</i>
<i>Rooted cuttings</i>	6800	2000	13,600,000	12% (Brasil) = 1,632,00	15,232,000
<i>Clay pots 15cm dia.</i>	6600	250	1,650,000	445,500 *	2,095,500
<i>Soil</i>	1000kg	150/kg	150,000	40,500 *	190,500
<i>Perlite</i>	800L	120/L	96,000	25920 *	121,920
<i>Water</i>	16.5m3	600/m3	9,900	2673 *	12,573
<i>Wuxal</i>	500L	1500/L	750,000	202,500*	952,500
<i>Workers</i>	174h	1200/h	208,800	48,375*	257,175
TOTAL			16464700	928668	<u>17,393,368</u>
Production cost/1 plant			2,635 HUF		

*Hungary 27% VAT

The planned sell price for the plants is 4500 HUF/plant

Total income if all plants are sold is 29,700,000 HUF

Profit is 12,306,632 HUF

At least 3,866 plants need to be sold to make a profit! :)



Content of the plan (5th page)

Bibliography of the used literature sources

For choosing a plant variety, use a catalogue of a company

These catalogues usually contain other useful information about how to grow these crops

<https://www.syngentaflowers.eu/catalogues>

<https://www.panamseed.com/catalogs.aspx>

<http://www.selectacutflowers.com/en/home>

<https://www.florensis.com/en-gb/cut-flowers/>

<https://www.danzigeronline.com/>

etc.

For the prices of the used material search information in online shops or marketplaces

(retail prices are also acceptable if you can not find wholesale prices)

<https://www.floraccess.com/en/> - prices of propagation materials and ready to sell plants

<https://www.florasourceltd.com/young-plants> - prices of in vitro propagation materials

For counting the work time requirement there are two document available (in Hungarian: Filla Márton, Fehér Béláné) in the course site with work performance data, but other sources are also usable

Recommended literature for performance indicator numbers:

Chris Beytes (ed.) 2003: Ball Redbook. Volume I., Batavia Illionis, USA, Ball Publishing

Debbie Hamrick (ed.) 2003: Ball Redbook. Volume II., Batavia Illionis, USA , Ball Publishing

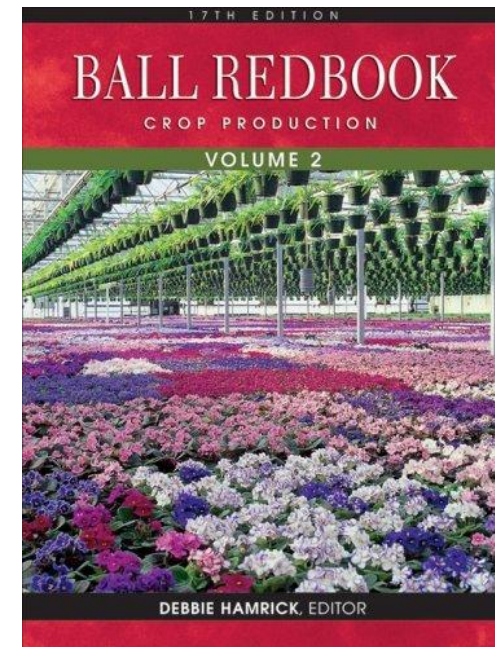
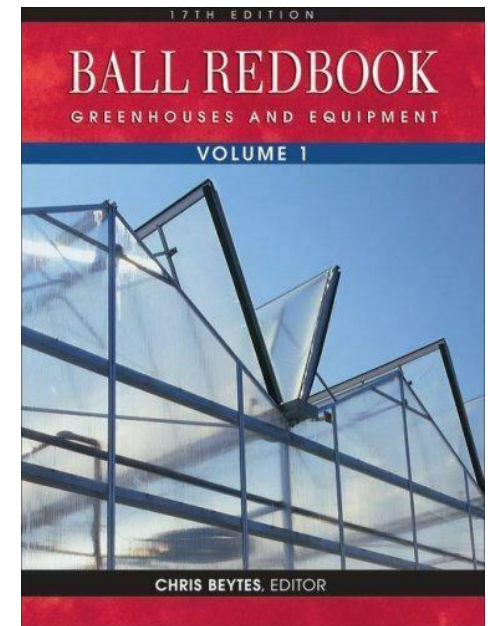
Komiszár Lajos, Schmidt Gábor, Szántó Matild: A dísznövénytermesztés munkafolyamatainak szervezése, Budapest, Mezőgazda Kiadó, 1995

Magda Sándor: Kertészeti ágazatok szervezése és ökonómiája (Mezőgazdasági vállalkozások szervezése és ökonómiája c. könyv III. fejezete), Szaktudás Kiadó Ház, 2003

Filla Márton: Munkaszükségleti kulcsszámok a dísznövénytermesztési munkafolyamatok gazdaságos tervezéséhez és a munkák helyes szervezéséhez. Budapest, 1975

Fehér Béláné: ASZI-144 tankönyvi segédlet: Teljesítmény-adattár kertészeti munkákhoz

Online presentation (in the website of the Department): Greenhouse equipment and substrates for ornamental growing



Example (Literature/references)

Potted Chrysanthemum 'Daybreak Appleblossom'

References:

https://balkonmarket.hu/spd/nov007/COMPAQPEAT-Tozeg-250-Literes?gclid=Cj0KCQiw8eOLBhC1ARIsAOzx5cFgIfKVtdw-aQF7Mthi6H-DoFiTRIO4kAe7DOG2rh8jO6-KYmxElGoaAi0wEALw_wcB

<https://www.gardendesign.com/flowers/mums.html>

https://www.gazdadszkont.hu/viragcserep-12-cm-fekete?utm_source=argep&utm_medium=cpp&utm_campaign=direct_link

<http://www.kovarikrizantem.hu/termekek.html>

<http://www.ordoghkertesz.hu/krizantem-szaporito-anvag-eloallitas.html>

http://www.tulipakert.hu/downloads/krizantem_ariegyvek_2021.pdf

Vonsik I.: 2006. A krizantém termesztése és növényvédelme, Dr. Vonsik Imre krizantém kertészete, Balassagyarmat

<https://webshop.oasis.hu/>

Dracena reflexa var. angustifolia

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Mayer Planting Systems. The Mayer Potting Machine TM 2105. *Mayer Planting Systems*. [Online] [Cited: 11 26, 2023.] <https://mayer.de/en/planting-systems/products/tm2105/>.

Nieuwkoop Europe. Brussels® Product number: 6ELHBR20W. *Nieuwkoop Europe*. [Online] [Cited: 11 26, 2023.] <https://www.nieuwkoop-europe.com/en/planters/all-planters/6ELHBR20W/Brussels-6ELHBR20W>.

Pickle, Mercy. 2023. *Dracaena photograph*.

Tilly, Péter. 2023. Production of foliage plants.pdf. *Hungarian University of Agriculture and Life Sciences Institute of Landscape Architecture, Urban Planning and Garden Art*. [Online] 11 8, 2023. [Cited: 11 26, 2023.] <https://landscape.unimite.hu/documents/2845981/3074073/Production%20of%20foliage%20plants.pdf/181dffa-3946-85e7-2a12-9f9fbec7eeb1?t=1699453838162>.

Tillyné, Mándy Andrea and Honfi, Péter. 2016. *Növényházi dísznövény-termesztés egyetemi jegyzet*. Budapest : s.n., 2016.

Turner, James. 2023. The Price Range Of Red-Edged Dracaena: What To Expect. *ShunCy*. [Online] 10 28, 2023. [Cited: 11 27, 2023.] <https://shuncy.com/article/how-much-is-a-red-edged-dracaena>.