

PRODUCT DATA SHEET

Sunflower

Botanical name	Helianthus annuus
Seeding rate	Grown for oil/seed production: 7 plants/m ² in pure stands Grown for flowers/ornamental plants: 15-25 plants/m ² in pure stands
Distance between rows	Grown for oil/seed production: 37.5-60 cm in pure stands Grown for flowers/ornamental plants: 12.5-37.5 cm in pure stands
Sowing period	Grown for oil/seed production: mid-late April for pure stands Grown for flowers/ornamental plants: up to late May for pure stands
Sowing depth	3-5 cm



General information and usage

- ▶ A plant with a surprisingly wide array of uses
- ▶ Difference between the various uses (seed, silage or ornamental plant production)
 - Seed production: covers the production of both oil and edible seeds
 - Silage production: includes all uses related to fodder production for livestock or to obtain biogas
 - Ornamental plant production: usually involves true-breeding varieties with ample pollen and nectar production for flowering, insect protection and biodiversity mixtures

Botany

- ▶ Family: Aster family (Asteraceae)
- ▶ Genus: Helianthus
- ▶ Origin: Central America

Morphology

- ▶ Annual herb with a vivid yellow composite flower, grows up to 5 m (depending on variety and cultivation purpose)
- ▶ Forms a taproot with powerful lateral roots
- ▶ Roughly circular, hairy stem with leaves that sometimes have fine hair
- ▶ Yellow flowers form an impressive composite arrangement (blooms last 5-12 days)
- ▶ Mainly cross-pollinated by insects

Varieties and seeds

- ▶ The number of varieties is fairly small and they are distinguished by their intended use
- ▶ In Germany, 14 varieties have been approved for seed production and one for silage production
- ▶ German sunflower cultivation is primarily focused on seed production, especially to obtain sunflower oil



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Climate requirements

- Warm and dry sites are preferable in Germany and Central Europe
- Ideally 130-150 frost-free days
- Accumulated temperature values during the growing period of > 1,450°C are considered good
- Cultivation is possible with an annual average temperature of > 6.5°C, though it is more successful at annual average temperatures of > 8°C
- Young plants can tolerate frost up to -5°C
- During the growing period, water requirement is 500-600 L
- Young plants are susceptible to adverse reactions caused by water scarcity
 - Relatively good drought tolerance after early growth stages since the roots have grown deeper into the soil
 - Water shortages later on lead to lower oil yields

Soil requirements

- Well suited for loamy sand to clayey soils
- Soils with high root penetrability are ideal
- Because of their taproots, the plants are sensitive to soil compaction
- Soil can be aerated by tilling
 - Goals: in addition to mechanically removing weeds, increase soil temperature and stimulate plant growth during early stages
- Tolerates cultivation in a relatively large soil pH range

Crop rotation

- Sunflowers are autotolerant
- Due to its susceptibility to *Sclerotinia sclerotinium*, not recommended for rotations involving rapeseed
→ grown at least 4 years apart from rapeseed
- Cereals, maize and potatoes are recommended prior crops
- Legumes are not recommended due to their high N contribution
- Volunteer sunflower plants can be prevented in subsequent rotations with shallow tillage (helps seeds to sprout)
- Subsequent rotations of crops in which eliminating volunteer sunflowers is difficult (e.g. potatoes or cruciferous plants) should be avoided where possible



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Soil preparation

- The aim is to have a well-distributed, even, finely crumbled and weed-free seedbed, which allows for direct sowing for vegetable cultivation:

Objective	New cultivation
Measures	Basic soil preparation: Clear by ploughing on heavy soils, a cultivator is also a possibility on lighter sites. Secondary processing: Using a mill or rotary harrow for a fine, well-distributed seedbed.

Sowing

- Target stand: 60,000-75,000 plants/ha
 - Slightly thinner stands lead to shorter plants with higher flower diameters
- Field emergence generally occurs 2-3 weeks after sowing

Crop protection

- Adequate weed control, chemical options exist, though mechanical methods are highly effective due to the wide row spacing
 - Till once or twice (first tilling shortly after field emergence)
- Chemical weed suppression should be completed prior to emergence, no later than 5 days before sowing
- Disease and weed pressures are generally moderate under local field conditions
- Known pathogens include:
 - Grey mould (from 4th leaf stage; *Botrytis cinerea*)
 - White mould (= *Sclerotinia* spp.)
 - Downy mildew (primarily affects the undersides of leaves)
- Monitor regularly for aphid infestations (infestations usually begin at the shoot tips → curling leaves are a potential sign)



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Fertilisation

- ▶ Based on soil testing (comply with the fertiliser regulations!)

Annual nutrient losses in kg/ha:

	Total N	P ₂ O ₅	K ₂ O	MgO
Total	70-100	40-55	60-85	15-20

- ▶ If mineral fertiliser use is planned: carry out measures prior to sowing, since young plants are very sensitive to elevated salt levels in the soil
 - The sulphate type should be carefully chosen, especially when using potash fertilizer, since sunflower plants are very sensitive to chlorides
- ▶ Split into multiple applications on light soils with a high N replacement potential
 - Pre-sowing application of 20m² cattle manure is an option
 - The ultimate quality of the harvested product is shaped in the plant's early development; N is stored first in the leaves and then in the seeds as protein compounds
- ▶ Sulphur requirement: 30 kg/ha

Harvest and treatment

- ▶ Harvest period: beginning in late September, about 130 days after sowing
- ▶ The plants should be harvested once the leaves begin to wilt and fall off and the backs of the flowers turn brown
 - The seed shells become hard and seeds begin to fall out
 - Potential seed yield: 2,300-3,300 kg/ha at 91% DM
 - Typical seed moisture content at harvest: 12-35%
 - In order to prevent mould formation (→ leads to higher free fatty acid content in seeds): quickly dry harvested seeds to 9% moisture at a max. temperature of 70°C with the aim of not exceeding a 45°C limit in the seeds
- ▶ Seeds can be threshed using a normal thresher
 - Keep the concave wide open during harvesting
 - Diameter 9-16 mm depending on seed size



Any questions? Please feel free to contact us!

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