Odontoglossum Hybride pot plant

Source and varieties

Odontoglossum hybrids are usually a group of intergeneric hybrids with broad source and growth characteristics. The varieties have been selected for growth and flowering rate and can basically flower within 1 year.

Production procedures

Substrate

The substrate must consist of well-drained organic mixtures, e.g. two-thirds bark and one-third peat or a mixture of bark and pieces of coconut shell or 10-15% sphagnum.

Vegetative phase

- Vegetative phase plantlets delivered in flasks

  Plantlets are delivered in plastic flasks directly from the laboratory. Upon receipt, plants are deflasked into small pots or plugs filled with sphagnum. After 8-10 months, the plants will usually be large enough to transplant into a 11-12 cm pot.

- Vegetative phase plantlets delivered in plugs

  Plantlets com in plugs (plug trays) with a leaf length of 10-15 cm. After delivery, the plantlets are immediately transplanted to 11-12 cm pots. Various organic mixtures with good drainage and air-retaining capacities can be used. The basis is bark supplemented with some sphagnum, coir, peat fibre or chunks. Each substrate has its own character with regard to water and fertiliser application. The plants should immediately receive water and nutrients by means of overhead watering. Hand watering is sometimes necessary and is also a good way to monitor the crop. The plants are placed against each other in close association. That way there are approx. 70-75 plants/net m^2 for about 25-30 weeks. After some 25-30 weeks, the plants are moved to the spike initiation and flowering section where both night and daytime temperatures are somewhat lower. The plants are spaced out and depending on the variety, there will be 40-50 plants/net m^2 for six months. Dependent on variety and rate of production, about half to two-thirds will be ready for delivery as flowering plants at the end of the year. Varieties not flowering by this time will have become larger and need to be spaced further apart at a rate of 25-30 plants/net m^2. These will be ready for sale after about 6-8 months.

Temperature

As a rule, the target temperatures depend on the two phases:

1. Vegetative phase.
   The vegetative phase is characterised by a night temperature of 18-20°C and a day temperature of 20-22°C.
2. During the spike initiation and flowering phase, target temperatures are 14-16°C at night and around 18-20°C during the day.

Higher temperatures, particularly in summer, can be prevented by, for instance, heavy whitewashing, an outdoor screen or use of roof sprayers. The light intensity in summer is less important than striving for the right temperature and ensuring sufficient air movement in the greenhouse. Make sure that the plant temperature is not more than 1°C higher than the greenhouse temperature. That may easily happen in high light, both natural and artificial. At night the leaf temperature may 1-2°C lower than the greenhouse temperature.

Light

The best growth and flowering results in Odontoglossum are obtained by exposing the plants to moderate light intensities from 8,000 to 10,000 lux at the plants. Growth lighting greatly improves shoot growth so that plants will reach flowering size sooner. The greenhouse must be kept whitewashed from spring until late autumn to prevent excessively high temperatures. When using a variety of whitewash types it remains important to monitor the light intensity in the greenhouse.
The maximum growth lighting is 7,000 lux In the vegetative phase light intensities can be observed of 130-150 µmol m^{-2} s^{-1} (5.5-6.5 PAR day sum) and during cooling a little less light, 100-120 µmol m^{-2} s^{-1} (4-5 PAR day sum). Light intensities above 180 µmol/m^2/sec must be prevented because of the risk of excessively high leaf temperatures.

Water

Water is one of the most important factors in production. Only rainwater or reverse osmosis water is suitable. Any other kind of water will inevitably result in cultivation problems. Provide enough water storage capacity. Water consumption should be calculated as a minimum of 15 litres of water/m^2/week. Water used for irrigation must be between 15 and 18°C. During the vegetative phase, even 20-22°C is recommended. Cooler irrigation water lowers the pot temperature and this can inhibit growth. A heated indoor intermediate tank or a counter-flow system is recommended. Water is provided by overhead watering to which fertiliser is added.

RH

A good RH is important for good growth and flowering. A low RH on sunny days and in spring inhibits growth. When the plants are observed closely, it can be noted that the leaves fold together, roll up and take on a drab grey colour. The optimum RH values are 70- 80%. These percentages are light-dependent, so at lower light intensities a lower RH is acceptable, however at 10,000 lux 80% RH still results in good growth but 65% RH will cause problems.

As a rule, more light also results in higher temperatures and thus a lower RH. If at higher temperatures (25-26°C) the RH is higher, the plant can assimilate better.
Humidification or the use of roof sprayers will greatly improve the greenhouse climate. The biggest problems usually occur when humidity drops too suddenly and if at the same time, the light intensity increases strongly. In warmer regions the use of Pad and Fan cooling systems has a very positive effect on growth. Higher values than 80% are acceptable without any problems, yet in that case it is necessary to ensure sufficient moisture discharge by moderate heating and simultaneous ventilation (air movement in the greenhouse). The RH around the plant can much more easily be controlled by measuring the plant temperature with an infrared camera.

Fertilisation

Fertilising and irrigating are done simultaneously. The composition of fertilisers depends on the season and the growth stage of the plants. Although either simple and/or compound fertilisers can be applied, working with compound fertilisers is usually much more practical. For the vegetative phase, a combination of calcium nitrate, Plantprod or Peters 20-20-20 and magnesium sulphate in a ratio of 2:6:1 would be a fine combination that could be supplied by a 2-tank system. When plants become too lush or start flowering or if production takes place when light is less in winter, the N application (Urea) can be lowered or a potassium-rich fertiliser can be used. The best EC values are 0.5-0.8 EC. During freezing weather, reducing the EC somewhat would be advisable due to the effect of heating. The irrigation water pH must be between 5.5 and 6. If the pH is too low (below 5) the solution is to modify the ammonium nitrogen and/or urea application. On hot sunny days it is recommended to follow up fertiliser irrigation with clean water irrigation at 1-2 litres/m^2 to prevent leaf spots or shoot rot. You do have to add Dolokal to the substrate in advance. Depending on the materials used, it should be applied at the rate of 3 kg/m^3.

Diseases and pests

With sound cultivation and sufficient control of the most significant predators, use of chemical control agents will rather be exception than rule. Red spider mites and Californian Thrips are actually the most important pests that can spread rapidly in Odontoglossum cultivation.

- Red spider mite.
  Red spider mite causes dull and grey leaves, also on the underside, and inhibited growth.
- Californian Thrips.
  The presence of Thrips in the flowering phase causes flower damage in the form of watery spots. Thrips also pass on Tomato Spotted Wilt Virus (TSWV), causing extensive circular leaf spotting.
- Root rot.
  Root rot always has a physiological cause. In many cases the cause is badly drained substrate and/or too high EC. Water that is too cold also results in root problems.
- Mites.
  Mite infection (Brevipalpus or flat mite) strongly discolours the underside of the leaf.
- White worms (Lyprauta).
  Lyprauta fly larvae feed on root tips in a wet substrate. Ensure quick drying of the substrate. Spread Macro-mite Macrocheles robustulus directly on transplanting.
- Harmonica leaf.
  Harmonica-shaped leaves are caused by a moisture shortage in hot and dry periods.
- Flower and leaf spots.
  Flower and leaf spots may occur with intense incident light and high root pressure and can be prevented by heavier shading, timely venting and using fans. After fertilisation it is recommended to irrigate again with clean water without wetting agent.
- Pinched and distorted flowers.
  Pinched and distorted flowers may occur at high temperatures during spike initiation and flowering or bad root condition.
- Bud desiccation.
  Ethylene and excessively high temperatures may cause bud desiccation. This depends on variety and light sensitivity.
- Bud and/or shoot rot.
  Bud and/or shoot rot can be caused by bacterial infection, too high-temperature, too little evaporation, too wet conditions or a high EC at the surface of the pot.

- Leaf tips.
  Dead leaf tips are caused by moisture shortage in hot and dry periods.
- Snails and slugs.
  Snails and slugs may be found in wet plants and then control measures should be taken. Ensuring proper greenhouse hygiene, such as removing any weed growth under the benches, is important as well .

It would be best to consult an expert with regard to which chemical control agents to use and what the application dosages are and we recommend to carefully read the labels.

Greenhouse systems

Sections

A nursery needs at least two sections to produce Odontoglossum as pot plants:

- Vegetative phase.
  During the vegetative phase plants are in a warmer climate for about 5-6 months. The vegetative phase section takes up roughly 25% of the available space.
- Spike initiation and flowering phase.
  The spike initiation and flowering phase lasts 6-12 months. Because the plants occupy about twice as much space during the flowering phase, the warmer section used for the vegetative phase has to accommodate about 75% of the entire production. Some of the plants, when delivered with a leaf length of 10-15 cm, will flower a year after having been transplanted to pots while other varieties may take an additional 6 months to flower. This depends on the variety and/or the planting date.

Benches/mobile containers

Production takes place on benches or mobile containers with an open bottom. Various materials are possible. We advise against ebb-and-flow systems. Make sure there is space to walk between the benches or containers for inspecting the plants.

Heating

The heating system must be suitable to keep the section in use for vegetative cultivation at a minimum temperature of at least 22°C during the day and 18-19°C at night whilst maintaining the section in use for spike initiation and flowering at a temperature of at least 18°C during the day and at least 15°C at night, regardless of outdoor temperatures.

Shading system

A shading system is required, not so much for saving energy but more to limit excess light. A double screen is not necessary. An external shading system offers a good way to cultivate at a cooler temperature without whitewashing.

CO_2 system

A CO_2 system will provide an effective supplement for optimum growth. Although no specific studies have been conducted into Odontoglossum, the crop will undoubtedly benefit from this.

Growth lighting

Growth lighting will be necessary during winter months to achieve the required light intensities for the spike initiation phase. It also provides advantages during the vegetative phase, particularly with regard to better shoot growth so that plants are quicker to reach flowering size. The lighting system must have a capacity of at least around 4,500 lux.

Production

Yields at a modern facility with mobile containers or benches and a space utilisation of 84% depends on variety, production and loss percentage, and will be 30-40 plants per m^2. Using fixed benches results in a reduction of about 20% in production. The labour requirement is around 1,500 m^2/worker/year. As a rule, the loss percentage is approx. 10%.

Space utilisation diagram greenhouse (production in 12 cm pots)

Cultivation phase	Plants/net m^2	Period (weeks)	Space requirement%
Transplanting to ready to flowering	72	30	32
65% flowering + spacing out	45	26	42
35% flowering + spacing out	30	30	26