



SOYBEAN PROTOCOL

Donald Danforth Plant Science Center

Plant Growth Facility

Updated February 2019

Planting/Transplanting

Preferred method uses 1-gallon pots:

- 1) Fill one-gallon pots with Berger 7-35% almost to the top. Please do not pack soil down into pot. Do not use pots larger than the one-gallon as it will take longer to get seed and you will get more vegetative growth vs. seed production.
- 2) Top water soil thoroughly. After watering, soil should be about 1" below rim to provide sufficient headspace for watering.
- 3) Plant at least three seeds per pot approximately ½ inch deep and cover with soil. More seeds should be used if germination percentage is known to be low. Gently water seeds in so that soil settles around seeds.
- 4) Put one PTR label in each pot. Plants are placed in tall holder trays (2 pots per tray) and put into designated area.
- 5) After plants have germinated, thin plants to two plants per pot unless otherwise requested. In order to get optimum growth, do not leave more than two plants in a pot to go to seed.

1801 Flats:

When planting in an 1801 flat, water in soil before sowing seeds. Use Berger 7-35% soil and do not compact soil. Place a dome on the tray for more uniform germination. Thin plants to one plant/pot after they have germinated. Plants should be transplanted within a month in order to not stunt plant growth.

Transplanting from 1801s into 1-gallon pots:



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To transplant, fill a 1-gallon pot about ½ full of soil. Place root ball on top of soil, fill the other half of the pot covering root ball with soil and thoroughly water in. Top of root ball should be at or slightly below new soil line.

Watering

Plants are checked twice a day and watered when soil is dry. Do not water all plants at once. Do not water plant if the soil is still wet. The amount of water needed will vary according to what stage of growth the plant is in. During the early plant stages, they may only need to be watered a couple times a week. Once they are flowering and setting seed, they may need to be watered twice a day; double soaked at each watering when dry/sunny. Fertilize 3x/week with 15-16-17 and use clear RO to water the other days. Fertilizer is set at 200 ppm N in the greenhouse and 100-150 ppm in the chambers. Begin fertilizing when the first true leaves are present.

- 1) For most soy varieties, seeds usually germinate within a week. Keep the top of the soil damp before and during germination. When seeds have germinated, the seedlings follow the regular watering schedule. (If needed, plants can be germinated on the mist bench with heating mats to increase germination. Use dome on tray.)
- 2) When about 75% of the seedpods have turned brown, water less frequently to let plants dry down more in-between watering. Plants can be condensed to three plants per tray and allowed to slightly wilt before being watered.
- 3) When more than 90% of seedpods are brown, stop watering and condense plants to six plants per tray. Move to dry down bench if desired.

Staking/Plant Care

Plants are staked when they have grown to about 12 inches or when plants start to fall over. Place a 4-5' bamboo stake, 1 for each plant, towards the interior of the pot (or a 3' stake if in chambers), wrap the stem around the stake counter-clockwise to start training the plant for growth, and gently tie the top of the stem to the stake.



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Soy is a high-maintenance crop and needs constant care. Leaves regularly fall during its growth and need to be removed from the benches weekly. It is also a fast grower and it will need to be monitored for staking/tying throughout its growth cycle. This is done on a weekly basis as well. If plants grow taller than their stakes, they can be looped back over and re-tied to stake.

Harvesting/Cleaning

When a plant has completely dried down (approximately 3-4 months old), cut pods off using small shears. Place pods in a pollination bag. Write the owner's name, the variety or line, any other specific identification information and the harvest date on the outside of the bag. Any extra tags that are in the pot can go into the bag. PTR's do not need to go in the bag unless they have specific information about that particular plant. (Check out PTR before putting label in bag.) **Each plant's seeds need to go in their own bag. Do not combine plants into one bag unless you are certain that they are all the same type and are being bulked for one owner.**

To clean the seeds, remove the seeds from the pods, and then place the seeds back in the bag. If there is not a large quantity of seeds for a particular plant, seeds can go into a large coin envelope instead. To reduce seed loss from them rolling on the floor, it is best to do the cleaning in a green flat or a tray.

Other Information

Researchers may request that soy plants be started in chambers so they can monitor them easier, and then moved to the greenhouse at a later point. Usually these plants are moved when they are about one month old and are not staked until in a greenhouse. Move the PTR in the PTR system when you move the plants.

Sometimes, researchers may only need immature seed pods for their work. When they do, we will usually keep the plants after they are finished with them and use them for our own seed stock. Once all pods are full and starting to turn brown, check out the researcher's PTR



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labels, and replace with Greenhouse PTR's so that the researcher is no longer charged for plants they do not need.

Pest and Disease Management

Common Pests and Diseases

Mites and Thrips - are the main pests found on soybean. Thrips damage is usually found on new growth, while mites tend to like upper leaves of older plants. Beneficial insects are used to limit population growth of these pests. Californicus and Persimilis are used to control mites, while Strateolaelaps and Cucumeris are used to control thrips. Soy needs to be monitored and sprayed accordingly to keep the pests at a manageable level. There are a number of pesticides that are used to treat these pests.

Powdery Mildew - This occasional problem is treated with a spray bottle of Procidic or Strike.

White Fly - are also common pests on soy. They rarely exist in large enough populations to become detrimental to the plant however they can become a serious problem if their population begins to spread. Beneficial insects such as parasitic wasps can be used to limit population growth and there are many pesticides that can be used to remove white fly.

Phytotoxicity issues

Pylon may show spotted leaf burn, but will not affect seed production.

Growing Conditions

Chambers

Temperature: 25°C day/ 23°C night (77°F/73°F)

Humidity: 50%



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Light: 14-hour day at 200-600 μmol

Greenhouse

Temperature: 25°C day/ 23°C night (77°F/73°F)

Humidity: 35% minimum

Light: The supplemental lights come on when the sunlight is below 400 W/m^2 between 6am-8pm (14 hours) from September through May and between 6-10am May through September.

Shading: The shade curtain automatically closes to 50% when the sunlight level is over 900 W/m^2 and it pulls to 100% when the sunlight is over 1000 W/m^2 .