Seeders

Seeding is the process of sowing seed in a container with a moist growing mix so that they will absorb moisture and germinate. Seedlings are generally grown in a germination flat and then transplanted to pots or flats that will hold the plants until sold. This is done to conserve space and heat in the greenhouse. Transplanting is normally done when two or three true leaves have developed.

The traditional method of sowing was done by broadcasting the seed over the germination flat or placing the seed in rows. Today, direct seeding into plug trays with 50 to 400 cells is the preferred method. This makes transplanting easier as the seedlings are already singulated and are easier to handle.

Transplanting is the process of separating the seedlings and placing them into the container where they will be grown on, usually until they reach marketable size. Transplanting before the true leaves develop makes handling difficult as the seedlings are very small. Leaving the seedlings in the germination flat too long will result in long, spindly stems that make transplanting difficult.

**Traditional method**
The traditional method of growing seedlings for transplants is to use a flat without any partitions. The growing mix is compacted slightly and the seed spread evenly over the flat or in rows directly from the seed packet or with a vibrating seeder. This method is still used by small growers that seed only a few flats. Disadvantages are that the seedlings quickly become crowded and stretch as they compete for light and space. When the seedlings are removed for transplanting the root system is damaged causing transplant shock which slows growth and development.

**Plug method**
The plug method was developed in the late 1970’s to overcome some of the disadvantages of the traditional method. Plug trays with 50 to 600 cells are available. The cell size you select will depend on the size of the seed, the size of the transplant and the length of time the transplant will be grown in the tray. Plug diameter can be from ½” to 2” and depth from ¼” to 6”. Plug trays generally have the same dimensions as the growing flat. A standard size flat is approximately 11’ x 22’.”

Seeding is done with a precision seeder and then the trays are placed in a germination chamber or on greenhouse benches where temperature can be accurately controlled.

Advantages to plug transplants are that the plants are separated into individual root balls, minimizing damage when transplanting. The singulation also allows transplanting to be much faster as the seedlings don’t have to be pulled apart. Another advantage is that the plugs can be grown longer before transplanting. This allows greater flexibility in scheduling the transplanting date.

Plug production is an exacting science and there are growers that specialize in this. Smaller growers can purchase plugs at a cost that may be less than they can grow them.
Seeding Equipment
A good seeder is one that will place the correct number of seeds in the flat in the proper location and depth. Seeders have been continually improved to meet the needs of automated production methods.

Many types of seeders are available from a simple vibrating scoop for open germinated flats to precision devices that will sow one or more seeds per cell in a 512 plug tray at a rate of up to 1000 flats/hr. Prices also vary widely from just a few dollars for the manual machines to over $30,000 for one that is fully automated.

There are several things that need to be considered before purchasing a seeder.

Compatibility - it should fit the seedling production method you use to grow plants. A template or precision seeder is needed if you grow direct seeded cell trays or plug flats.

Amount of seeding - the amount and frequency of seeding that is done. For small operations, it may be more economical to purchase plugs.

Type and size of seed - if you sow a large variety of seed it will require greater adjustment and changes to the seeder. Several templates may be needed. Template or needle seeders are frequently used for odd-shaped seeds. Some seeders work best with pelletized seed which adds cost.

Accuracy - greater accuracy means less skips and less wasted seed. Template seeders may pick more than one seed per cavity. Precision seeders can be set to place more than one seed per cell.

Speed of operation - For small growers where speed is not the main objective, manually operated template seeders (2 - 4 flats/min) are commonly used. Mechanized vacuum tip and needle seeders (2 - 6 flats/min) are used by small to medium size plug growers. Large production plug growers generally use drum or cylinder seeders (12 - 70 flats/min.)

Tray sizes and shapes - the number of tray sizes and shapes affects the number of seed templates and the amount of adjustment that has to be made to the seeder. Consideration should be given to standardizing where possible.

Ease of operation - Most machines require one person to operate. Ease of adjusting for different conditions and seed is important.

Seeding area - A dry, environmentally controlled, dust free room is best for precision seeding. A controlled environment storage should be available for seed storage. Some growers also build in space for tag storage.

Warranty, reliability and service - should also be considered as repair parts may be needed.
Demonstration of equipment - Visit other growers and trade shows to see how a particular seeder will operate.

Manual Seeders

Vibro Seeder - This hand held vibrating scoop operates on flashlight batteries and spreads seed evenly in rows in a flat. It works well for seeding a few flats.

Little Wonder Seeder - Designed to fit across a flat, the V-shaped trough uses a notched drum to meter the seed. As the drum is turned, seed is picked up in the notches and then dropped into the flat, one row at a time. Drums with different notch sizes are needed to sow different seed. This bulk type seeder is available in several sizes to fit flats from 11” to 14” wide.

Manual Slide Template Seeder - Several direct placement manual seeders are available to seed cell flats. Bulk seed is placed in a tray with cavities spaced the same as the flat. The cavities are filled by brushing the seed over them. A visual inspection is made and then a slide released to drop the seeds into the dibbled flat.

Wand Seeder - PVC wand fitted with plastic tips to pick up and place the seed. Size of tips depends on the size of the seed. It can be used with vacuum pump, shop vac or household vacuum. Pick up and release of seed is controlled by a valve. Seed is held in tray. A different wand is needed for different plug or cell trays. It takes 4-5 minutes/flat.

Vacuum Template Seeder - Several companies manufacturer a vacuum plate seeder. A template with holes to correspond with the cell spacing on the flat is fitted to a vacuum box. Seeds are picked up from a bulk seed tray. A visual check is made to see that all cavities are full. Template is placed over plug tray and vacuum released to drop seed. Different flat configurations and different seed sizes require different templates. It will sow 2-4 flats/min.

Precision Mechanized Seeders

Needle/Nozzle Seeders - These seeders have nozzles or needles attached to a bar or manifold. Cell trays are indexed one row at a time past dibble and seeding stations. Vacuum nozzles operated by a built in compressor pick up seed from a seed tray and move to discharge it into the cells. A vibrator may keep the seed evenly distributed. Change from one type of seed or tray to another can be done in a few minutes. The size of the nozzle opening determines what size seed can be handled. Nozzles are available from some manufacturers that can handle multiple seeds per cell at one time. Some manufactures offer a double row seeding. Exhaust air is used to release seed and then clear needle tips. Most models have a conveyor to advance the trays under the seeding head.
Rotating Sowing Shaft Seeder
This seeder is designed for sowing tree seed and uses vibrating trays to singulate the seed. A rotating sowing shaft with cavities sized for the different seed types picks up the seed, rotates and drops it into seed tubes. Multiple seeding is accomplished by rotating as many times as the number of seeds needed per cavity. Seed shafts can be changed in about a minute. The unit can be integrated with a container filling line. The machine is manufactured by BCC AB, Landskrona, Sweden.

Drum and Cylinder Seeders - This seeder consists of a drum or cylinder with holes sized for the type of seed to be used and spaced for the desired spacing in the plug tray. Seed is picked up from a seed trough by a vacuum on the drum and held until the drum rotates to a position over the plug tray. At this point the seed is ejected by air or water. Some manufacturers use a rotary valve to limit the vacuum to a particular set of holes. Brushes or air curtains are used to remove multiple pickups. An air blast may be employed to clean the holes in the drum. Timing of the drum may be mechanical, infrared beam or electric switches. Drums can be manufactured with a multiple sow set of holes.

Accessories
Seeders may be fitted with several accessories that may be either attached or separate. They need to be timed to match the output of the seeder and should be associated with a conveyor that removes the flat when done.
Compressor - Some seeders require a separate air compressor to operate. Before purchasing a unit, consult the manufacturer to determine the correct output and pressure.

Conveyor - A separate conveyor is required by some units. This may consist of a single unit that feeds the flats and removes them or two units, one for supply and one for removal. They should have variable speed motors to adjust the speed to the rate that the seeder operates.

Dibble - A dibble is standard equipment on some needle seeders. On other seeders it can be added as an optional piece of equipment that compacts and creates a depression for the seed in the flat. It needs to be timed for the speed of the seeding.

Covering unit - This unit contains a hopper for vermiculite, perlite or sand. A motorized roller feeds the material through a gate as the flat passes underneath. Depth of cover is adjusted by the gate opening and roller speed.

Water bar - Can be fitted to some seeders either before or after seeding to wet the mix and settle the seed. A collection pan with hose to recycle or dispose of excess water should be included.

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