

MEAD WOODLANDS GREENHOUSE FACILITY

The MEAD Corporation containerized seedling production began with the construction of the first greenhouse in late 1979. Production at that time was 250,000 seedlings per year. In the fall of 1982, construction began on 2 more greenhouses and 3 shadehouses. This increased the growing area under plastic to its current size of 45,000 square feet. The headhouse and automated machinery came in 1984 and the yearly seedling production rose to 5.2 million seedlings (3 crops per year). Holding areas and cold frames (hoop houses) were added in 1987, increasing the facility's size to 4.5 acres. (see figure #1)

The cropping schedule (see figure #4) begins with the December sowing. This crop is germinated and remains in the greenhouses until the end of February. The December crop is then moved into the adjoining shadehouses to begin acclimation. The second crop or March crop is then sown and placed in the greenhouses to grow until mid-July. The third crop or April crop is sown and placed in the shadehouses following the December crop move to the hoop houses. Hoop houses are equipped with a minimal amount of heat to prevent frost damage. All seedlings are moved to outside holding areas by the end of July. The houses are empty for clean-up and maintenance until December.

The houses are always sown to maximum capacity. Total cavities sown in each crop is 1.9 million. This typically yields approximately 1.7 million plantable seedlings or more than 5 million seedlings per year. Seedlings are grown for both Publishing Paper Division and Northern Hardwood Division Lands (700,000 acres in the Upper Peninsula of Michigan). One million seedlings per year are produced for the Fine Paper Division of Mead in Chillicothe, Ohio. Each year 50,000 to 70,000 seedlings are donated to various organizations and non-profit groups and any excess stock is sold on the open-market.

The principle species grown are red pine (35% ±), tamarack (20% ±), white pine (20% +), jack pine (20% ±) and European larch (5% +). Many other species are grown in small quantities such as red maple, sugar maple, northern white cedar, virginia pine, loblolly pine, birch, bald cyprus, red oak, white and norway spruce.

PREPARATION OF GREENHOUSE CROPS

Seedling production begins in the headhouse with the box filling operation. (styrofoam containers). A 2:1 mixture of sphagnum peat moss and horticultural grade vermiculite is prepared in the mixer. The medium is conveyed to the flat filler. a continuous line of containers is fed into the flat filler. The boxes are automatically filled, packed and the surface compressed by the flat filler. Eighteen boxes per minute are filled by this machine.

Boxes are then seeded with 2 pneumatic conveyor seeders. Each seeder is capable of sowing 60-70 lines or approximately three boxes per minute. The seeding machines also place a fine covering of vermiculite over the seed.

Seeded boxes are removed from the seeder and placed on motorized conveyor that moves them into the greenhouses. The boxes are laid out on benches in the houses where the crop is germinated and grown.

The total preparation (filling, seeding, and placement of each crop in the greenhouse) requires eight days and a part-time crew of six people. Each single crop consists of approximately 8,040 containers or 1.9 million cavities.

Our fertilization program begins when the seedlings are approximately 20 days old. We begin with a highly-soluble fertilizer containing 15% nitrogen, 11% phosphorus and 29% potassium, and later (+ 40 days old), change to a fertilizer containing 20% nitrogen, 10% phosphorus and 20% potassium. Chelated iron and soluble trace elements are included in our fertilization program. We also inject 75% phosphoric acid in our irrigation water and fertilizer mixes to maintain a slightly acid pH of approximately 5.5 in our growing medium. Disease and insect control are accomplished by adding fungicides and insecticides directly to our irrigation water.

After 90 to 140 days under active growing conditions in the greenhouse, the crops are moved to the shadehouses or hoopouses to slowly acclimatize. All seedlings are moved outside by the end of July to allow sufficient time for winter hardening.

Four to ten months after sowing, depending on species, seedlings are ready for planting in the field. Seedlings not planted in the fall are over-wintered outside. The following year these seedlings can be spring planted or grown through the summer and planted as double flush seedlings in the fall.

FIGURE 1. MEAD CONTAINERIZED SEEDLING PRODUCTION FACILITY SCALE DRAWING

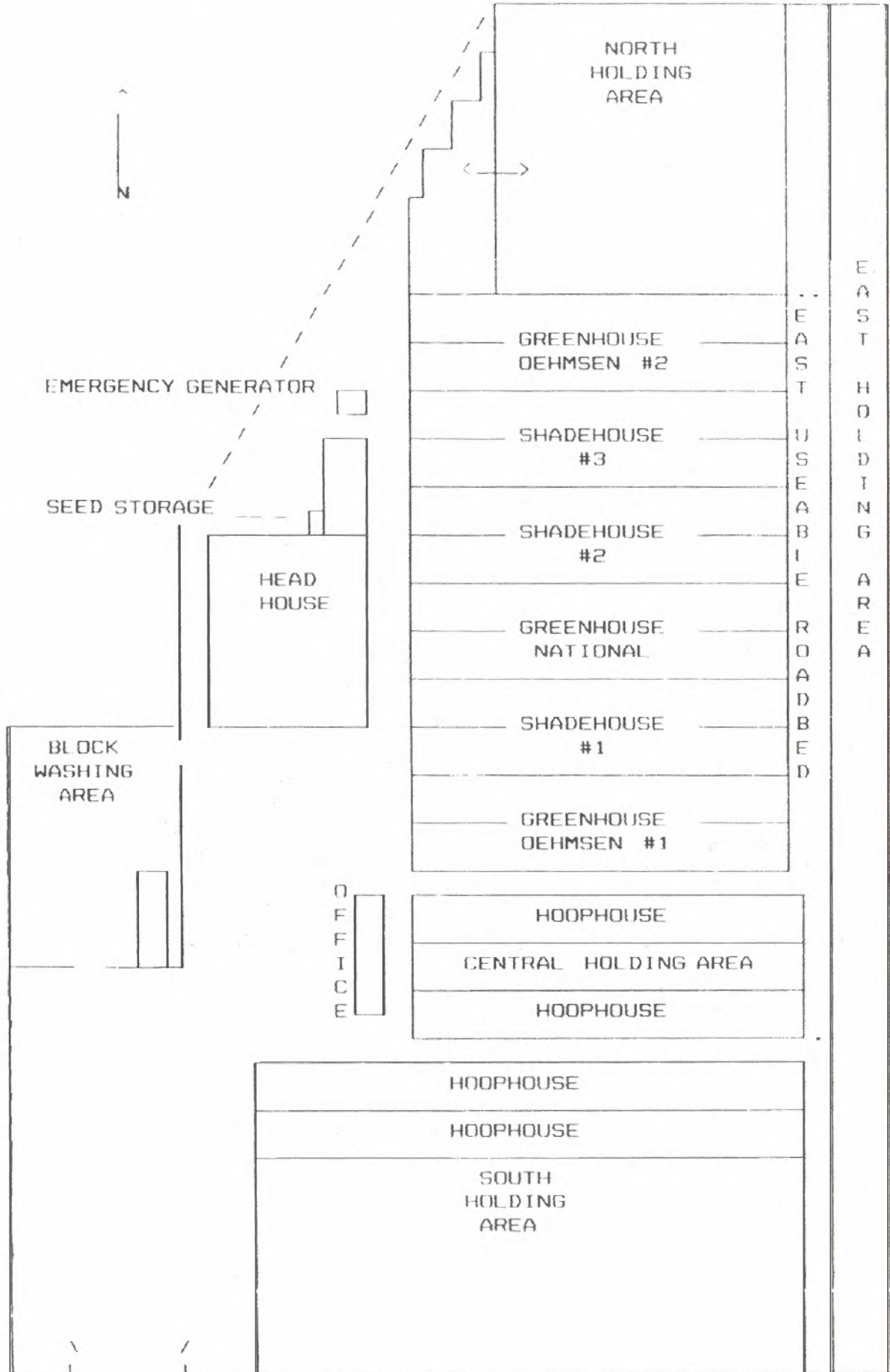


FIGURE 4. GREENHOUSE AND SHADEHOUSE CROPPING SCHEDULE

