GROWTH MANIPULATION OF JUNIPERS

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Greenleaf Nursery Company is headquartered approximately 90 miles southeast of Tulsa, Oklahoma, at Park Hill. Our Texas Division is located in South Texas approximately 70 miles southwest of Houston at El Campo. Both nurseries are exclusively producing container-grown ornamentals, growing a broad selection of narrow-leaved and broad-leaved evergreens, trees and shrubs The practical aspects of growth manipulation of junipers presented in this paper will be from experience gained at the Oklahoma site.

Our Oklahoma division is growing 50 cultivars of junipers, offered for sale in 1-, 2-, 5-, and 7-gallon containers. Our juniper crop comprises 58% of our total production.

Growth manipulation of any crop, in this instance, junipers, simply means to operate, manage and control this growth to one's advantage Thus, the growth manipulation of junipers is done to achieve a quality, salable product at a price that is favorable to both the seller and the buyer.

The manipulation of growth starts in the propagation area. We feel that it is essential to reach the container with a high quality liner. To produce this liner, we begin taking our cuttings in early December from plants in our growing area which have another year to grow before sale. These plants have had the proper growing conditions, resulting in vigorous new growth, which aids in our rooting percentage and uniformity.

Our juniper liners are grown in the propagation beds for approximately 1 year before being transplanted bare-root to the container in February and March. The liners are closely graded at the time of digging and graded again during planting to insure that only uniform, healthy liners reach the container.

At this state we need to insure that the basics of good container growing are followed. These basics include the use of suitable containers, media, cultural practices, pruning, spacing, and timing.

Today's containers are mostly plastic of many sizes, shapes, and colors. A container that has adequate drainage, desirable size and durability should be chosen.

The medium used to fill the containers is one of the more important basics, as we all know, when dealing with containerized plants that must develop a root system in a very limited growing volume Our present mix consists of groud pine bark,

sand, ground shale, and fertilizer additives. This is a very porous mix, which allows good drainage but maintains adequate nutrient levels.

Cultural practices that must be followed are proper watering, fertilization, and pest control. Our watering is monitored very closely by our division personnel. Each division supervisor has one person whose sole responsibility is to determine water needs. These people probe each division daily, actually taking soil samples of the medium, determining the water needs for that day, and co-ordinating water placement with the irrigation department In this manner we can accurately water only when needed and in an amount that will not leach needed nutrients out of the container.

Our plant culture department monitors the nutrient levels throughout the growing season. Soil samples are taken weekly on each group of plants, nutrient levels determined, and action taken to insure that maximum levels are maintained. Our fertilization program consists of three separate operations. The first of these is the addition of fertilizers at the time our soil medium is made. The second is a hand application of Osmocote 18-6-12 on all of the 2-year crops after the first growing season. The fertilizer is carefully distributed under the foliage on the surface of the medium. A slow-release nitrogen fertilizer is applied to all salable crops prior to shipment to maintain adequate nutrient levels from the time they leave the nursery until they are permanently planted. The third method of fertilization is done through "fertigation", or the injection of nitrogen, phosphorus, and potassium through our overhead watering system. This is done when our soil tésts show a decline in available nutrients during the growing season.

The successful control of ornamental pests depends on an early and correct diagnosis of the problem. Our pest management program is designed to obtain the utmost in control of the various pests and problems related to insects, diseases, and weeds. Nutrition and irrigation problems are included in this quality control program. The program involves 3 interrelated stages:

1) The presentation of information needed to recognize and report the pests.
2) The collection of data in the form of a field work sheet, filled out each week by the division supervisors.
3) Interpretation of this data into useful information by the plant culture department.

The interpretation of the data collected on the field work sheets includes recognizing specific trends in the occurrence of pests, then setting up time schedules and planning the spray program so we can treat specific pests with specific chemicals at

the proper time. We are then able to cut spraying costs and at the same time achieve better results.

Another step in the growth manipulation of junipers is shearing or pruning. This is done to produce a bushy, well-branched, uniform plant. Our 1- and 2-gallon junipers are sheared a total of 7 times from the time they are taken as a cutting until they reach salable size. First, the cutting is tipped back when it is originally taken for propagating. Then, as liners in the propagation bed, they receive their second and third shearings during the growing season. The fourth shearing is done immediately after the liner is planted in the container. The fifth shearing is done during the middle of the first growing season in the container. Cuttings are taken from this 1-year-old crop between December and March. As soon as the cuttings have been taken, they are sheared for the sixth time. The final shearing is done in June before the plants become salable that fall.

The 5-gallon junipers receive an additional 2 shearings to complete their cycle. The 7-gallon junipers receive 4 more shearings than the 1- and 2-gallon sizes to complete their growing cycle.

A combination of the number of shearings and the large volume of junipers to be sheared inspired us to come up with a faster way of shearing our juniper crop. I gave a paper (1) last year at the Eastern Region IPPS meeting that describes a shearing machine which eliminates 3 of the hand-shearing operations. Using this machine for an 8-hour day, 2 men can shear about 70,000 1-gallon plants that are can to can and about 40,000 1-gallon plants after they have been spread. Certain cultivars do require some hand shearing behind the shear machine. However, it is usually less than ½ man-hour per 1000 plants.

Spacing is another important factor in determining the outcome of growth manipulation of junipers. Without the proper space the juniper cultivars will rapidly lose their lower foliage, grow in an unnatural manner and completely lose their quality. Our 1- and 2-gallon junipers are grown can to can the first years. *After this period, they are spaced across growing blocks 100 feet* wide in beds 78 inches wide with 18 inch aisles. The 1-gallon containers are placed on an 8 space, which amounts to a 10.2 inch center to center. The 2-gallon containers are placed on a 6 space, which is 14.1 inch center to center. Our 5-gallon plants are on 22 inch centers. Seven gallon plants are spaced according to requirements.

The overwintering of junipers in Oklahoma requires us to bunch the salable crop close together for mutual protection. The one-year-old crop is grown can to can for the first year, so nothing has to be done until spring, which is not true of other

plants. The plants are then spread to allow room for the second growing season.

Timing is going to play a large part in the overall growth manipulation of junipers to obtain quality in the container stock. It is the big key to larger profits If what has to be done in the production of container grown junipers is not timed properly, you can be assured that quality and profits will be reduced.

I have discussed with you 10 points to consider in the overall growth manipulation of junipers. You need to neglect or disregard only one of these and the result will most likely be a second or poor quality plant.

Start with a strong, vigorous liner. Use an adequate container filled with a medium in which you can control the moisture and nutrient levels. Closely monitor the water and fertility needs of the plants. Provide control of insects, diseases, and weeds. Shear for proper growth, space for proper size, and overwinter to protect your investment. Above all, properly time each step in the growth manipulation of junipers so you can be assured that quality and profits will be increased.

LITERATURE CITED

1 Fletcher, J B 1979 Greenleaf nursery's shear machine *Proc Int Pl Prop Soc* 29 290-291

CHARLIE PARKERSON: Questions for Blake Fletcher. How do you shear by hand?

BLAKE FLETCHER: We use Corona grass shears and grab-shear. That is, one hand is placed at the correct height and the plant given a single cut. All the branches are an even height.

CHARLIE PARKERSON: Do you pay on a piecework basis?

BLAKE FLETCHER: No, as we feel it is too difficult to control quality.

CHARLIE PARKERSON: Can you produce a 2-gallon plant in the same time as a 1-gallon?

BLAKE FLETCHER: Yes. The only difference is the cost of 2 liners instead of 1

ATRINAL AND OFF-SHOOT-O IN AZALEA PRODUCTION

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The production of azaleas requires that the apical growing points of the plants be periodically removed during the growing