

Administrative, Economic, and Technical Observations in Developing and Maintaining an Effective Weed Control Program¹

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Weed control is an important part of a nursery operation. As managers we should be concerned with not only the technical aspects of an effective weed control program but influence we have on the "human resources" as well.

As managers we spend between 60 to 80 percent of our operations budget on human resources-salaries. And according to the July 11, 1985 issue of the Wall Street Journal, titled, "Loyalty Ebbs at Many Companies as Employees Grow Disillusioned", we may have some room for improvement. The graph shows that since 1970 there has been an increased dissatisfaction in all management levels of the work force. Sick leave is up to over 13%.

What does this have to do with weed control? An effective weed control program is carried out by people who will do, not by people who can do.

All the technical knowledge in the world is of little importance if it is not applied, or applied wrong, or applied at the wrong time under the wrong conditions because of lack of desire to be effective on the part of the employee. This intangible inner drive called motivation is directly related to the degree of employee commitment to the job and the organization.

As a manager what do you do to effectively utilize this resource? Does your interviewing program allow your staff to assist in hiring the person they will be supervising or working with? As a supervisor were you trained in the art of interviewing? Do you have written job descriptions and have an understanding of what type of characteristics you are looking for **in** an applicant? Do you hire someone to fill a specific beginning level position without considering him for higher level positions.

Do you have an effective training program for teaching the employee the technical skills needed for his job? Does your program include communications and team building skills, policies and functions of the organization and skills needed for supervision and promotion?

Do you have a written annual plan or work that the staff has helped you develop?

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Do you have a review system that allows you to work with an employee on what needs to be accomplished? Provide them with different levels of goals so that the work is challenging while evaluating their progress on a regular basis. Does your program reward them for their success? Remember even if money is limited, praise is free.

The skills and knowledge acquired as a supervisor are learned in most cases. There are a few of us that have that natural ability, but for the most part most supervisors are promoted because they were super-workers not because of their ability to supervise.

As a supervisor you need to find out what motivates an employee. Remember managers do not motivate employees. Motivation is something that a person has within him - he brings it with him. A manager can stimulate motivation through training, planning methods and rewarding accomplishment.

Last year the Oklahoma Forestry Division spent \$27,283.57 on a weed control program. Of the total cost \$18,241.71 was labor and \$9,041.86 was spent on chemicals!

Table I. Three Year Cost Data of Oklahoma's
Weed Control Program

	Total Hrs. & Costs By Year		
	FY83	FY84	FY85
Labor (Hrly) on chemical control	1,284.5	1,691	1,530.25
Labor (Hrly) on hand weeding	<u>3,255</u>	<u>2,988.5</u>	<u>2,862</u>
Total Hours	4,539.5	4,679.5	4,392.25
Labor (\$) on chemical control	7,920.78	8,987.28	8,216.26
Labor (\$) on hand weeding	<u>11,359.95</u>	<u>10,448.58</u>	<u>10,025.45</u>
Total (\$) of labor (\$8/hr. for Sr. Technician and \$3.35/hr. temporary labor)	19,280.73	19,435.86	18,241.71
Chemical Cost	5,334.73	9,109.00	9,041.86
Total Cost	24,615.46	28,554.86	27,283.57
Total Seedling Production	1,562,300	1,191,650	1,685,600
Cost Per Seedling	<u>.01575</u>	<u>.02396</u>	<u>.0162</u>

The following information is a comparison of hand weeding vs. hand weeding and chemical control on 25 acres based on data from a 1981 study at the Norman Nursery done by Dr. Larry Abrahamson, SUNY.

Table II.

Hand Weeding Only	\$133,000.00/yr (est)
Chemical Control + Hand Weeding	<u>27,283.57/yr</u> (Actual cost for 1985)
Savings/Year	105,716.43

We like to think the money was well spent. However, we will continue to work closely with the staff in the manner I have discussed to help each individual become more informed to further reduce costs, both in labor and chemicals.

I feel that management should behave as if employee development is the lifeblood of the organization. This is not to suggest that employee development is of more importance than operations or accounting efforts. It is rather to say that the growth of the organization is dependent upon the growth of its employees.

One observation that I might mention is, when the human resource is poorly utilized so is the equipment and the supplies, (in this case chemicals), that are purchased to do the job. This generally means that both labor and materials cost more to complete the project in a less than acceptable manner.

Another area that is important to everyone is: Why have an effective weed control program? Each individual on the team needs to know and appreciate what the purpose of what they are doing is all about. Or, why should we bother?

An effective weed control program will help:

- A. Reduce fertilizer costs.
- B. Reduce competition in the seed bed yielding an increased quality crop.
- C. Increase survival of the germinating seed.
- D. Reduce the number of cull seedlings at the time of harvest.
- E. Allow more effective use of irrigation water.
- F. Reduce weed seed sources for future crops.
- G. Decrease problems with lifting and grading seedlings.
- H. Increase esthetics, improve attitudes, organization and funding.

Solving a complex problem like weed control requires a wide range of technical methods and cultural practices. The following are methods and techniques utilized at the Oklahoma State Nursery.

Treflan is applied to all areas that are planted to seedling crops except for a few non tolerant species. The herbicide is applied 2-3 weeks prior to planting.

Pre-emerge herbicides such as Mowdown, Devrinol, Dacthal, Goal and Ronstar are applied over the tops of the seedlings on all species grown. The herbicides are applied with tractor mounted spray tanks and the granular forms are applied with a Gandy fertilizer spreader.

Mechanical weed removal methods are required on a small scale, because the pre-emerge herbicide will not control all the weeds.

Hoeing: Hoeing is used on some weed crops in the more open grown species and along the outside edge of the seedling beds. Triangular shaped hoe blades seem to work the best.

Hand pulling: The weeds are removed from the ground by utility knives with curved blades.

If the weeds have started to seed out, they are bagged up and removed from the field.

Drop tubes have been developed on a tractor mounted spray boom to spray pre-emerge or contact herbicide along irrigation lines. The boom can easily go over the top of the riser while the drop tube applies the herbicide from the proper height. With slight modifications the drop tubes could be used to spray aisles on tall species. A tractor mounted spray tank was built for spraying Roundup herbicide. The tank has a center and side mounted boom. The tank also has a hand gun for spraying open areas such as along windbreaks, fronts of beds or along irrigation lines. It can also be used for spot spraying.

Hand held spray tanks are used extensively for weed control. The 12-2 gallon tanks can easily be carried by the employee. Roundup is used in the tanks. The tanks have long wands so the employees can easily spray weeds between the seedlings. Cones are placed over the nozzles so the herbicide is targeted just to the weeds.

Weedwicks are also extensively used for weed control. Roundup at a 33% rate is used in the wicks. The wicks can be used in tight places between seedlings. The sponge type weed wick head seems to work best. This type gives the best coverage and eliminates dripping.

A purple dye is used in the hand sprayers and weedwicks. The dye helps with visual metering of the Roundup. It was specifically developed to be mixed with Roundup. The dye is produced by BeckerUnderwood in Ames, Iowa.

A 2" layer of sawdust mulch is applied to several species of hardwoods during mid-summer. The sawdust helps to moderate the soil temperature and has some weed control benefits. The sawdust is applied with a manure spreader when the seedlings are 6-8" tall. This practice does not work well on the conifers because it has a tendency to bury them, the sawdust won't sift through the needles. The sawdust does not affect the fertilizer requirements of the seedlings.

Cover crop is planted on all fallow areas. The cover crop reduces the weed crop that might come in, prevents wind erosion and increases the organic matter. Sudan is planted in the spring and wheat is planted in the fall.

Weed eaters are used to control the weeds from seeding out on weeds around the complex, windbreaks and other areas that can't be mowed or sprayed.

Methyl Bromide fumigation is used on a limited basis at the Oklahoma State Nursery for weed control.

In the past several years with increased costs in labor, herbicides have been the main focal point. The Oklahoma Forestry Division started its herbicide program in the fall of 1977. Dr. Larry Abrahamson, SUNY, under funding from the U.S. Forest Service drew up a three year program to test and register chemicals for nursery use. Larry has continued with the Oklahoma Forestry Division under contract with SUNY. The following summary in Table III. shows what herbicides are currently operational in the Oklahoma Nursery:

Table III.
Herbicides Applied at the Oklahoma Nursery

Herbicides	Species	Rate (Lbs. AI./AC.)
Mowdown/Devrinol Tank Mix	All conifers, Lace- bark Elm, Arborvitae, Russian Olive, Autumn Olive, Green Ash and Baldcypress	3.0/1.0
Goal	All conifers: Lob- lolly, Shortleaf, Scotch, Austrian, Ponderosa and Vir- ginia Pines, Red Cedar and Arborvitae	.5
Dacthal/Devrinol Tank Mix	Euonymus, Hackberry, Multiflora Rose, Red- bud, Catalpa, Sand Plum, Silver Maple, Osage Orange, Mulberry, Black Walnut, Pecan and Bur Oak	10.5/1.0
Ronstar or Treflan, Granular	Black Locust	1.0
Treflan (Pre-Plant)	All species <u>except</u> Euonymus, Hackberry, Lacebark Elm, Sand Plum, Sycamore, Catalpa and Silver Maple	1.0
Mowdown/Devrinol Tank Mix or Goal	Irrigation lines and along windbreaks	3.0/1.0
Roundup	General Use	2-3 oz/gal.

Dr. Larry Abrahamson has continued his research and the following is an outline of the current work that he is doing (Table IV); He has worked closely with the Oklahoma Forestry Division over the past 8 years to develop the herbicide program we have today. Thanks to everyone's efforts and his direction and research we have saved thousands of hours in labor and increased the quality of our seedlings.

A quick look into the future shows that continued work needs to be done in finding chemicals that can be applied to some of the sensitive hardwoods.

Table IV.
Herbicide Research 1985, Oklahoma Nursery
Coordinated Through State University, New York

Species	Herbicide Tested	Rate (Lbs AI./AC.)
Pecan	Devrinol (50W)	1.5
	Mowdown (80W)	3.0
	Caparol (80W)	1.0
	Dacthal (75W)	10.5
	Devrinol/Mowdown (Tank Mix)	1.0/3.0
Sycamore,	Enide (90W)	4.0
Catalpa, Lace- bark Elm and	Treflan (4EC)	.75
	Dacthal (75W)	10.5
Redbud	Devrinol (50W)	1.5
	Ronstar (2G)	1.0
	Caparol (80W)	1.0

Each chemical was tested post seed, post germination and post seed plus post germination. Each was tested at 1X and 2X rates.

It is also important to have several herbicides for each species so that a rotation can be set up. This will reduce the chances of different weed species becoming resistant to the chemicals.

To increase the effectiveness and versatility of chemicals, "underleaf spraying equipment" needs to be perfected and utilized. This will allow us to place a wider variety of chemicals on specific areas of the plants, weeds, or just on the soil. This should help:

- A. Reduce hand weeding costs, or make them non-existent.
- B. Reduce the cost of chemicals, in that the spray is directed to areas where it is most effective.
- C. Reduce damage to the plants from stunting or decreased vigor.
- D. Help apply chemicals to sensitive plants that we currently do not have control methods for.
- E. Allow more than one cultural practice to be carried out at one time, i.e. underleaf spraying and cultivation, or underleaf spraying and fertilization.
- F. Allow more than one chemical to be sprayed at a time (example - spray a contact such as roundup as needed along with a pre-emergent).

References

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