

IMPACT OF DESERT FORESTRY ON THE
PLANT MATERIALS SYSTEM OF NEVADA¹

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ABSTRACT

The desert forestry program in the State of Nevada has given rise to several problems at the nurseries. This paper explains the background of the major problems and suggests possible means to mitigate them.

INTRODUCTION

The development of desert forestry as a new concept in the plant materials system is bringing about basic changes in the state nurseries. These changes are being manifested in management, production and customer relations. The most important changes and their relationship to physical conditions and policy are considered in the text. Solutions or mitigating programs are also considered that show some promise for management.

WHAT IS DESERT FORESTRY?

Nevada can be described as the driest state in the United States. It is almost entirely within the Intermountain Basin, the landscape being largely characterized by Sagebrush, Greasewood and Pinyon-Juniper types. Small wonder that the state found it necessary to define a kind of forestry that could be workable in this arid land. Our 1975 Legislature defined desert forestry as "the science of developing, caring for or cultivating conservation plant materials in an environment by modifying their response to adverse growing conditions while minimizing the consumptive use of water." I am sure you can readily see a couple of potential areas for action in carrying out the thrust of the definition.

How can the response of plant material be modified to adverse growing conditions? The only practical ways that are available to us now are pruning and the use of films to reduce transpiration. Any problem in desert forestry that follows this path, however, will be highly restricted as the costs are quite high.

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Minimizing the consumptive use of water opens a wide, promising avenue in the selection of adapted species. This particular field not only presents us with a wide number of choices, it also presents us with an attainable goal. There is no doubt that this is our greatest potential, but a serious set of problems emerge that have an effect on our nursery operations. Following is a consideration of those problems on the nurseries that supply conservation plant materials.

THE GEOGRAPHY OF NEVADA

The problems we have found in matching the thrust of desert forestry to our plant materials program are closely tied to geography. A brief look at the conditions found in Nevada will be enlightening.

Nevada is characterized by a wide variety of geographical conditions. A look at the map will show you why. The north-south distance is about 475 miles, east to west about 375 miles. In this expanse we have elevations from 500' to 13130' above sea level and a multitude of mountain ranges in a more or less north-south orientation. Each mountain range has a moist side and a dry side. The valleys usually have closed drainage systems with dry lake beds and considerable areas of alkaline soils.

Strong winds are found everywhere in the state. Periodically, winds in excess of 100 miles per hour are reported in northwestern Nevada. Abrasion of plant tissue by blowing sand (or ice crystals) is not unheard of. Wind can also do strange things to nurseries; a consignment of containerized ornamental plants lost 90% of light soil mix in the containers in one afternoon of wind in the Carson City area.

Temperatures cover a wide spectrum. A portion of our state extends into margins of the Sonoran Desert along the lower Colorado River. Here the coldest temperatures may be 25°F or above. In fact, at Laughlin, Nevada there are some descendants of the original date palms introduced into the United States. The northeastern part of the state has the other extreme - low temperatures with a protracted winter. In between we can find almost everything else. In western Nevada storms blow off the mountains at any time of the year. Late frosts are commonplace. Diurnal temperature fluctuations in excess of 60°F occur in July and August in the northern area, fluctuation in the south at the same time may be only a few degrees.

Precipitation may be as little as 2 inches per year on the eastern slopes of the mountains to more than 40 inches at the upper elevations on the western slopes. Evaporation rates vary from 36 inches in the western mountains to 82 inches in the southeast and pose a very special problem in establishing plant materials. It is pretty close to miraculous when plant material is established with 2 inches of rain, summer temperatures in excess of 110°F, intermittent winds carrying abrasive sand and an evaporation rate of 82 inches!

It is no wonder that desert forestry has had an impact on the plant materials system. To fulfill the directive of the law, a large number of species and selections will have to be screened to find those suitable for each of the many specific geographical locations within the state. Those that are successful will be incorporated into the production schedules of the nurseries. Record keeping will have to be increased and more importantly to the nurseryman, propagation and growing facilities become more complex.

THE ROLE OF THE FORESTERS

Those of you who are managing forest nurseries are already working closely with foresters in the field. They recognize and select the genetic material that is to be used for reforestation programs in their districts. The cones are collected and delivered to you and it is then your responsibility to clean and store the seed to produce plant material on their demand. The nurseryman who is growing windbreak material for the general public, on the other hand, has a lot of fun trying to outguess his market. Fortunately, many of the species are standard and can be used over a wide area. The introduction of new selections for specific sites, though, cannot be done by the nursery manager. Field personnel become an integral part of the nursery by assuming a role similar to the forester in selecting genetic material for the nurseries.

The service forester as an active agent of the nurseries will assume a certain amount of control over nursery management. The responsibility cannot be taken lightly if the program is to succeed. This person must be aware of the many parameters imposed by specific sites and must recognize those plant species that will enhance the chance of success in the program. He must also monitor the plantings over time to build stability into the plant materials program. Long term success is not built on the capricious addition or deletion of plant species in the production schedule.

A second vital function that must come from the field is the estimates of plant materials needed. Plant production far in excess of need is not economical and too few may not accomplish what the forester wants to do.

THE NEW NURSERY

As the desert forestry has developed in Nevada, six major problems have emerged. They range all the way from internal changes in management to dealing with the clientele.

A problem has developed in management that is rather extensive. Mention has already been made about the role of field personnel in selecting and designating quantities of material needed in the program. It is difficult enough for one person to set budgets under an enterprising system, let alone widely dispersed individuals. We find that there is a reluctance on the part of the newly enlisted field personnel to set targets for production and sales. This imposes a certain amount of adroit footwork upon the management to meet the budget requirements as set by the oversight agencies of legislature and administration.

The nursery operations themselves have revealed four problems. One is the seed bank. Many of the species that will be introduced will be collected from the wild. Arid land plants are notorious for erratic seed production, some only setting crops at intervals of 10 years or more. Storage of this material to keep it viable is very often on a hit or miss basis. There will be erratic production of native plant species until a reliable source of seed is obtained or until storage procedures have been worked out for the difficult subjects.

The second problem in nursery operation is closely related - propagation. We simply do not know the requirements for successful germination of some of these species. Shortages of certain species can be anticipated simply because we have not provided the conditions necessary for germination and growth.

Thirdly, a wide spectrum of plant material imposes an economic problem on production . There are so many different plants requiring their own growing conditions that the greenhouse beds are fragmented. We cannot as yet predict very well the time required for production of all species of plants handled by our nurseries.

The last problem we have encountered revolves around our decision to produce in containers. We have selected a container that is cheap, of adequate size, but not very durable. Distribution of nursery stock has become a problem because of the weight involved. Thus far we have been keeping the light weight soil additives at a minimum because of the clay soils we have encountered in the planting sites. Heavy trucks are necessary for transportation to distribution points in the state.

Our only problem we have encountered in dealing with the clientele is one of timing. Containerization has lengthened the planting season, but the typical customer wants to plant in the spring. Monetary restrictions forbid the construction of extensive nursery equipment to enable the program to exist on spring sales alone.

CAN ANYTHING BE DONE TO EASE THE IMPACT?

The nursery manager, like everyone else finds it very easy to list the woes that accumulate from a new program. The responsibility of the manager is not to stop there, but to proceed with the program, solving those problems so as to bring the new program into existence. We can draw from our experience and propose some procedures that could be employed in the early planning period that would have made our changeover easier to accomplish.

Of course, the uppermost question is "how can this program be implemented?" And, of course, no answer can be found without understanding. A definition is needed that is clearly understood and agreed upon by the policy makers, administration, oversight agencies and the action agency that clearly defines the mission and the limits of the new proposal.

After this agreement has been reached, the action agency should embark on an investigative program that has the thoroughness of a systems analysis. After all, the manager of the action agency is the person who is supposed to do the budgeting*and the time frame reference for the project. He simply cannot institute a complicated program without having the best information possible. Admittedly, no one has succeeded in gathering all of the information about any project, but mistakes in commitment are inversely proportional to the body of knowledge.

Management must make accurate estimates of the resources needed to accomplish the mission. The manager must justify the expenditure of funds to obtain the necessary equipment and the necessary positions. Do not forget that the cost of training is as much as part of development as is the cost of a new greenhouse.

Position descriptions and responsibilities must be clarified early in the program. Once the level of responsibility and area of responsibility of each actor is understood, many of the problems of management are mitigated. Personnel management must be based on who is responsible for what.

Pursue the course of action with deliberation. The addition of too many activities and functions in a short period of time results in confusion, hard feelings and the inevitable delay. There will be problems that crop up that no one could anticipate. When time is planned into the change over period these can be handled without becoming crises.

For the internal problems of production, remain flexible. Add or subtract species in the production schedule only with good justification. Use small units for seed treatment and germination so that specific growing conditions can be provided. Keep equipment as "general" as possible. The nursery will have to supply small quantities of plant materials for specific uses.

Consider seed orchards as an integral part of the nursery. Control of seed collection and production would be concentrated and more easily facilitated. A higher production of seed would be anticipated and that would reduce storage problems.

Integrate a distribution system with the necessary transport within the nursery. The initial cost may be high, but the loss of some management decisions to the field personnel can be made up in part by better distribution. Plant losses are at a minimum if the responsibility of distribution rests with the nursery. The weight problem may be mitigated as more knowledge is gained about the planting sites.

It will not be easy to change the habits of the clientele. We are now developing an informational program to show the advantages of planting at different seasons of the year. For Nevada, we really need three programs, one for each of the major areas. Eventually, the plant materials program, through the field personnel will become a positive benefit to the people of the state.

Evaluations will have to be frequent and honest. The final criteria for success will be determined by the clientele of the program.