PLANTATION AND DIRECT-SEEDED STAND MANAGEMENT: A LOOK AT SOME FUTURE YOUNG STAND MANAGEMENT PRACTICES

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The idea I hope to develop in my part of this panel discussion is that young stands offer a tremendous opportunity for being intensively managed. Currently, little cultural work is done in young stands until they reach merchantable size. Will we continue to just let these young stands grow? In the next 10 years or so, as our silvical knowledge increases, it appears likely that several practices will be carried on in this period of the rotation that are not now considered feasible or practical. In developing this thesis, I will use slash and loblolly pines to illustrate my points. However, I do think that the principles may apply to other pines, as well as to hardwoods.

POSSIBLE FUTURE PRACTICES

What are some of the practices that might be used in young stands? My list would include those practices that:

1. Improve site conditions
2. Control competing vegetation
3. Control stocking
4. Improve quality and value of the ultimate product.

I think most of you would agree that before a given silvicultural practice will be accepted, the biological aspects for the practice must first be demonstrated and then its economic aspects justified on a cost and return basis. This is essentially the nub of intensive management.

SOME SPECIFIC PRACTICES

Turning now to some specific young stand measures, let us discuss three: fertilization, control of competing vegetation, and control of young stand densities--and speculate on what place these practices might hold for the future.

Fertilization in young stands

Ten years or so ago there was a surging interest in the fertilization of forest stands. To some it was to be the panacea for forestry, and to others, it was completely impractical. Research in the interim has pointed out the complexity of the "fertilization problem." Results from various fertilization studies have often been seemingly in conflict, but as we learn more about plant nutrition, and the various interaction effects that chemical and physical properties of the soil have on plant nutrition and tree growth, many of these anomalies have been or will be explained. Probably the crux of the fertilization problem is being able to diagnose the nutrient deficiency and then to prescribe the fertilizers when and where needed.

An outstanding example of the beneficial effects of fertilization is the Australian experience. They found in their northeast coastal region, where slash and loblolly pines are best adapted climatically, that the soils are deficient in phosphorus. A standard practice is to apply super phosphate to these soils so as to bring the P_2O_5 content up to about 120 ppm for slash pine and 150 ppm for loblolly pine plantations (Moulds, 1957).

In Florida, evidence is accumulating that the application of phosphorus on soils almost totally deficient in available phosphorus may be feasible (Curtis, 1964). Early results of a cooperative study by the University of Florida, The Buckeye Cellulose Corporation, and the American Agricultural Chemical Company have been so promising that Buckeye has established a pilot test on a 630-acre tract using granular triple super phosphate.

My point is that it seems quite likely that fertilization will not be an uncommon practice for soils that have nutrient deficiencies. This will be particularly the case once the diagnosis and prescription problems are licked.

Control of competing vegetation

Turning now to the second practice: controlling young vegetation that competes with a direct-seeded or planted stand. Let us look first at some reasons why this might be a possible measure. Such control should make more growing space available for crown development. This should subsequently result in a larger photosynthetic area and better growth. If the site is droughty, or the general area experiences drought periods during the growing season, control of competing vegetation should also make available more soil moisture for the stand being managed. Timing the control of the competing vegetation also has its implications. If the stand is not able to make use of the released growing space because of age or size or other reasons, then responses may be insignificant.

Actually, very little work has been done to show what effect small hardwoods have on pine growth in young stands. There have been studies conducted in older pine stands relating effects of hardwood understories on available soil moisture. Several have shown that by controlling understory hardwoods and shrubs more soil moisture is made available to the pine overstory and some benefits are reflected as an increased growth response.

Interim results from a study on the Bigwoods Experimental Forest in North Carolina from plots with and without the hardwoods controlled at age 6 are indicating significant growth differences. Seven years after the hardwood treatment, average diameter was 0.4-inch larger and average annual basal area growth was 2.3 square feet per acre more when hardwoods were controlled than when they were not. This has not been evaluated in terms of merchantable growth because only a small portion of the trees have reached merchantable size. However, the growth reduction attributable to the hardwood competition in a young loblolly pine stand may prove to be large enough to warrant the adoption of control measures. There is, however, another side to this coin and that is relative growth rate of the competing hardwoods and their value. This will certainly need to be evaluated, which will give the forester another choice in the management of these stands.

Control of young stand densities

Let us turn to the third practice: control of young stand densities. The first two practices discussed will probably be equally adaptable to direct-seeded and planted stands under similar site conditions. However, the control of young stand densities is obviously germane only to direct-seeded stands because planting implies control of initial spacing.

Plantation spacing studies should provide us with some initial guidelines. Generalizations are always risky. But if I had to generalize on the results of the various plantation spacing studies, I would list two points:

1. That the closer spacings produce more total cubic-foot volume, but on more stems with smaller diameters.

2. That the wider spacing produces larger trees and more merchantable wood at an earlier age.

If these points are valid for plantations, they are likely to be valid also for direct-seeded stands. And thus, if the management objective is larger trees and more merchantable wood at an earlier age, then control of young stand densities will be called for. One major gap in our knowledge is the age at which spacing control should be initiated in a direct-seeded stand. A slash pine study in Georgia indicates that diameter growth differences are not apparent in differently spaced plantings until age 5. From that single study, it would appear that control of densities could be delayed to about age 5 with no appreciable effect on growth. Perhaps the range in age might be 4 to 6 years.

SUMMARY

This has been a hurried look at only three possible future practices in young stands. Others may be even more important. However, the idea that I would like to inject is that there are some promising opportunities for applying cultural practices in young stands, especially in those holdings that are intensively managed. To answer the first question that I posed--no, I don't think we will continue to let young stands just grow! I think we will be taking a critical look at a number of practices and will be applying those that available evidence suggests will pay off.

LITERATURE CITED

Curtis, Floyd H.
1964. Fertilizing slash pine from the air. Forest Farmer 23(9):8.

Moulds, Frank R.
1957. Southern pines in Australia. Forest Farmer 16(10):6-7.

PROCEEDINGS, DIRECT SEEDING WORKSHOPS. 1965. pp. 137-140. (The Western Direct Seeding Workshop at Alexandria, Louisiana on October 5-6, 1965. The Eastern Meeting was held at Tallahassee, Florida, on October 20-21, 1965)