

Southern Forest Tree Improvement

Problems and Research Priorities - June, 1983

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The Conference Chairman asked the ad hoc Committee to poll the attendees about their perceptions of researchable problems facing southern forest tree improvement and about the priority that should be assigned each of these problems. Accordingly, we circulated a questionnaire at the conference that listed 16 appropriate items and asked each attendee to add items if necessary and to rank any or all of these in order of priority. A similar survey had been carried out in 1973 at the 12th SFTIC and it was desired to compare the perception of problems and priorities 10 years later as well as to produce some useful data for planners of Forest Tree Improvement research in the South.

Of the approximately 200 registrants, 94 responded. We calculated the average rank assigned to each of the 16 items printed on the questionnaire and merely listed the additional items that were volunteered.

All respondents did not rank all 16 items so an adjustment was necessary to arrive at average rank. We assumed that unranked items were considered lower priority than ranked ones and then assigned a single low rank to the items each respondent left unranked.

Results were as follows (Table 1). Items are listed in descending order of priority (1 = highest priority, 16 = lowest).

Advanced generation pine breeding strategies headed the list by a considerable margin reflecting the fact that most southern programs are into at least the second generation. Concern about direction of the breeding in the future is obviously high.

The high average ranking of juvenile-mature correlations probably reflects the often-expressed concern with early testing, so that we "turn over" generations more rapidly.

Fusiform rust resistance breeding, seed orchard management, including cone and seed insect control, ranked high as did vegetative propagation which has had a period of intense publicity recently.

It is noteworthy that competition effects and incorporation of genetic effects into growth and yield models attained average rank even though work in these areas is quite new in forest genetics. There must be a fairly widespread awareness that genetic gain in growth rate is expressed through a process of stand-dynamics and that growth and yield methods are going to be necessary to relate row-plot progeny test data to actual yields.

Table 1.--Priority ranking (high to low) assigned to 16 research categories by attendees at 17th SFTIC (1983).

RESEARCH CATEGORY	X RANK
ADVANCED GENERATION PINE BREEDING STRATEGIES	5.3
JUVENILE - MATURE CORRELATIONS	6.5
FUSIFORM RUST RESISTANCE BREEDING	6.7
CONE AND SEED INSECT CONTROL	7.2
SEED ORCHARD CULTURE	7.3
VEGETATIVE PROPOGATION	7.4
COMPETITION EFFECTS	7.6
GENETIC EFFECT INTO GROWTH AND YIELD MODELS	8.1
REPRODUCTIVE PHYSIOLOGY	8.4
CONE AND SEED HARVESTING	8.6
POLLEN MANAGEMENT	9.6
HARDWOOD GENETICS AND BREEDING	9.8
GEOGRAPHIC VARIATION	10.0
GENE CONSERVATION	10.2
HYBRIDIZATION	10.7
BROWN SPOT NEEDLE BLIGHT RESISTANCE	12.7

The volunteered items (Table 2) could not be assigned average rank with the items printed on the questionnaire but it was obvious that genetic engineering was considered of some importance. We included respondents listing cytogenetics, gene mapping, molecular genetics, and genetic engineering itself in this category.

Table 2.--Research categories volunteered by 94 respondents at 17 SFTIC (1983)

RESEARCH CATEGORY	NUMBER MENTIONING
GENETIC ENGINEERING	6
PITCH CANKER CONTROL IN ORCHARDS	4
EARLY TESTING	3
ACCELERATED BREEDING	3
ASSESSING SELECTION PROGRESS	1
SELECTION INDEX	1
THINNING PROGENY TESTS	1
OPERATIONS RESEARCH - LINEAR PROGRAMMING	1
DISEASE RESISTANCE	1
YIELD PHYSIOLOGY	1
ORCHARD DESIGN	1
SEED EXTRACTION AND CONE RIPENESS	1

Ten years ago, when the first generation orchards were just beginning to produce seed, cone and seed insect control headed the list of concerns of attendees at the 12th SFTIC (Table 3).

Table 3.--Proportion of respondents listing nine research categories in response to a questionnaire on research priorities circulated at the 12th SFTIC (1973)

<u>RESEARCH CATEGORY</u>	<u>Proportion of respondents listing</u>
	%
CONE AND SEED INSECT CONTROL	63
REPRODUCTIVE PHYSIOLOGY	38
HARDWOOD GENETICS AND BREEDING	30
ADVANCED GENERATION PINE BREEDING STRATEGIES	28
CONE AND SEED HARVESTING METHODS	24
FUSIFORM RUST RESISTANCE BREEDING	23
PINE POLLEN MANAGEMENT	23
FOREST GENE RESOURCE CONSERVATION	15
JUVENILE/MATURE CORRELATIONS	9

Reproductive physiology was in second place. Presently, both these items are perceived to be of lesser importance by SFTIC attendees. Seed supply is apparently less of a problem now as a result of maturing orchards and development of effective insect control measures. Hardwood genetics has also declined in priority ranking over the past 10 years while juvenile-mature correlations went from the bottom to the top of the list during the same period.