APPENDIX A

Research on these tree and shrub seed topics was suggested:

A. Cone and Seed Production

Prediction of seed crops.
Correlation of weather conditions, pollination, and seed production.
Effectiveness of pollination.
Reduce seed crop periodicity.
Fertilize to increase seed production--what, when, how much.
Production characteristics of individual trees.
Preventing loss of conelets to frost--especially in seed orchards.
Prevention of insect and disease damage to developing cones.
Estimating cone and seed yields.

B. Cone Collection, Handling and Storage

Cone and seed maturity indices--especially for Abies, Picea, hardwoods and shrubs.
Relation of embryo development to seed maturity.
Cone and seed harvesting techniques and equipment.
Chemical abcission of cones.
Cones per bushel and seeds per pound.
Identification of cones by sources.
Identification of immature cones and seeds.
Proper storage conditions for cones--moisture conditions, ventilation, prevention of heat, etc.
Length of seed storage in the cone--relation to dormancy.
Control of insects and fungi in cones.
Cone afterripening techniques to extend collecting season.
Degree of seed ripening in the cone, by species.
Does rough cone handling harm the seed? (Collection method in relation to seed quality.)

C. Seed Extraction, Processing and Storage

Cone conditioning to gain maximum seed extraction.
Temperature and humidity limits for safe cone drying, by species.
Rate of drying, by species.
Causes of excessive kernel shriveling.
Safe limits for present dewinging and cleaning techniques.
Reducing processing damage to seed.
New extraction technology.
Prestorage testing and treatment of seed.
Optimum seed moisture before and during long-term storage.
Seed storage containers and conditions; storage of damaged seed.
Basic storage characteristics of seed-longevity, etc.

D. Seed Quality Determination

Improve seed sampling--equipment and methods for normal and unusual conditions.
Proper time to make germination tests.
Overcoming seed dormancy--pregermination treatment.
Stratification methodology.
Faster and cheaper germination tests.
Germination pecularities of individual species.
Seed quality determination with X-ray equipment.
Alternate viability tests--respiration, chemical staining, excised embryo, etc.
Testing seed for seedling vigor.
Importance of different kinds of damage to seed.
Storability tests.
Consistency of viability tests to field performance.
Ocular estimates of seed quality.
Develop standard, practical methods of moisture determination.
Species and seed source identification.
Basic seed characteristics--seeds per pound, size variation, etc.
Presence of pests and microorganisms.
Presence of and removal of seed lot contaminants.

E. Seed Treatment and Dissemination

Seed conditioning to obtain vigorous seedlings.
Presowing treatment effects on seed viability and growth of seedlings.
Fungicides and insecticides to protect seed.
Maintaining viability of Endrin-treated seed.
Preventing seed damage during dissemination.
Mechanized seedspotting and other improvements in techniques.
Seed treatment standards.