earlier studies (SALAZAR, 1986; NGULUBE, 1989). Among the growth characters, collar diameter showed highly significant positive correlation with seedling dry weight followed by plant height and root length. The significant positive correlation between total number of nodules and seedling biomass reflect that rhizobium symbiosis enhance the plant response by providing increased nitrogen for plant growth and this association indicate the importance of these traits in selection of seed sources. High correlation between root length and total number of nodules showed the influence of root length on nodulation, as the root length increases, root surface area to allow the infection from rhizobia increases.

Conclusion

The preliminary phase of this trial involving 20 seed sources revealed the existence of considerable amount of genetic variation for seedling and nodulation traits among seed sources, which provides firm base for establishment of wide range provenance trial. Although, this experiment demonstrated the presence of variation in nodulation capacities between seed sources, some more specific studies are needed in this species to determine the seed sources having high potential for nitrogen fixation. The selection therefore, should be aimed at seed source with highest level of susceptibility to root nodulation with rhizobia which could perform well in the initial stages of plantation establishment on poor sites.

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JOHN (JACK) W. DUFFIELD

JACK DUFFIELD died July 13, 2006 in Shelton, Washington, at the age of 94. He was an inspiration for many in forest genetics, and we regard him as one of our very best friends.

His early education was at Cornell University where he earned a B.S. in forestry and at Harvard University where he earned a Master of Forestry. He was a forester first and

always and remained a member of the Society of American Foresters from 1935 until his death. He was elected a Fellow of the Society in 1960.

However, it was in forest genetics that he became a true pioneer. As early as 1940, while he was working as a forest geneticist for the USDA Forest Service's North-eastern Forest Experiment Station, he published on chromosome counts in oaks (*Quercus*). For the next few years, he turned out a series of papers on subjects such as pollen longevity in pines (*Pinus*), polyploidy in red maple (*Acer rubrum*), and cytological staining, published in the *American Journal of Botany*, the *Journal of Forestry*, *Stain Technology*, and the *Journal of Heredity*. One of his 1940 papers, coauthored with A. G. Snow, had the ambitious title "Genetics in Forestry", and predated classics in the field such as Bertil Lindquist's book "Genetics in Swedish Forestry Practice" by eight years and Syrach Larsen's "Genetics in Silviculture" by 18 years.

His research career was interrupted by WWII. During service with the U.S. Army in North Africa and Italy from 1942 to 1945, JACK rose from lieutenant to major,

and was awarded the Silver Star and the Purple Heart. As a commissioned officer during a period when the U.S. military was still segregated, he commanded a company of black soldiers and won their respect.

After the war, he returned to research as a scientist at the USDA Forest Service's Institute of Forest Genetics, Placerville, California, where he worked from 1946 to 1953. During this period, he earned his Ph.D. in genetics from the University of California, Berkeley, and at the same time used his maturity to help many other graduate students.

While at the Institute of Forest Genetics, JACK organized and added to its 115-acre Eddy Arboretum. So many colleagues from around the globe visited him there that one house was made available on a permanent basis to serve those who came to work and study with him. One of us (BZ) was among those, spending weekends at the Institute while pursuing my own Ph.D. at the University of California. While JACK completed his dissertation on bishop pine (*Pinus muricata*), he helped many graduate students with their theses, such as suggesting to me (BZ) my dissertation study on the natural hybrids of Coulter pine (*Pinus coulteri*) and Jeffrey pine (*P. jeffreyi*).

In addition to his tenure in government research, his broad career also spanned private forestry and academia. In private, industrial forestry, he was director of the Industrial Forestry Association tree breeding and nursery operations in Oregon and Washington. In academia he was a member of the forestry faculty at the University of Washington and later at North Carolina State University, retiring from North Carolina State University in 1977 after 14 years.

It is notable that his experience in genetics and silviculture, and his influence, spanned the continent. While a student he worked on western white pine blister rust control on the Clearwater National Forest, Idaho, and after graduating from Harvard University he was employed for a year in the Lake States on the Huron National Forest, Michigan. His research was conducted in the Northeastern United States and in the Pacific Southwest, and he taught silviculture at universities in both the Douglas-fir region of the Pacific Northwest and in the loblolly pine region of the South. Along the way he had a major impact on forestry worldwide: as the U.S. delegate on FAO's eucalyptus study tour of Australia (1952); as the U.S. AID advisor to Yugoslavia on culture of white pine and Douglas-fir (1963); and as a Fulbright lecturer at the University of Ljubljana, Slovenia (1968–1969).

He was best known for his work on the taxonomy of pines. His 1952 paper in the first volume of *Zeitschrift für Forstgenetik und Forstpflanzenzüchtung* (now *Sil-*

vae Genetica) on relationships among the pines pioneered the use of crossability relationships in defining pine taxonomy. It provided a foundation for the work of those who followed in pine systematics, and was a seminal classification that had to be acknowledged and tested by all who came later.

He was also a mentor and a valuable colleague who gave unselfishly of his time. In the early 1980s, when one of us (FTL) needed advice on what to do about a legacy of field trials established by the Institute of Forest Genetics, he spent his summers at Placerville tracking down provenance, progeny, and hybrid tests and making recommendations on their future utility and management. When the late JESSE P. PERRY was writing his book "The Pines of Mexico and Central America", JACK led him to herbaria and arboreta to help him compare morphology, resin characteristics, and hybrids of pines proposed for inclusion. JACK wrote the forward to that book.

JACK was not only erudite, he was literate. At the universities he served, he taught silviculture, but his influence also extended to the general question of forestry education. He became concerned about the poor level of written expression common among forestry students. He edited the reports of his students and those in other classes for grammar and style, and many students were aided because of his influence. Not only did he help students at his universities, but he published papers on "Writing for a Scientific or Technical Journal" and on "The Education and Training of Foresters". He was, at times, editor of *Forest Science* and associate editor of the *Journal of Forestry*, where he helped many colleagues polish their manuscripts.

After retiring from North Carolina State University, the boy, born in Brooklyn, New York, moved back to his favorite area in a country the man had known from coast to coast – the state of Washington on the shores of Puget Sound. There he continued to advise and consult for another 30 years and to add publications to his extensive bibliography. Mostly, however, he continued his wide-ranging interests in dendrology by adding to his own arboretum, continued to read and note a variety of biological phenomena, and enjoyed a long and well-deserved life with his wife Marjorie, who pre-deceased him in 2005.

He and Marjorie were both naturalists and met on an Audubon Society outing. Their three children, EDWARD W., THOMAS, and CYNTHIA, were marked by their parents' interest in natural history and the outdoors and continue to be engaged as bird watchers, botanists, naturalists, teachers, and Outward Bound instructors.

F. T. LEDIG, B. J. ZOBEL