Leucaena selections (EDN)

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From EDN 57-6

FROM OUR SEEDBANK

KX2 'Ohana': A NEW FORAGE LEUCAENA. The KX2 'Ohana' leucaena is an interspecific cross of *Leucaena palida* K636 and *Leucaena leucocephala* K8 developed by the Hawaii Agriculture Research Centre (HARC) for resistance to the psyllid insect which has hurt leucaena production in many regions of the world. Compared to K636, KX2 'Ohana' has superior psyllid resistance and greater cold tolerance. Whereas K636 only produces well at sea level, KX2 produced five times more foliage at 850 m (2800 ft) elevation than K636 grown at sea level. Under dryland conditions with heavy psyllid infestations, KX2 yielded two times more foliage than K636. Trials in Hawaii indicate that KX2 can be grazed 5-6 times/year in lowland tropics, with yields in rainfed environments in Hawaii ranging from 4-7 t/ha/yr (1.6-2.8 t/acre/yr) in the lowlands to 2-3.5 t/ha/yr (0.8-1.4t/acre/yr) at higher elevations. If you would like a small packet of seed for experimentation, they are available from ECHO's seedbank. Trial packets are free to those working with small-scale farmers in developing countries; others please send US$2.50 per packet. [outdated information, please contact ECHO for current price]

From EDN 99-7

FROM ECHO'S SEED BANK

Highlights of Dr. Brewbaker's Leucaena Tree and Sweet Corn Breeding Programs

By Dr. Tim Motis
ECHO Seed Bank Director

We were privileged to have Dr. James Brewbaker as a speaker at our annual conference in November 2007. As a plant breeder at the University of Hawaii, Dr. Brewbaker has devoted many years of scholarly research to the leucaena tree and to sweet corn. He has always had a strong interest in ways that his work can benefit smallholder farmers. This article will highlight seeds he donated to ECHO's seed bank, along with key points from his presentations, his conversations with ECHO staff, and his publications.

Leucaena leucocephala, frequently referred to as 'Leucaena' (in Australia and the United States) and Ipil ipil (in the Philippines) is a long-lived, fast-growing, leguminous, multi-purpose agroforestry tree. Uses include reforestation, fuel wood, shade crop for coffee and cacao, green manure, and fodder. As fodder, leucaena has nutritional value that can be comparable to that of alfalfa. It can be toxic to non-ruminant animals, and to ruminants (cows, goats) that do not have appropriate ruminant bacteria (*Synergistes jonesii*; often already present in ruminant animals in the tropics). The toxic effect is due to mimosine, an unusual amino acid present in the leaves and seeds.

Leucaena foliage

Leucaena wood

Figure 8. Leucaena leucocephala foliage (left) and firewood (right). Photos by Tim Motis.

Leucaena originated in Central America and Mexico. Early in the 16th century, Spanish traders brought what is now referred to as 'common' (also known as 'Hawaiian') leucaena to the Philippines. Common leucaena plants are shrubby and tend to be weedy. Nonetheless, the agroforestry potential of the plant was widely recognized and common leucaena spread to most of the tropics, thriving in low-elevation areas with slightly alkaline soils.

Leucaena plantings were mostly free of pests until late in 1982 when the leucaena psyllid (*Heteropsylla cubana*) began to spread beyond its native territory in Central America to parts of the world where there were no insect predators to keep it in check. There it caused major damage to existing plantings. Urgent research efforts led to new types of L. leucocephala that were selected from extensive collections at the University of Hawaii and other institutions. Types have been identified that are resistant to psyllids and are better suited to forage (Peru type) and timber [Salvador (Hawaiian giant) type] production. ECHO currently carries seed of K6 (Peru), K8 (Salvador), K67 (Salvador; heavy seeder), K500 (cross of Peru and Salvador types; excellent for forage), and K636 (Hawaiian giant; cold tolerant and psyllid resistant).

Dr. Brewbaker emphasizes that there are at least 21 other leucaena species besides *L. leucocephala*, and that some of these possess traits that provide plant breeders with even greater ability to address the problems mentioned above. L. diversifolia (ECHO carries seeds of K156 and K784), for example, provides genes for cold tolerance. *L. pallida* has resistance to psyllids and low seediness. Crossing *L. leucocephala* with *L. pallida* resulted in a hybrid (KX2-Hawaii) that tolerates cool weather, has psyllid resistance, and is low in mimosine. At the November 2007 conference, Dr. Brewbaker provided ECHO's seed bank with KX2-Hawaii seeds. See the final paragraph of this article for information on how to request a trial packet of seed.

Concerning seed propagation of KX2, Dr. Brewbaker mentioned that the traits of this hybrid can be maintained over successive generations of seed saving as long as seed is collected from more than just two or three trees. He recommended establishing leucaena "orchards" as living seed banks, and suggested eliminating off-types. An off-type of KX2, for instance, would be a tree that is shrubby and produces numerous seed pods in large bunches. True-to-type, less-seedy KX2 trees produce just a few pods that usually occur singly in the tree canopy. (Leucaena trees can produce so many seeds that they become a weed problem. Consequently, types that produce much fewer seeds are desirable).

Dr. Brewbaker also spoke about his efforts to develop sweet corn varieties that perform well in the tropics. North American sweet corn varieties typically fail in the tropics, largely because day length in the tropics is shorter than an average summer day in the northern hemisphere. Pests such as earworms can also significantly harm the plants.

An open-pollinated sweet corn variety that Dr. Brewbaker developed is called 'Hawaiian Supersweet'. He provided us with seeds of both a yellow- and white-kernelled form of this variety. ECHO has carried the yellow-kernelled type in the past; the type with white (also called silver) kernels is a new addition.

Brewbaker continually "massages" 'Hawaiian Supersweet' by growing it out and selecting ears from the