

**Trees for Improving Sustainability, Resource Conservation, and  
Profitability on Farms and Ranches**  
Kona, Hawai'i May 16-19, 2006

University of Hawai'i College of Tropical Agriculture and Human Resources  
Mealani Research Station, Waimea  
[www.ctahr.hawaii.edu](http://www.ctahr.hawaii.edu)

**Site characteristics:** Elevation 2,800 feet; rainfall 56 in., average minimum temperature 55 deg F, average maximum temperature 69 degrees F, soils Maile series, well-drained silt loams that formed in volcanic ash, hydrous, ferrihydritic, isomesic acrudoxic hydruclands

**Windbreaks:** Planted 1967 by Dr. Yusuf Tamimi.

1. *Acacia melanoxylon*, blackwood acacia. Not inoculated, did not do well.
2. *Araucaria heterophylla*, Norfolk Island Pine. Traditional windbreak, moderately sparse canopy, narrow so it doesn't take up much land, does not spread.
3. *Cupressus lusitanica*, Mexican cypress, Portuguese cypress. Not very uniform.
4. *Cupressus macrocarpa*, Monterey cypress. Not very uniform.
5. *Eucalyptus globulus*, blue gum. Did not do well, removed from trial.
6. *Eucalyptus sideroxylon*, red ironbark. Drought resistant, black bark. Performs well.
7. *Eucalyptus paniculata*, grey ironbark. Rough bark. Performs well.
8. *Melaleuca quinquenervia*, paperbark. An invasive species near wetlands but not spreading in pastures. Branches spread so it's not a windbreak for narrow spaces.
9. *Olea europea*, wild olive. Short dense windbreak. Branches spread wide. May naturalize and become a weed.
10. *Sequoia sempervirens*, redwood. Did not do well.

## Forage dry matter yields and psyllid resistance of thirty-one *Leucaena* selections in Hawaii

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### Abstract

Forage yields of *L. leucocephala* (Lam). de Wit have been reduced as the result of psyllid damage since *Heteropsylla cubana* Crawford invaded the Hawaiian Islands in 1984. The forage productivity and psyllid resistance of 31 *Leucaena* species and interspecific hybrids were assessed from 5 harvests in Hawaii during 1991 and 1992. The trial consisted of an augmented randomized complete block with 22 *Leucaena* selections in all 4 replicates, 2 selections in 3 replicates and 7 selections in 1 or 2 replicates.

Forage (leaves and stems < 6 mm diam.) dry matter (DM) biomass yield over a 13-month period ranged from 1.4 to 34 Mg ha<sup>-1</sup> from total DM ranging from 1.9 to 63.7 Mg ha<sup>-1</sup>. Percent forage fractions ranged from 49 to 78% (forage DM/total DM). The 10 selections in this trial of either *L. pallida* Britton & Rose, and its hybrids with *L. leucocephala* consistently produced both the highest forage and total DM yields averaging 22 and 40 Mg ha<sup>-1</sup>, respectively. This represented a three-fold increase in forage production when compared to *L. leucocephala* K636 (a standard around the world).

The excellent performance of the *L. pallida* lines was attributed to high psyllid resistance and seedling vigor. All *L. pallida* selections with the exception of K953 exhibited good psyllid resistance. *Leucaena diversifolia* Benth. K749, *L. pallida* K376, and *L. esculenta* (Moc. & Sesse) Benth. K950 had the highest psyllid resistance ( $p < 0.05$ ). Psyllid damage was negatively correlated to forage DM yield at both harvest 2 and 5 ( $r = -0.55$ ,  $p < 0.01$ ,  $n = 94$ ). Forage DM was positively correlated to seedling vigor for the first harvest ( $r = 0.83$ ,  $p < 0.001$ ,  $n = 74$ ) and combined harvests ( $r = 0.88$ ,  $p < 0.001$ ,  $n = 74$ ).

Key words: total DM - percent forage – psyllids

Currently *Leucaena* var. Kx2 (*L. pallida* x *L. leucocephala*) being propagated for use for animal forage at the Mealani Research Station and elsewhere at higher elevations in Hawai'i.

Fact sheet on *Leucaena* hybrids:

[http://www.tropicalforages.info/key/Forages/Media/Html/Leucaena\\_spp\\_hybrids.htm](http://www.tropicalforages.info/key/Forages/Media/Html/Leucaena_spp_hybrids.htm)

Research on *Leucaena* in Hawai'i:

<http://www2.ctahr.hawaii.edu/forestry/Data/Research/leucaena.html>