Cultivar trial of olives (Olea europa) in Hawai‘i

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ABSTRACT

Hawaii has the advantage of diverse ecological zones with 11 of the world’s 13 climate zones. Many crop species can be grown in Hawaii, including olives (Olea europa) that are adapted to Mediterranean growing conditions with mild, rainy winters and warm, dry summers. Ten olive cultivars were selected for oil production; six cultivars were transplanted on 24 February 2011 and four cultivars were transplanted on 13 July 2011 at the Lalamilo Research Station in Kamuela, Hawaii (760 m elevation; latitude and longitude, 20.0188°N, 155.6765°W). The soil series was the Waimea series (medial, amorphic, isohoristic, humic Haplustolls). Trees were planted in a randomized complete block design with 1-tree plots replicated seven times at a spacing of 3 m in single row windbreaks. Maximum minimum air temperatures were recorded at the Lalamilo station, and the lowest minimum temperature recorded was 8.3°C, which is above that reported to be required for breaking the dormancy of buds. Yet, during March 2013, trees of three cultivars (Arbequina, Arbosana, and Koroneiki) were observed to flower. On 16 October 2013, five trees each of ‘Arbequina’ and ‘Arbosana’ were harvested, and six trees of ‘Koroneiki’ were harvested in a one-time harvest. Average yields per tree were 1.89, 4.89, and 2.04 kg (fresh weight) and total yields were 8.8, 14.2, and 11.0 kg fresh weight, respectively for ‘Arbequina’, ‘Arbosana’, and ‘Koroneiki’. The average color of fruit was 3.5, 2.1, and 3.3, respectively. Oil was milled from these fruit (in two presses), resulting in 2.0, 3.0, and 2.6 kg of oil (assuming a specific gravity of 0.91) or a yield of 22, 21, and 24%, respectively. Oil was sent to the University of California Davis Analytical Lab and olive oil quality was determined to be extra virgin. Apparently, the olive oil quality was determined to be extra virgin. The lower yield of olive oil for the 1st press of ‘Arbequina’ was due to an error during processing.

RESULTS

Young olive plants were damaged probably due to Fuller Rose beetle (Naupactus cornuvus Boheman; Coleoptera) (Fig. 2A). Shade cloth cages were made to protect olive plants from beetle damage and wind.

Figure 2A. Damage to young, olive plants probably due to Fuller Rose beetle. 2B. Shade cloth cages.

Chilling hours to break dormancy have been calculated as number of days from when mean daily temperature dropped below 7.2°C until the first reproductive budburst (Orlandi et al., 2004). During December 2012 to January 2013 (Fig. 5), the lowest minimum temperature recorded was 8.3°C.

CONCLUSIONS

Olive cultivars Arbequina, Arbosana, and Koroneiki appear to grow well in the agro-environment of Lalamilo station in Waimea, Hawai‘i. After only 2.5 years of growth, they flowered, fruited, and produced a harvestable yield and high-quality ‘extra-virgin’ olive oil. We are in the process of working with cooperators to determine other agro-environments suitable for olive production in Hawai‘i Island, and to determine the minimum chilling hours required to break bud dormancy.