

EVALUATING DIFFERENT VARIETIES AND BIOCHAR APPLICATION RATES ON THE YIELD OF SOYBEAN

Amjad Ahmad, Hue V. Nguyen, Joshua Silva, Jensen Uyeda, Jari Sugano, Theodore J.K. Radovich, Lynn Nakamura-Tengan, Sharon Motomura, and Kylie Tavares
 College of Tropical Agriculture & Human Resources, University of Hawaii at Manoa

Introduction:

Soybean or soya bean is a species of legume crops and originally from East-Asia. Soybean high nutritional value (35-50% protein, oil 14-24%) Both fresh shell and dried seed forms are highly regarded for their protein, oil, and a multitude of nutritional uses. Typically soybean is used at the green shell stage as *edamame*. However, it is also used for: cooking green or dry beans, flour, soy milk, tofu, soy sauce, miso, and *natto*, among others.



Figure (1): Soybean (UH-Big Island).

Soybean is also known with other names worldwide, such as: Soya bean, daizu (Japanese), dadou (Chinese), and kong (Korean). Soybean days to harvest are between 45-65 days for fresh pods or seeds and 70-90 days for dry seeds. Soybean plant population is recommended to be around 6 plants/foot and 30 in between rows. However, smaller row spacing (4-5 plants/foot and 15-20 in) may lead to a higher yield. Soybean planting depth is between 1-1.5 inches deep. Soybean dry seeds vary in color and size. The seed color can be yellow, green, or black. It can be harvested at three different stages of maturity: green pods, green-mature peas, and dry seeds. It is recommended to store green-mature soybean in a cool, well-ventilated area and dry soybean seed is cleaned, graded, and packed in small plastic bags.



Fresh pods



Fresh seeds



Yellow seeds



Green seeds



Black seeds

Field trials were conducted, at Waimanalo Research Station, to evaluate the yield of 10 soybean varieties under the windward condition (soil and climate) of Oahu Island. Figure (1) shows that the 5 top yielding varieties were: UH-Goo, Butter Bean, UH-Kahala, Sayamusume, and Midori.

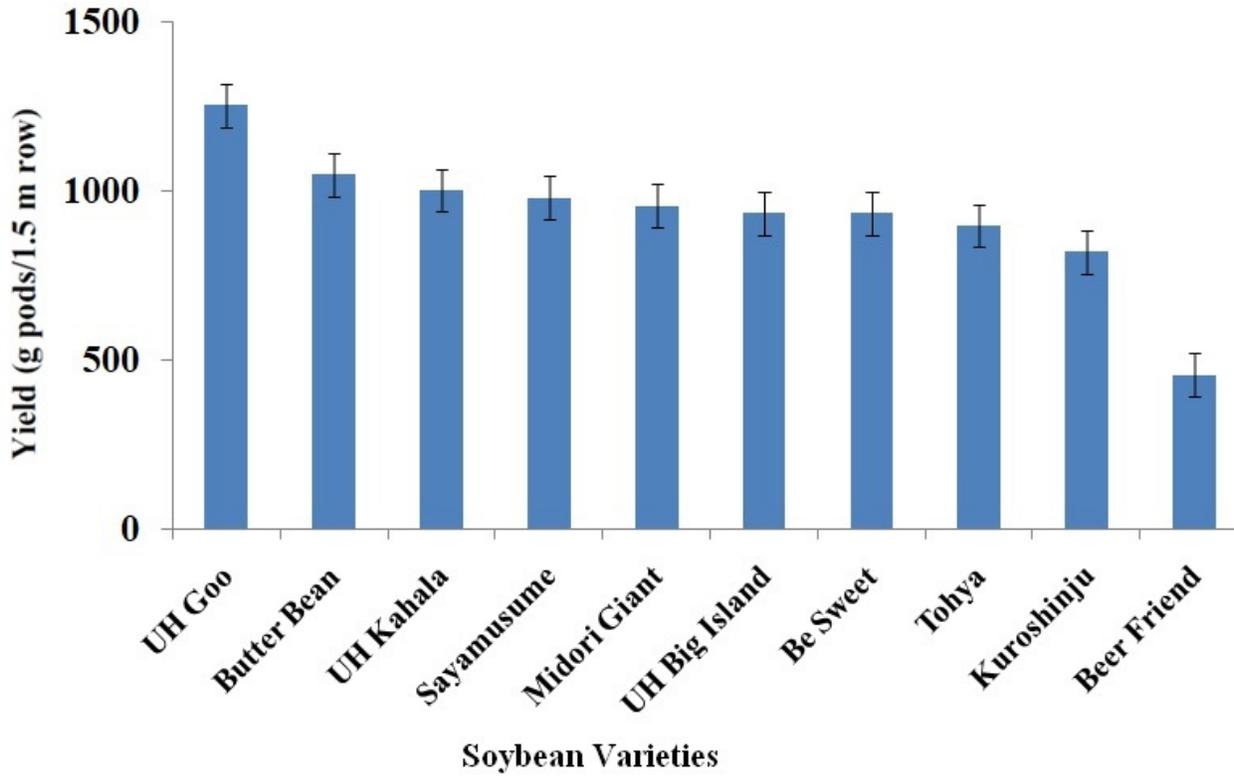


Figure (2): Yield of 10 soybean varieties evaluated at Waimanalo Research Station.



UH Goo



Butter Bean



UH Kahala



Sayamusume



Midori Giant



UH Big Island



Be Sweet



Tohya



Kurishinju



Beer Friend

Figure (3): Soybean varieties with plant height, growth structure, and pod size for the evaluated varieties.

Additional field trials were conducted, at Poamoho Research Station, to evaluate the yield of soybean (UH-Big Island variety) under 3 rates (0, 10, and 20 ton/acre) of biochar (Fig. 3). The biochar was incorporated into the top 4 inch soil depth two weeks prior to planting the soybean seeds.

Fertilization, weeding, irrigation, and other treatments were performed based on the recommendations for soybean and as needed throughout the growing season. The results showed a significant increase in soybean yield with biochar application. Soybean yield was increased by 15 and 30% in that 10 and 20 ton/acre biochar treatments) compared to control (no biochar). Economic analysis is needed to determine the short- and long-term benefits of biochar application.



Figure (3): Biochar produced in Hilo from Macadamia nutshell.

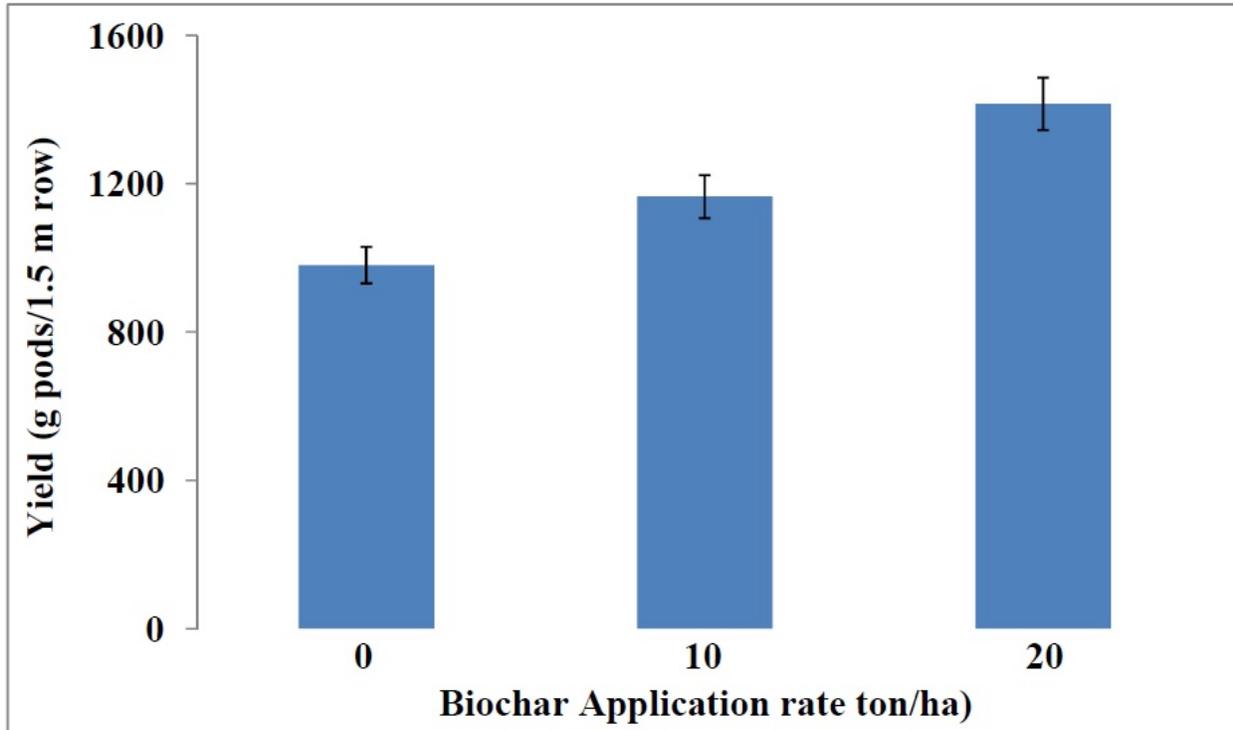


Figure (4): Soybean (UH-Big Island variety) yield under different biochar application rates.