Edamame (Vegetable Soybean) Variety Trial at Neely-Kinyon Farm-2002

Dr. Kathleen Delate and Heather Friedrich, Depts. of Horticulture & Agronomy
Bob Burcham, farm superintendent, Neely-Kinyon Research and Demonstration Farm
Dr. Walter Fehr, professor, Depts. of Agronomy
Dr. Lester Wilson, professor, Dept. of Food Science and Human Nutrition

Introduction

Interest in edamame or vegetable soybeans has increased in the U.S. in recent years. Edamame soybeans are harvested immature, similar to green beans. Immature soybeans have less of a "beany flavor," which appeals to American consumers. Edamames are boiled and served either in or out of pods, usually eaten as a snack or in soups, salad, or as a vegetable dish. Edamames are usually harvested at 85% pod fill. Pod color and size can be employed as quality indicators, with high quality pods having 2 - 4 seeds/pod and pod length around 2.5 inches. Insect- and disease-free pods should be harvested. Chilling beans for 3-10 hours after harvest will help limit sugar and amino acid degradation. In 2001, edamame research trials were established on organic fields at the ISU Neely-Kinyon Farm and processed at Iowa State University to determine yields and taste.

Materials and Methods

Three varieties of edamame soybeans (IA1010, IA2040 LF and Kenko (Seedex, Inc., Longmont, CO) were planted on June 3 at 125,000 plants per acre. Plots were harrowed on June 17, and row cultivated on June 24, July 1 and hand-hoed on July 18. Stand counts were made on June 19, 2002. A mechanical bean picker (Pixall BH 100, OXBO, Clear Lake, WI) was used in 2002 to harvest from two 20-ft rows on August 21, 2002, when pods were green and full. Edamames were also hand-harvested on August 21 to compare mechanical vs. hand-harvests.

Results and Discussion

There were no significant differences among varieties for stand counts at the N-K farm. Soybean stand populations averaged 95,444 ± 366 (Table1). Despite a numerically lower stand in Kenko compared to the other varieties, there was no significant difference among varieties. There were no significant differences for yield at any sites. N-K yields averaged 8268.7 ± 274.7 lbs/acre (Table 2). Across three sites in this IDALS project, the average edamame yield was 7964.3 ± 436.6 lbs/ac. Bean leaf beetles were present in these trials, although plant health was not impacted.

There were significantly higher yields when edamames were hand harvested compared to the mechanical harvester (Table 3). The greatest difference in harvest method was in variety IA1010. Greater harvesting efficiency will develop over time, as operators become more familiar with machine adjustments and proper speed of operation. In addition to the challenge of determining which varieties perform best in terms of yield, seed size, taste, color, and nutrition, harvesting poses an additional challenge requiring further studies. Edamames should be harvested when the optimum combination of sugar, amino acid content and pod fill is obtained. The fact that sugar and amino acid concentration peak before complete pod fill provides

additional challenges to growers. Unlike most soy products, edamames require minimal, but essential, equipment and processing protocols for maintaining quality. Edamames can be sold fresh in Farmers' Markets, stores or at roadside stands as bundled plants, and sold fresh or frozen in pods or as shelled beans. Several edamame operations utilize hand harvesting, but labor costs may seriously impact the profitability of this crop. Neely-Kinyon organic edamames were served at Field Days and received high grades for excellent taste. Further studies will be conducted in 2003.

Table 1. Plant populations at 38 days after planting, 2002.

Variety	**Stand count ± SE**
IA 1010	97,333± 7,796
IA 2040LF	100,333 ± 2.186
Kenko	84,333 ± 20,795
LSD 0.05	NSD

Table 2. Edamame yields, 2002.

Variety	**Yield (lb/ac) ± SE**
IA 1010	8,667.0 ± 600.0
IA 2040LF	8250.3 ± 390.5
Kenko	7888.7 ± 465.8
LSD 0.05	NSD

Table 3. Hand-harvested vs. machine harvested edamame yields, 2002.

Variety	**Yield (lb/ac) ± SE**
	Mechanical
IA 1010	6911.5
IA 2040LF	7521.7 ± 1317.9
Kenko	6934 ± 853.8
	Hand
IA 1010	9252.4 ± 186.3
IA 2040LF	8285.1 ± 406.5
Kenko	8110.9 ± 501.4
LSD	0.002

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References

Washington State University's Edamame Program, http://agsyst.wsu.edu/edamhome.html