

2003

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Recommended Citation

Delate, Kathleen; Friedrich, Heather; Burcham, Robert; Fehr, Walter R.; and Wilson, Lester A., "Edamame (Vegetable Soybean) Variety Trial at Neely-Kinyon Farm, 2002" (2003). *Iowa State Research Farm Progress Reports*. 1452.

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Abstract

Interest in edamame, or vegetable soybeans, has increased in the United States in recent years. Edamame soybeans are harvested immaturely, 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, and are usually eaten as a snack or in soups, salads, 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 a pod length of 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 in organic fields at the ISU Neely-Kinyon Farm and their produce processed at Iowa State University to determine yields and taste.

Keywords

horticulture, Agronomy, Food Science and Human Nutrition

Disciplines

Agricultural Science | Agriculture | Agronomy and Crop Sciences | Food Science | Horticulture | Nutrition

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

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Introduction

Interest in edamame, or vegetable soybeans, has increased in the United States in recent years. Edamame soybeans are harvested immaturely, 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, and are usually eaten as a snack or in soups, salads, 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 a pod length of 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 in organic fields at the ISU Neely-Kinyon Farm and their produce 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/acre. Plots were harrowed on June 17, row cultivated on June 24 and 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-harvesting.

Results and Discussion

There were no significant differences among varieties for stand counts at the N-K farm. Soybean stand populations averaged $95,444 \pm 366$ (Table 1). Kenko had a significantly lower stand compared with the other varieties. There were no significant differences in yield at any site. N-K yields averaged $8,268.7 \pm 274.7$ lbs/acre (Table 2). Across three sites in this IDALS project, the average edamame yield was $7,964.3 \pm 436.6$ lbs/acre. Bean leaf beetles were present in these trials, although plant health was not impacted.

Significantly higher yields resulted when edamames were hand harvested as opposed to machine harvested (Table 3). The greatest difference in harvest method was in the variety IA3006 LF. Greater harvesting efficiency will develop over time, as operators become more familiar with machine adjustments and the 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 study. Edamames should be harvested when the optimum combination of sugar content, amino acid content, and pod fill is obtained. The fact that sugar and amino acid concentrations 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 at Farmers' Markets, stores, or roadside

stands as bundled plants, and sold fresh or frozen in pods or as shelled beans. Several edamame operations use 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.

Acknowledgments

We gratefully acknowledge the help of the following persons who provided support and assisted with this research: Seedex Seeds, Noreen Wantate, Andrea McKern, Jorge Alvaro, and Katie Schroeder. Support for this project came from the Leopold Center for Sustainable Agriculture, and the Specialty Grants Program–Iowa Department of Agriculture and Land Stewardship.

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

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

Table 2. Edamame yields, 2002.

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

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

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