STATUS OF NARROW-ROW SNAP BEANS

Nathan H. Peck
Department of Vegetable Crops
New York State Agricultural Experiment Station, Geneva

During 1973, several hundred acres of snap beans planted in narrow rows in Maryland, Oregon, and Canada were picked with Chisholm-Ryder Multi-D harvesters.

In October 1973, an evaluation of all factors in the narrow-row system of commercial snap bean production was obtained from persons who had experience with or observed narrow-row snap bean production. This evaluation will assist in exchanging present information and planning future research and extension programs for snap beans.

Nearly all improvements needed for snap bean production in a narrow-row system apply to beans grown in any row width. The adaptation of upright plant structures with uniform pod set plus cultural practices for once-over mechanical picking of snap bean pods for processing started with the introduction of 2-row mechanical harvesters in the mid 50's. At present, in the 70's, the continuous adaptations of these factors for snap bean production are even more necessary in order to obtain the best plant responses from more equidistant plant spacings harvested with multiple-row harvesters.

**Plant type** Everyone wants a well-anchored, root rot resistant rooting system, an erect, determinate plant structure with small efficient leaves, and a concentrated set of high-yield, quality pods with the lower end of the pods at least 6 inches above the soil surface, positioned in the top center of the plant frames and with pods easily picked and separated from clusters without mechanical injury.

Most present commercial bush varieties, grown without excessive vegetative growth and remaining upright, are acceptable for harvesting when grown in narrow rows. Narrow rows tend to hold the plants upright. Highest yield of harvested pods of processing quality per unit area should be the consideration, regardless of the amount of excessive vegetative growth or number of pods too young to harvest with present varieties, provided that the excessive growth does not interfere with the pickability of the pods, cleaning, and pod injury during harvest.

**Row width and plant spacing** Narrow rows do not necessarily mean high plant populations per unit area but uniform distribution of the plants over the soil surface. About 36 square inches per plant is ideally best for each plant and for interception of sunlight by the leaf canopy, especially in the seedling stage when the plants are spaced equidistant at 6 inches x 6 inches. However, this 36 square inches per plant is best for handling cultural practices such as planting, fertilization, pest control, and harvesting when the plants are in rows 36 inches apart with a plant every inch. At present, a system of rows about 18 inches apart with a productive plant every 2-3 inches within rows is a practical compromise between equidistant plant spacing (best for the plant) and wide rows (best for handling cultural practices). The row width used for snap beans may be compatible with other crops for the same planter, such as narrow-row soy beans and field corn.

**Weed control** Although generally combinations of applications of pre-plant plus pre-emergence herbicides have given satisfactory weed control, a cheap, effective, one-application herbicide that will control all weeds through the season is needed. Leaves of beans planted in narrow rows develop a complete leaf canopy over the soil surface early in the season, reducing weed growth. No cultivation is needed.
**Fertilizer placement**  Fertilizer banded 2 inches to the side and 2 inches below the depth of seed at planting time has consistently given uniform emergence and growth of snap bean seedlings. This practice should be continued regardless of width of rows. Banding fertilizer at planting time promotes uniform and vigorous seedling growth. An application of nitrogen, phosphorus, and potassium in the band is needed to obtain the greatest response to banded fertilizer. Commercial planting equipment is available for banding fertilizer and planting at the same time in rows as narrow as about 16 inches. Also, equipment can be modified for planting rows as narrow as 12 inches. Sufficient fertilizer and water should be applied to prevent the plants from running short, especially during the critical period between blossoming and harvest. However, over-fertilization should be avoided to prevent excessive vegetative growth.

**Fertilizer rate**  Rate of banded fertilizer should be considered per lineal foot of row as well as per acre. For example, since there are 43,560 square feet in an acre, 435.6 pounds of fertilizer per acre will be 1 pound of fertilizer per 100-foot row for beans planted in rows 12 inches apart, or 3 pounds of fertilizer per 100-foot row for beans planted in rows 3 feet apart. A reasonable rate for most New York State soils is 1.5-2 pounds of a complete fertilizer (10:20:10, 8:24:8, 8:24:16) per 100 feet of row for rows 18 inches apart, or about 450-600 pounds of fertilizer per acre depending upon soil tests.

**Pod mold**  Fungicide applications for pod molds should be applied in dense foliage snap beans, planted in narrow rows or any row width, at least until predictions of the occurrence of mold can be made at the time that controls are needed. Benlate has given satisfactory pod mold control in narrow-row snap beans.

**Harvesters**  A multiple-row (uniform plant spacing) harvester is part of the narrow-row system of snap bean production. The yield and quality of the pods in the hopper per unit cost of production and harvesting should be considered for evaluating a system. However, there should be continuous improvement in varieties, cultural practices, and harvesters to increase yield by improving percent of picked pods and quality of pods within economic limits. Mechanical improvements can be made (and should be made) rapidly, sometimes over winter, as evident by the rapid introduction and improvement in the snap bean harvesters over the past 20 years.

Snap beans harvested by the present multiple-row harvesters or any harvesters should be:

1. Planted on productive soils
2. Upright, uniform pod set, pod set high in plant frame, varieties with good rooting systems.
3. Uniform seedling growth by even planting depth, banded fertilizer, evenly spaced good seed, and without planter injury to seeds.
4. Weed, disease, and insect control within economic limits.
5. Surface of soil should be level after planting, no stones up high.

**Evaluations**  Snap bean growers' and processors' evaluations of varieties, cultural practices, and harvesters are very useful to and welcomed by researchers and manufacturers for determining the limiting factors and stresses in snap bean production. Spacing rows 12 to 18 inches apart should increase yields of snap bean pods by at least 30 percent, provided that some other factor(s) does not limit yield.

New varieties of snap beans with better pod set and root rot resistance adapted to close spacing, being developed by plant breeders, plus the associated changes in cultural practices, disease and insect control, and better seed, should increase yield of pods by 50 percent or more within the next 10 years.