



EXTENSION BULLETIN E-629

FARM SCIENCE SERIES

JULY 1968

*Michigan dry edible*

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# Bean Problems

*( 21 illustrations )*

MICHIGAN STATE UNIVERSITY Cooperative Extension Service

## ***Six Guidelines for a Successful Bean Crop***

- 1. Select well drained, productive bean soils and supplement with the appropriate analysis and rate of fertilizer—including micronutrients.**
- 2. Plant adapted varieties. Consult your county extension agent or elevator manager for results of local trials.**
- 3. Get a good stand. Use high quality seed (preferably certified), plant in early June on a firmed seedbed in the row, leaving the soil loose and porous between the rows.**
- 4. Use effective weed control practices. Keep fields free of perennial weeds—herbicides are practical, effective and economical.**
- 5. Control damaging insects and diseases. The use of certified seed provides a good foundation for a successful crop. See illustrations on the reverse side for pest identification and control.**
- 6. Harvest on time to avoid weather damage. Use special precautions to avoid foreign material such as stones, glass and other crops in the harvested crop.**

## ***Michigan Bean Industry Facts***

1. Michigan produces more than 98% of the navy beans grown in the United States.
2. Three-fourths of these navy beans are produced in six counties located in the "Thumb" and Saginaw Valley.
3. Light red kidney, dark red kidney, cranberry, yelloweye, pinto, red, and several minor types of beans are also produced in Michigan.
4. Dry beans contributed about \$50 million in cash receipts to Michigan in 1966—the second largest single crop enterprise in the state.
5. Eighty-five to ninety per cent of the beans for domestic consumption are canned—the remainder are packaged and sold as dry beans.
6. "Pork and Beans" is the most important bean product in the U.S.
7. Approximately 85% of the canned pork and beans are in consumer-size cans while the remainder are for institutional trade.
8. Twelve major firms process navy beans.
9. Over 98% of the navy beans are of Michigan State University-developed varieties.
10. Recent MSU zinc research has resulted in an additional annual income of \$5 million for dry bean producers.
11. More than 85% of Michigan's 12,000 bean producers support the Michigan Bean Commission. The 2c per hundredweight assessment is used to support research, new product development, market expansion and foreign market development.
12. The Michigan Bean Commission is actively involved in developing foreign markets for Michigan dry beans.
13. The flavorful, nutritious Michigan beans provide a "best buy" for the nation's homemakers.
14. Michigan's cool summer climate makes it well suited for high quality navy beans.

## Insect



### GREEN CLOVERWORM

**Symptoms** — Circular or ragged-edged holes in leaves; some leaves and blossoms eaten entirely; worms up to 1¼ in. long; slender, light green (yellowish when young) with faint white lines when mature; found on underside of leaf; drop to ground when disturbed.



### SEED CORN MAGGOT (Bean Maggot)

**Symptoms** — Seed fails to sprout or seedlings are weak, sickly; dirty-colored (yellowish-white) maggots bore into seed, have pointed head, ¼ in. long when mature. Most damaging in damp soils with high organic matter.



### MEXICAN BEAN BEETLE

**Symptoms** — Irregular holes similar to green cloverworm appear early; later, leaves become feathery and brownish; caused by copper-brown "lady-beetle," ¼ in. long, 8 small black spots on upper wings; yellow-grub feeds on underside of leaves, causing feathery, sieve-like damage; pods may be eaten also.



### ARMYWORM ADULT (Moth)

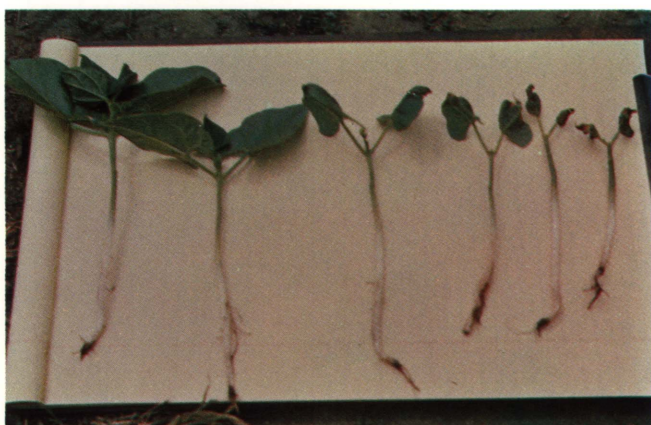
**Symptoms** — Pale brown or brownish-gray, small white dot on each front wing; wing spread of 1½ in. unfolded; hide during day on bean and other plants; strongly attracted to black-lights.



### ARMYWORM

**Symptoms** — Large, ragged holes, especially at edge of leaves; worm droppings on ground beneath plant; dark green worms with white line on back; found on plant, especially at night and on cloudy days, also on soil near plant; most active at edges of fields.

## Herbicide



### EPTC (Eptam) INJURY

**Symptoms** — Unusually dark-green plants, stunted leaf tips eventually turn brown (completely brown in severe cases). Caused by over-application of EPTC. If symptoms aren't severe, plants recover under good growing conditions.

# DRY BEAN PROBLEMS

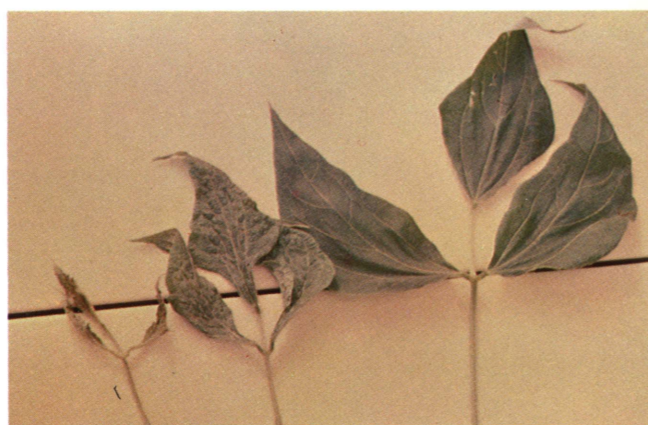
(Information Contributed by Cooperative Extension Service and Agricultural Experiment Station of MSU; and U.S.D.A., with the Cooperation of the Michigan Bean Commission.)

## HERBICIDE (continued)



### PYRAZON (Pyramin) and TCA INJURY

**Symptoms** — Leaf yellowing, especially margins; infected plants are stunted or killed and immature at harvest. Occurs usually where sugar beets treated with Pyrazon and TCA have failed. (Plant beans between beet rows treated with Pyramin and TCA to eliminate problem.)



### 2,4-D INJURY

**Symptoms** — Crinkling and rolling of leaves, curving of stems, stunted, dark-green plants. Usually caused by drift from nearby fields or by planting too soon after pre-plant application for Canada thistle control.



### ATRAZINE INJURY

**Symptoms** — Yellowing of leaf margins and area between veins (2-4 weeks after emergence) followed by browning, and death. Caused by uptake of residue in corn-treated soil. (To control residue, grow corn one more year without atrazine before beans.)

## Physiological



### SUN SCALD (Guttation)

**Symptoms** — Edges of leaves "burn" in periods of high soil moisture (after a rain) followed by high temperature, sunshine and rapid air movement. Evaporation of excess water from leaf cells leave salt deposits which draw water from nearby cells, causing the "burning."



### BRONZING

**Symptoms** — Bronze coloration of leaves caused by air pollutants (ozone, sulfur dioxide and other gases generated in burning coal, gasoline, other fuels). Ultra violet light from the sun adds to injuries caused by gases.

## PHYSIOLOGICAL (continued)



### WET FEET

**Symptoms** — Plant suffocates and tissues break down when high moisture and compaction leave few air-spaces in soil. Roots cannot "breathe" adequately to move nutrients from soil up into the plant.

## Mechanical



### SEED INJURY

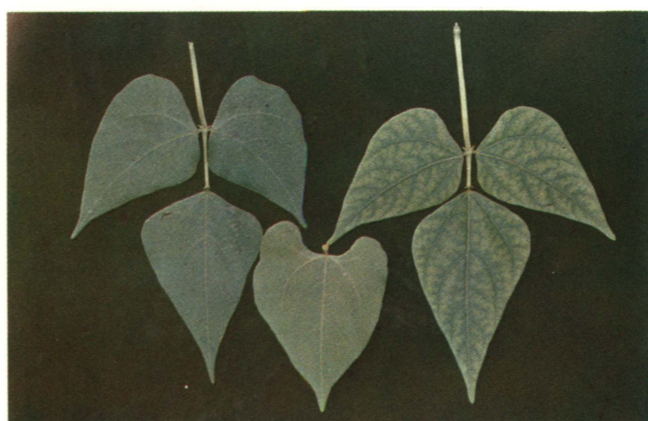
**Symptoms** — Irregular germination, loss of vigor, slow development, and uneven flowering and ripening. Checked and split seed coats and injury to embryo result in loss of primary leaves and terminal growing point.

## Deficiency



### ZINC

**Symptoms** — Pale green leaves, yellow near tips and outer edges at or soon after emergence; become dwarfed or deformed and die. Pods may fail to develop; plants slow to mature. Correct with soil or foliar zinc application. Often confused with common blight symptoms. Healthy leaflet, lower left.



### MANGANESE

**Symptoms** — Yellow, mottling between veins of affected leaf (r). Symptoms occur 3-4 weeks after emergence, usually on soils with pH over 6.5. Controlled by soil or foliar manganese application. Healthy leaf at left.



### P-Zn INTERACTION

**Symptoms** — Brownish leaf discoloration; stunted plants, pods fail to set. Zinc deficiency is intensified by heavy phosphorus application. Red beans (above) show effects of increasing phosphorus without additional zinc application.

## Disease



### COMMON FUSCOUS BLIGHT (Bacterial)

**Symptoms** — Brown lesions begin along leaf margin, may spread over entire leaf; bright yellow zone surrounds lesions; many small, dead spots on pod. Especially damaging in extended warm, wet periods. Bacteria also invade developing seeds.



### HALO BACTERIAL BLIGHT

**Symptoms** — Green-yellow halos surrounding lesions on leaves; plants become stunted and chlorotic; infected pods show large, greasy-appearing lesions. Also seed-borne. Especially destructive to colored beans in cool, wet weather.



### WHITE MOLD (Sclerotinia)

**Symptoms** — White fungal growth on pods and stems; small, black, round structures (sclerotia) form inside infected pods and stems. Usually occurs late in growing season. Sclerotia live in soil, germinate under favorable conditions, and invade bean plants.



### ROOT ROT (Dry Root Rot)

**Symptoms** — Brown-red lesions form on root and hypocotyl, often coalesce to girdle entire root; adventitious roots form just below soil surface on severely infected plants. Infected roots cannot provide plants with enough water during drought; plants become stunted, may die.



### RUST

**Symptoms** — Small, circular pustules often surrounded by yellowish zone on leaves; appear late in growing season. Masses of brown spores form in the pustules and spread the disease. Especially destructive in cool, wet season.

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G. S. McIntyre, Director  
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