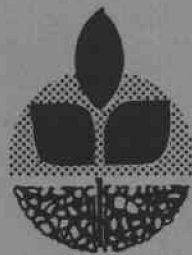


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CANEBERRIES: A Summary of Research Progress, 1979



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Agricultural Experiment Station
Oregon State University, Corvallis

ACKNOWLEDGEMENTS

We thank those companies and their representatives who have donated materials, equipment, and plants to our research program. We extend special thanks to those growers who are providing field plots and assisting in special experimental treatments and observations.

Donations

Bischof Farms, Inc.: 'Munger' black raspberry plants
Chevron (Ortho) Chemical Co., Sherman Reed; Orthocop
Dupont, Norm McKinley: Benlate
Fujii Farms, Jim Fujii: 'Evergreen' blackberry plants
Lilly-Miller, Bill Vollmer: Microcop
Mobay Chemical Corp., Jack Warren: Dyrene
The J. M. Smucker Co., Dean Katterheinrich: Black raspberry plants
Wilbur-Ellis, Gordon Hedman: Kocide 101

Cooperators: Growers, Fieldmen, County Agents

Ken Brown, Marion County Extension Service, Salem
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Ed Duyck, Grower, Cornelius
Jim Griesenauer, Grower, Salem
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Numerous growers who have identified and donated 'Boysenberry' clones

CANEBERRIES - A Summary of Research Progress, 1979

Foreword

Caneberries represent an increasingly important crop for Oregon farmers as evidenced by their farm-gate value of \$21,127,000 in 1978, an increase of 78 percent over the past five years. This is primarily a reflection of higher berry prices caused in part by increased use of berries in yogurt.

As the value of these crops has grown, so has the need for up-to-date research grown. Growers and processors have recognized this research need and are now supporting a research assistant at the North Willamette Experiment Station. In response to increased program support, we are attempting to acquaint the caneberry industry with details of our program.

You will note that the purpose, treatments, and progress of each current and recently-terminated experiment are summarized. We are hopeful that these very brief summaries will identify the critical aspects of each experiment and acquaint you with the various cooperators. Your reaction to our research program, either directly to me or to any of the cooperating personnel, is welcome.

To simplify understanding, trade names of products and equipment are sometimes used. No endorsement of product names is intended nor is criticism implied of products not mentioned.

Lloyd W. Martin, Superintendent
North Willamette Experiment Station

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CROWN GALL IN 'BOYSENBERRY'

Larry W. Moore
Ornamental Research Lab, OSU

Purpose: To determine the effect of crown gall on 'Boysenberry' productivity and to determine the effectiveness of a bacterial antagonist in preventing gall formation

Treatments: Plants were divided into three groups. Plants in one treatment group were treated with disease inoculum only. A second group of plants was wounded and treated with inoculum. The third group of plants was not wounded, but was treated with inoculum and a bacterial antagonist (liquid dip).

Progress: Gall was rated on plants as they were dug from the field five years after planting. One hundred percent of the wounded inoculated plants produced gall. These plants were severely stunted and produced least fruit and the smallest fruit. One-third of the unwounded inoculated plants were gall-infected. The infected plants in that group were less vigorous than plants without gall. Only 15 percent of the unwounded inoculated plants treated with bacterial antagonist were galled. These plants produced most fruit and the largest fruit. The results indicate that galling reduced vigor and yield, that wounding encouraged infection when inoculum was present, and that the bacterial antagonist helped prevent infection.

ESTABLISHMENT AND MANAGEMENT OF 'BOYSENBERRY'

Lloyd W. Martin, Superintendent
North Willamette Experiment Station

Purpose: To compare the effect of 1) alternate year (AY) and every year (EY) cropping and 2) March and August training on 'Boysenberry' yield and berry size under drip and sprinkle irrigation; to compare production of virus-free and field-run plants, standard thorny clone and Thornfew clone (a select clone with few thorns), plants spaced 3 feet and 6 feet in the row, plants propagated in 6-inch and 2-inch pots

Treatments: Cropping and training: EY spring, EY summer, AY spring, and AY summer

Virus: Virus-free and field-run
Clones: Standard thorny and Thornfew
Spacing: 3-foot and 6-foot
Pot size: 6-inch and 2-inch

Progress: The study of AY cropping and EY cropping revealed a trend towards higher yields with AY cropping. Time of training did not significantly affect yield, but March trained plots produced significantly larger berries in several comparisons. EY plots performed comparably with March or August training, but AY plots tended to produce higher yields with August training. Yield data favored virus-free plants over field-run plants and

standard thorny clone plants over Thornfew. High density (3-foot) spacing did not increase yield significantly over normal (6-foot) spacing. Plants propagated in 6-inch pots produced a significantly higher yield than plants propagated in 2-inch pots in the first year of production. For details see 1979 Oregon Agricultural Experiment Station Special Report by same title.

'BOYSENBERRY' CLONAL EVALUATION

Lloyd W. Martin, Superintendent
North Willamette Experiment Station

Purpose: To identify superior 'Boysenberry' clones for propagation and release to growers

Treatments: Fifty-seven virus-free 'Boysenberry' clones were supplied by R. H. Converse (USDA-SEA), OSU, and forty-seven 'Boysenberry' clones were identified by Oregon growers. 'Boysenberries' from California and New Zealand were included, as well as the 'Tay' berry from Scotland.

Progress: Plants were subjectively evaluated for cane vigor and fruit set in 1978. Cane count, yield, and berry size data were recorded for each plant. Fruit set, vigor, and number of canes were positively and significantly correlated with yield. The most productive plants yielded the equivalent of 2.0 T/A in the "baby crop" year. This compares favorably with the average 1.7 T/A from all fruiting fields in Oregon. The single-year data are more encouraging than conclusive.

'BOYSENBERRY' PROPAGATION BY STEM CUTTING

Esther Nelson, Research Assistant
North Willamette Experiment Station

Purpose: To determine the best time for taking 'Boysenberry' cuttings; to compare performance of cuttings rooted at different times and grown in two container sizes before field setting

Treatments: Cuttings taken in June, July, August, September, and October and grown out in 2-inch or 6-inch pots

Progress: Clones have been identified and cuttings taken according to schedule. These have been placed in propagating flats and will be transplanted to 2-inch or 6-inch pots after rooting. Plants will be held for spring planting in 1980. Evaluations will be based on percent of rooting (1979), amount of growth (spring 1980), and harvest data 1980 and 1981.

'BOYSENBERRY' TRAINING OBSERVATIONS

Esther Nelson, Research Assistant
North Willamette Experiment Station

Purpose: To compare performance of 'Boysenberries' completely trained in summer, trained to the first wire in summer and second wire in spring, trained completely in spring

Treatments: Summer training, spring training, and half summer - half spring training

Progress: Plants cut to the ground in 1979 are being trained on three schedules. The value of the observations may depend upon winter weather. The experiment could supply data to confirm observations that plants trained to the first wire in summer are easier to spray and train than those trained in spring and less injured by cold than those summer-trained.

NITROGEN AND BORON FERTILIZATION OF 'WILLAMETTE' RED RASPBERRY

Michael H. Chaplin
Dept. of Horticulture, OSU

Purpose: To determine the most beneficial rates of N and B application, the relationship between fertilizer rate and levels of various elements in leaf tissue, and the value of leaf versus petiole analysis as an indicator of nutritional status

Treatments: Nitrogen at 0, 60, and 120 lb N/A with Boron at 0 or 2 lb B/A

Progress: The middle level of N (60 lb N/A) proved more effective than no N (0 lb N/A) or high N (120 lb N/A). Boron was present in leaf samples in similar quantities in the acceptable range whether plants were supplied 0 lb B or 2 lb B. In general, leaf analysis proved a better indicator of nutritional status than did petiole analysis. A detailed report is in preparation.

TRAINING AND FERTILITY IN 'MEEKER' RED RASPBERRY

Lloyd W. Martin, Superintendent
North Willamette Experiment Station

Purpose: To identify relationships among N rate, cane length, and productivity

Treatments: Canes pruned to 5 feet, 6 feet, and 7 feet and supplied 0 lb N/A or 60 lb N/A

Progress: In two harvest years, fertilized plots produced a greater yield than did unfertilized plots similarly pruned. Highest yield was produced by the longest fertilized canes. In unfertilized plots, yield did not increase with cane length. At each cane length, unfertilized plots had more buds but lower yields than fertilized counterparts.

RED RASPBERRY SEEDLING AND SELECTION EVALUATION

Francis J. Lawrence
USDA-SEA, OSU

Purpose: To evaluate red raspberry seedlings from the OR-US breeding program; to evaluate advanced red raspberry selections from British Columbia, Washington State University, and OR-US breeding programs

Treatments: Seedlings grown individually in the field for two years; selected plants propagated from root cuttings of seedlings grown in blocks for three to six years

Progress: Seedlings are bred under controlled conditions and grown in a greenhouse until field setting. The plants are evaluated primarily for vigor, fruit quality, and productivity. Those seedlings deemed superior are selected for planting in blocks where they are further evaluated and compared. Approximately 500 seedlings and selections are under consideration at any time.

CULTIVAR TESTING FOR MECHANICAL HARVEST OF RED RASPBERRY

Lloyd W. Martin, Superintendent
North Willamette Experiment Station

Purpose: To evaluate red raspberry cultivars and selections for mechanical harvest

Treatments: Red raspberry cultivars Nootka, Willamette, Meeker, OR-US 1950, OR-US 1780, Skeena and Chilcotin are planted in replicated 30-meter plots

Progress: Red raspberries were planted spring 1978 and spring 1979. Red raspberries will be trained to 5' trellises and harvested mechanically in 1980. Evaluation will be in terms of yield, quality of harvested fruit, and comparison with hand harvest as plant material permits.

VIRUS INFECTION OF 'MUNGER' BLACK RASPBERRY

Richard H. Converse
USDA-SEA-AR, OSU

Purpose: To monitor the rate of Tobacco Streak and Raspberry Bushy Dwarf virus infection in a planting originally free of virus and to assess the long-range consequences of infection on productivity and vigor

Treatments: Annual testing of individual plants for virus infection

Progress: After three years, 6 percent of the original virus-free planting was virus-infected. The planting is estimated to be at least one mile from the nearest source of infection. A comparable virus-free planting adjacent to an infected planting (Corvallis) was infected at the rate of 25 percent per year. The rate of virus infection of a clean planting appears to be related to its distance from an infection source. Because of the limited infection, long-range consequences of infection have been difficult to assess.

EFFECT OF BORON ON 'MUNGER' BLACK RASPBERRY PRODUCTION

Arden Sheets, Agent
Washington County Extension Service

Purpose: To determine the effect of B at three rates on 'Munger' productivity; to determine the effect of B fertilization on B level in leaf tissue

Treatments: Solubor at 1, 2, or 3 lb B/A applied to the soil in 2-foot bands on each side of the plants (1974-1977)

Progress: Boron applied annually (1974-1977) did not markedly affect productivity. Yield with 1 and 2 lb B/A averaged 1.8 T/A; yield with 3 lb B/A averaged 2.0 T/A. Berry size averaged 1.8 g in all plots. Boron in leaf tissue was in the normal range of 26-29 ppm. In attempting to increase fruiting by increasing B within the plant, perhaps higher rates of B, foliar application, or different timing must be considered.

BLACK RASPBERRY CULTIVAR TRIAL

Esther Nelson, Research Assistant
North Willamette Experiment Station

Purpose: To evaluate the performance of eight black raspberry cultivars in terms of yield, berry size, suitability for mechanical harvest, and berry characteristics

Treatments: Black raspberry cultivars Allen, Alleghany, New Logan, Huron, Black Hawk, Cumberland, Bristol, and Munger (standard)

Progress: Plants were field set March 1979. All plants were dormant except 'Mungers' dug from local fields. There has been some difficulty in achieving uniform stand due to long storage of dormant plants and unfavorable weather. Missing plants will be replaced during the season. The stand will be evaluated beginning spring 1980. Berries will be evaluated for anatomical characteristics as well as productivity, flavor, and degree of crumbliness.

SPACING AND TRAINING FOR MECHANICAL HARVEST OF ALTERNATE YEAR 'MARION' BLACKBERRY

Lloyd W. Martin, Superintendent
North Willamette Experiment Station

Purpose: To identify plant spacing and training procedures to maximize yield of mechanically harvested AY plots

Treatments: Spacing at 0.5 M, 1.0 M, and 1.5 M (approximately 1½', 3', and 4½') and training during the season on wires at 1½', 3', 4½', and 6'

Progress: Three plots with each plant spacing were planted in 1978. Canes were cut to the ground in spring 1979. Three plots with each plant spacing were planted in 1979. Canes are being trained to the wires during the current season for mechanical harvesting in summer 1980.

'MARION' BLACKBERRY LEAF AND CANE SPOT FUNGICIDE SPRAY TRIALS

Iain C. MacSwan, Extension Plant Pathology, and
Edward K. Vaughan, Dept. of Botany and Plant Pathology, OSU

Purpose: To evaluate the effectiveness of several spray materials in controlling Septoria leaf and cane spot infection in 'Marion' blackberry

Treatments: Bordeaux, tribasic copper sulfate, Kocide 101, lime sulfur, polysulfide, Cyprex, Bravo at recommended rates, and an untreated check

Progress: In an attempt to establish disease, all trained treatment plots were sprayed with Septoria rubi spores on April 10, 1978. New canes were 2 inches to 8 inches. On April 28 and May 18, plots were sprayed with appropriate materials. To allow build-up of the disease, the scheduled fall spray was not applied. All plots suffered low temperature injury, but negligible cane spot infection. Samples of cane are being taken twice weekly and examined for presence of Septoria sporulation at the time of sampling and one week later.

SPRAY TIMING FOR LEAF AND CANE SPOT IN 'MARION' BLACKBERRY (OFF STATION)

Esther Nelson, Research Assistant
North Willamette Experiment Station

Purpose: To evaluate three fungicide spray schedules for effectiveness in controlling leaf and cane spot infection of new cane growth where 'Marion' blackberries have been cut off

Treatments: Four copper sprays plus fall spray: 1) sprays concentrated in spring, 2) sprays spread throughout the growing season, or 3) sprays concentrated in late summer/fall

Progress: Three growers are applying Cu (Kocide 101 or Microcop) on each of three schedules. Comparisons of the three treatments in each field and comparisons among the fields will be made fall 1979 and spring 1980. Evaluations will be based on lesion counts and growers' reactions. The evaluation may aid in reevaluating spray schedule recommendations.

DYRENE AND BENLATE TRIALS FOR LEAF AND CANE SPOT ON 'MARION' BLACKBERRY (OFF STATION)

Esther Nelson, Research Assistant
North Willamette Experiment Station

Purpose: To gain experience with and to evaluate the usefulness of Dyrene and Benlate (two chemicals labeled for control of leaf and cane spot in blackberries, but not commonly used); to observe the effectiveness of these materials in controlling fruit rot as well as leaf and cane spot

Treatments: Application of materials May 1, June 1, July 1, September 1: Kocide 101 (3 lb ai/A), Benlate (1 lb ai/A), Dyrene (2 lb ai/A); untreated check area; dinitro treated area in each fungicide block

Progress: The test area consists of trellised 'Marions' exhibiting disease and winter injury. The treatment blocks, one-third acre each, are being treated with fungicides according to the treatment schedule. Both Benlate and Dyrene are labeled for fruit rot control. Applications are being timed in hopes of protecting cane, foliage, and fruit from fungal infection. For comparative purposes, an untreated check area borders the plots as does an area in which new cane growth was chemically removed before fungicide applications. Evaluation will consist of ratings of infection fall 1979, spring 1980, harvest 1980, if possible, and the grower's reaction to handling the materials.

CONTROL OF LEAF AND CANE SPOT REINFECTION IN 'MARION' BLACKBERRY (OFF STATION)

Esther Nelson, Research Assistant
North Willamette Experiment Station

Purpose: To develop an effective spray program for returning a disease-infected 'Marion' field with canes removed to production; to compare the effectiveness of the recommended spray program with an intensified spray program; to evaluate the use of dinitro for initial cane burning and field sanitizing with both spray programs

Treatments: O.S.U. recommended spray program: dinitro burn-back before recommended spray program; intensified spray program; dinitro burn-back before intensified spray program

Progress: All plots are being treated according to schedule. No disease is evident on young canes, but dinitro treated plots are behind others in cane development. Plots will be rated summer/fall 1979 and spring 1980 for reinfection and number of canes per plant. If possible, yield data will be taken 1980.

BLACKBERRY SELECTION EVALUATION: OR-US 1717, OR-US 1600, OR-US 1050

Francis J. Lawrence
USDA-SEA, OSU

Purpose: To evaluate performance of three blackberry varieties on the basis of growth characteristics, disease resistance, hardiness, berry quality and productivity

Treatments: OR-US 1717 (thornless), OR-US 1600 (thornless), OR-US 1050 in observational trials at the Station

Progress: OR-US 1050 has undergone considerable distribution and evaluation in grower fields. The berry is considered excellent; the canes, however, are objectionably thorny. In spring 1979, the plants appeared moderately damaged by cold and disease.

OR-US 1600 is particularly attractive for its thornless cane. In spring 1979, the plants appeared to have sustained little cold injury or disease infection. Plants tipped in fall 1978 produced numerous vigorous tips. These were distributed to growers for further evaluation (see below).

OR-US 1717 is also attractive for its thornlessness. It did not perform as well as OR-US 1600.

OR-US 1600 BLACKBERRY EVALUATION (OFF STATION)

Francis J. Lawrence
USDA-SEA, OSU

Purpose: To evaluate the performance of OR-US 1600 blackberry under a variety of conditions

Treatments: Placement of 10 plants with each of seven growers

Progress: The OR-US 1600 thornless blackberry, developed through the OSU breeding and selection program, has exhibited a number of desirable characteristics. In comparison with standard varieties and other test varieties, the OR-US 1600 has shown some tolerance to winter injury and disease problems. The experimental plants, tipped in 1978 and grown out in gallon cans in a screen house, were planted by each of seven growers spring 1979. Over several seasons, beginning fall 1979, the growers will be asked to evaluate plants in terms of vigor, disease problems, productivity, berry quality, and growth characteristics.