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Impact of Disease Resistant Apple Cultivars on Fungicide Use in Ohio

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The impact of disease resistant apple cultivars and inorganic fungicides (copper and sulfur) on current fungicide usage patterns are being studied. The efficacy of "organic" and conventional fungicide spray programs was evaluated on an apple scab immune ('Liberty') and a scab susceptible ('McIntosh') apple cultivar in a randomized, replicated trial at Wooster, Ohio. Trees of both cultivars were nontreated, treated with inorganic "organic" fungicides only, or treated with conventional fungicides. 'McIntosh' trees received full season fungicide applications and 'Liberty' trees were sprayed only during the summer cover sprays (after petal fall) for control of summer diseases only. Emphasis was placed on evaluating the efficacy of disease resistance for full season disease control alone and in combination with various fungicide programs. Diseases of primary interest were apple scab, sooty blotch, fly speck and black rot. In 1991, the number of fungicide applications ranged from 0 for nontreated 'Liberty' to 12 for the full schedule "organic" treatment on 'McIntosh,' with both treatments providing excellent disease control. All nontreated 'McIntosh' fruit were scab infected and of very poor quality. Due to a dry growing season and lack of summer disease development, nontreated 'Liberty' fruit had excellent quality. In 1992, the number of fungicide applications ranged from 0 for nontreated 'Liberty' to 14 for the full schedule "organic" treatment, with both treatments providing good to excellent disease control. An economic analysis of the programs is currently being conducted.

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A Maturity and Storage Study of Scab-Resistant Cultivars

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Based on the starch-iodine test and internal ethylene concentrations measured during three harvest seasons (1991-1992), the maturity of scab-resistant cultivars grown in the Annapolis Valley, Nova Scotia, can be ranked as follows (earliest to latest): 'Redfree,' 'Prima,' 'Novamac,' 'Macfree,' 'Moira,' 'Priscilla 'Nova Easygro,' 'Liberty,' 'Sir Prize,' 'Novaspy,' and 'Trent.' Several cultivars, 'Novaspy,' 'Moira,' 'Priscilla,' 'Novamac,' 'Nova Easygro,' 'Prima,' and 'Macfree,' were studied for two years (1990 & 1991), and three cultivars were studied for one year, 'Sir Prize' (1991), 'Liberty' (1991), and 'Trent' (1990). In 1990 each cultivar was stored for 3 and 6 months at 3°C in air and

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standard controlled atmosphere (SCA: 4.5% CO_2 & 2.5% O_2) and in 1991 they were stored for 4 and 8 months at 0°C in air, SCA and low-oxygen controlled atmosphere (LO: 1.5% CO_2 & 1.5% O_2). 'Moira,' 'Prima' and 'Priscilla' had very limited storage life (< 2 months), due mainly to the development of storage disorders and rots. 'Novamac,' 'Nova Easygro' and 'Macfree' were essentially at the end of their storage life after 4 months, as firmness in 'Novamac' decreased substantially and 'Nova Easygro' and 'Macfree' began to develop core browning and scald. 'Novaspy' stored very well and was the only cultivar to maintain its quality after long-term storage (8 months). Among the cultivars that have been evaluated for only one year, only 'Sir Prize' had no problem with storage disorders after long-term storage. Both 'Trent' and 'Liberty' developed some core browning after long-term storage, and 'Liberty' developed vascular breakdown in SCA and LO storage. In summary, 'Moira,' 'Prima' and 'Priscilla' do not store very well, 'Novamac,' 'Nova Easygro,' 'Macfree,' 'Trent' and 'Liberty' may be acceptable for mid-term storage, and 'Novaspy' and 'Sir Prize' are recommended for long-term storage.

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Early-Season Diseases Occurring on Scab-Resistant Apple Cultivars and Advanced Selections Grown in Southeastern New York State

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Introduction

Scab-resistant apple cultivars (SRCs) and scab-resistant advanced selections (SRASs) developed at the Geneva Experiment Station, Geneva, NY are also screened for resistance to powdery mildew, fire blight, and cedar apple rust. Several SRC/SRASs were further evaluated in the Hudson Valley in southeastern NY to determine the feasibility of growing SRCs with no fungicide treatments.

Methods

Four SRC/SRASs propagated on MM.111 rootstocks with M.9 interstems were planted at the research station in Highland in 1989. Four additional SRC/SRASs propagated on 'Mark' rootstocks were planted at each of two nearby sites in 1990. None of the trees received fungicide sprays. Development of leaf spot, powdery mildew, and other diseases was monitored at all sites during the 1992 growing season. Incidence of leaf spot was determined by counting the numbers of spots per leaf for all leaves on 25 terminal shoots in each of four replicates. Incidence of powdery mildew was determined by observing the eight youngest terminal leaves on each of 25 terminal shoots.

Results

The SRC/SRASs did not develop typical yellow cedar apple rust lesions, but they all developed severe leaf spotting when exposed to high levels of cedar apple rust inoculum, as in the Hudson Valley Lab orchard (Fig. 1) and Orchard B (Fig. 2). Cedar trees were growing adjacent to both of these orchards but were not found within several hundred meters of Orchard A. Yellow or orange pycnia

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