ferences for the growth measurements taken among the 3 strains (Table 3). Walsh (8) also reported that young Macspur and Imperial McIntosh trees were similar in size but concluded that Macspur may eventually become smaller than the nonspur McIntosh because of cropping. However, he may have been observing some reverted Macspur trees. The variability among Morspur may be due to careless mixing of propagating wood (D. V. Fisher, British Columbia, personal communication). The Eastman strain appears very spurry and compact but it has not been planted extensively and whether bud reversion will become troublesome is not known.

In summary, the variable growth of spur strains of McIntosh is troublesome both from the commercial and research standpoint. Variable tree growth can cause tree crowding because spur trees of a cultivar are generally planted closer than non-spur trees (6). Variable tree size and growth habit among Morspur and Macspur trees make research with those 2 strains difficult.

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The Marshall McIntosh

William J. Lord[1]

During the last several years, thousands of Marshall McIntosh trees have been planted in New England. The demand has exceeded the supply because until recently the only source of this strain was a small nursery in Maine. We have described below the origin, growth habit and fruit of the Marshall McIntosh because of inquiries about the strain from other McIntosh-growing areas.

Marshall McIntosh is a non-spur strain that originated as a branch mutation of McIntosh in the orchard of the Marshall Farm, Inc., 340 Marshall Road, Fitchburg, Massachusetts 01420. The mutation was noticed in 1967 when the fruit developed red color 2 or 3 weeks earlier than those on the rest of the tree.

The Marshall brothers have found that the Marshall strain can be har-

[1]Department of Plant and Soil Sciences, University of Massachusetts, Amherst, MA 01003.

vested earlier than other McIntosh strains or be picked on the "normal" harvest dates. They report that the fruit stores well in both regular and CA storage but believe more information is needed concerning the harvest and storage of the strain.

We at the University of Massachusetts as yet have little information about the Marshall strain. We think it has real potential for CA storage because of early coloring; that it will increase pack-out because of more red color; and that planting of the strain will make the harvest season more orderly because the number of days that McIntosh can be harvested will be extended.

Our limited data show that at the Horticultural Research Center, Belchertown, MA, on September 6, 1978, 72% of the Marshall McIntosh fruit were Extra Fancy for color. On this date only 40% of the Cornell strain of McIntosh was Extra Fancy. On August 30, 1979, 75% of the Marshall were Extra Fancy in comparison to 53% of the Cornell fruit. Lastly, on September 4, 1980, 53% of the Marshall McIntosh were Extra Fancy and only 16% of the Cornell McIntosh fruit were of this grade for color. We also believe that the red color is more intense on Marshall than on other strains of McIntosh. Our data indicated that the maturity of Cornell and Marshall strains was similar as indicated by flesh firmness and sugar content of the fruit. Thus it appears that Marshall McIntosh is an early coloring strain and not both an early coloring and early maturing strain.

In 1979 we established a planting in which Marshall McIntosh is being compared with 6 other strains of the variety. Hopefully, we will obtain more reliable and complete information on the maturity of these strains and on their keepability in regular and CA storage.

Performance of the Apple Cultivar Prima in Ireland

MICHAEL J. HENNERTY[1]

Apple scab (*Venturia inaequalis* [Cke.] Wint.) is a major problem for apple growers in Ireland due to a mild moist climate and widespread distribution of infection sources. There is considerable interest in apple scab resistant cultivars for both commercial and home garden growers. Prima is the first modern scab resistant cultivar to be evaluated for the Irish market.

Budwood of Prima was obtained from Dr. D. F. Dayton, University of Illinois (1) and worked on virus free M26 rootstocks. The cultivar was included in trials planted in 1973 at the Horticulture Field Station, University College in Co. Dublin and at the Pomology Research Centre, The Agricultural Institute in Co. Waterford. These locations are about 125 miles apart, in two of the main apple growing regions. The spindle-bush training system was used throughout (2).

Tree growth was vigorous and upright in habit and cropping was considered regular at both locations. Full

[1]Department of Horticulture, University College, Belfield, Dublin 4, Ireland.