

### Abstract

Performance, optimal harvest, and postharvest studies of apple cultivar/rootstock combinations in northern Mississippi were evaluated during 1998 and 1999. Parameters measured were fruit set, scion and stock trunk cross sectional area, fresh fruit weight, yield, fire blight susceptibility, and maturity indices such as fruit size, firmness, soluble solids content, juice pH, and ethylene production evolution. 'Royal Gala'/MM 111, 'Scarlet Gala'/EMLA 7, 'Jonagold'/EMLA 111 and 'Improved Golden'/EMLA 111 and 'Improved Golden'/EMLA 7 were a better combination based on fruit size, fruit set percentage, total yield, and maturity indices at harvest than 'Jonafree'/Mark and 'Macspur'/M 7A. 'Earligold'/EMLA 7 and 'William's Pride'/M 7A were moderately acceptable combinations. The maturity indices of these cultivar/rootstock combinations were monitored weekly until harvest and used to estimate their optimal harvest date. Horticultural maturity of 'William's Pride' and 'Scarlet Gala', and 'Earligold' was determined to be 93 days after full bloom (DAFB) and were considered early harvested cultivars. 'Royal Gala' and 'Jonafree', picked 102 and 108 DAFB were medium harvest cultivars. 'Macspur', 'Jonagold', and 'Improved Golden' were late harvest cultivars (128-134 DAFB). At harvest and storage sample periods all the combinations were evaluated by an untrained consumer panel. Fruit appearance, flavor, sweetness, tartness, and firmness were rated. Results indicated that medium and late cultivars such as 'Improved Golden', 'Royal Gala', and 'Jonagold' were preferred by panelists. The early harvested cultivars, 'Earligold' and 'William's Pride', had a moderate acceptance as fresh fruit. After harvest the fruits were separated. One group was stored at 2°C and the another at room temperature (21°C). The internal ethylene concentration (IEC) in the core of fruit was measured weekly before and after harvest to monitor ethylene production. 'Earligold'/EMLA7 had the highest IEC at harvest and showed ethylene evolution at harvest and after harvest at room temperature (21°C) and had low ethylene production when apples were stored at 2°C. 'Royal Gala'/MM 111 ethylene evolution increased with time at room temperature and was initiated the second week in storage. Fruit stored at 2°C had low IEC and was initiated when apples were three weeks in storage. The remaining cultivar/rootstock combinations showed an intermediate trend between 'Earligold'/EMLA7 and 'Royal Gala'/MM 111 in ethylene production.