Performance of Component Species in Three Apple-Berry Polyculture Systems

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Abstract

The commercial and ornamental potential of three apple-berry polyculture systems was ascertained by monitoring the above-ground performance of component species in plots of ‘Goldflush’ apple (Malus domestica Borkh.) trees on M.7 rootstock cropped with either blackberry (Rubus spp. L. ‘Navaho’), edible honeysuckle (Lonicera caerulea L. ‘Blue Belle’ and ‘Blue Velvet’), or jostaberry (Ribes nidigrolaria Bauer ‘Josta’) as understory plants. Polyculture plots and corresponding monoculture controls were established in 1999, with berry plants at recommended (R) or close (C), half-recommended spacings. Blackberries and jostaberries planted in monoculture at recommended spacings (i.e., control (R) plots) amassed dry weights >1 kg/plant by Fall 2001; the dry weight of edible honeysuckle from comparable plots was slightly >0.3 kg/plant. In 2001, blackberry yield (3.1 kg/plant) and fruit weight (3.4 g) were typical of ‘Navaho’ plantings of similar age, whereas jostaberry was only moderately productive (yield = 2.86 g/plant; fruit weight = 1.4 g). Edible honeysuckle productivity (yield = 13 g/plant, fruit weight = 0.5 g) was minimal, due to disparate flowering phenology between cultivars. ‘Goldflush’ apple growth and productivity (yield = 25 kg/tree; fruit weight = 150 g) was consistent with values expected for trees of similar age. Blackberry plant dry weights were reduced by 20% to 33% when planted at close spacing, whereas blackberry yields were reduced 35% to 38% when grown in polyculture with apple. Both polyculture and plant spacing significantly reduced jostaberry dry weights (i.e., 12% and 24%, respectively) relative to the control, but neither significantly affected jostaberry yield. Conversely, both close-spaced planting and the presence of an apple tree improved the yield of edible honeysuckle. Apple performance was not affected by the presence of an edible honeysuckle understory, but apple growth factors were reduced in blackberry and jostaberry polycultures by as much as 65%. Apple bloom, fruit set, and yield were also significantly reduced in apple-blackberry and apple-jostaberry plots, with fruit numbers/tree averaging <5 in all except the apple-blackberry (C) treatment. None of the polyculture treatments studied were suitable for profitable fruit production. However, each of the polyculture constituents exhibited unique, beneficial attributes with respect to their use as components within an edible landscape.

edible landscaping intercropping interspecific competition blackberry Rubus spp. jostaberry Ribes nidigrolaria edible honeysuckle Lonicera caerulea