



PRIMOCANE RASPBERRY SEASON EXTENSION TECHNOLOGY

Joseph A. Fiola, Ph.D.
Specialist in Viticulture and Small Fruit

Primocane-fruiting or "fall bearing" red raspberries produce fruit on the current seasons growth in the late summer. These are grown in a system where the fall fruiting canes are mechanically mowed in the late winter (March/April), after which new canes sucker from the crown. This system is much more labor efficient, as there are minimal or no trellising requirements and also reduces disease pressure since all canes are removed each winter.

The typical harvest season extends from mid-August through frost. As with any crop, extending the harvest season can increase profit. Manipulation of cultural practices (floating row covers and tipping) and varieties can be very effective in extending the primocane raspberry season, both earlier and later.

Earlier fruiting with floating row covers

Introduction. Floating row covers ("FRC") (spun-bonded polymers) offer a viable method to increase early season growth, advance initial harvest dates, and increasing yields of vegetables and strawberries. The principal is that the FRC are placed over the plants in the late winter or early spring, the radiant heat under the cover warms up the soil, the plants begin to develop more quickly, and ultimately produce an earlier crop.

Procedures. Primocanes from the previous year are mowed at the soil surface at the beginning of March (New Jersey) or as late as possible before active growth, as is the typical practice for fall cropping of 'Heritage'. This is also a good time to narrow the row to a 12-inch wide hedgerow, which is the optimal width for high production and good fruit size.

The FRC material is available in different weights. The 0.6 weight material is best for brambles based on our experimentation. FRC are installed directly over the narrowed hedgerow, as soon as possible after mowing. The FRC is secured along both edges with various materials (irrigation pipe, bricks, wood strips, sandbags). The covers are removed in mid-April through late May, when the ambient air temperature is consistently above 70°F, or the canes have reached a height of about 20 inches (50 cm).

Results. In research conducted in 1989, 1990, 1991 and 1998, in New York, Michigan, and New Jersey, earlier harvest and/or increased yield was observed in nine of ten experiments. The most dramatic results were at Cream Ridge, N.J. in 1990, where covers applied March 1st accelerated harvest by 3 weeks, and the April 1st applied covers by 17 days over uncovered controls. August yields of March and April covered plots were 42 and 17 times that of the control, respectively. The total production curve was shifted seven to fifteen days earlier with FRC. The harvest peaks were earlier, greater, and more concentrated than the controls.

Acceleration of growth in the spring by "artificially" increasing the surrounding temperature of the planting through FRC caused a direct acceleration of the flowering and fruiting response, resulting in an earlier harvest. This can result in a significant yield increase, especially in years with an early frost. FRC can also be utilized to "stagger" the harvest by covering only a portion of the total area. The section with the March applied FRC will start first, followed by the April applied area, and finally the non-covered area, thereby spreading the peaks of harvest over an extended period.

The approximate cost for the covers is \$500-600/Acre, however, the material can be stored and reused a second year, cutting the cost in half. Increased yield resulting from the two to three week extension of the season should easily cover the cost of the material.

Earlier fruiting with new varieties.

'Heritage' has been standard cultivar for which this system was developed. It has good quality fruit, consistent production, and a long harvest season. It is adapted to PYO or commercial production, for fresh or processing. Limitations of **'Heritage'** include small fruit size and that it begins fruiting late in the summer.

'Caroline' is a red primocane-fruiting variety from the Cooperative MD/NJ/VA/WI Breeding Program. **'Caroline'** has a long conic shape, is very cohesive, has large size, great flavor and good shelf life. In trials in New Jersey, **'Caroline'** was 7-10 days earlier, comparable or higher yielding, with 18% larger fruit size than **'Heritage'**. It has good vegetative vigor, with good suckering.

'Anne' is a new golden primocane-fruiting variety with cohesive conic shape, large fruit size, and very good flavor. It is slightly earlier than **'Heritage'**, but is low yielding.

'Polana' is an ever bearing type of red raspberry that is up to three weeks earlier and has larger fruit size than **'Heritage'**. The berry has good flavor and cohesiveness. Yields per acre are high in part because each auxiliary bud produces two fruiting laterals.

'Autumn Bliss' and **'Autumn Briton'** were selected in Scotland for flavor, firmness, and size; they are also resistant to powdery mildew. They start earlier than **'Heritage'** but performance in the East has been inconsistent

Delayed fruiting through primocane tipping

Introduction. Pruning and tipping is a common practice used for delaying development and modifying plant canopy. Mowing and other forms of primocane suppression have been successfully utilized to delay primocane development as to not interfere with floricanes fruiting and trellis management. Tipping and mowing were utilized in an attempt to delay primocane development, bloom, and fruit development.

Procedures. The following are descriptions of the treatments:

Mow - the primocanes were mowed to ground when they reached 6 or 12 inches in height.

Soft tip - the top 1-2 inches of primocane were cut off after canes had reached full height.*

Hard tip - the top 2-5 inches of primocane were cut off after canes had reached full height.

(*Full height varies in height and timing each season, so one must keep track of the growth of the primocanes to decide when they have reached their final height. Also, in our experience, there were typically three "groups" of primocane heights within the planting. The tallest compose about 30% of the planting, the next group (approx. 3 inches shorter) about 50%, and the shortest group (another 3 inches shorter) about 20%. Since the mid group composed the majority, we applied all of our treatments based on this group, so the tallest were cut the most, the middle group as per the treatments above, and the shortest were barely cut.)

Results. On the average, the control canes have reached about 50-60 inches in height. The tipped canes branched at the tip site and, in most cases, sent up two strong branches that also reached about 50-55 inches in height. Regrowth of the canes of the six inch mowed plots was good, but not as dense as the control. They reached about 45-55 inches in height, but tended to be weaker and less upright. One plot was mowed at twelve inches, but re-growth of the canes was not good, and weeds quickly filled in.

The delay of fruiting ranged from 0 to 63 days depending on treatment and application date. Even in years with 0 days delay in first harvest, the whole harvest was staggered. In general, the early-tipped plots started fruiting about two to four weeks later than the untreated control. The hard-tipped plots were 3-7 weeks delayed and the late soft-tipped plots were up to 9 week delayed. The mid-to-late June tipping was better than early July, as much of the fruit of the July tipped plots will be lost to frost in most years in the Northeast. The six inch mowed plots were delayed about 4 weeks and had just sporadic ripening fruit. Warm seasons in 1995 and 98 induced early harvest that extended into November, optimal seasons to test the procedure. Even in these years however, yield of tipped plots was always less than control plots, as a portion of the crop was lost to frost.

Summary. The tipping treatment successfully delayed the beginning of harvest and the peak of the harvest. The soft tip (the top 1-2 inches) delayed the harvest about three weeks; the hard tip (the top 2-5 inches) about 5 weeks. The timing of the tipping is also important, with mid-to-late June better than early July. Total harvest will also typically be less in the tipped plots relative to the control, as some portion of the yield will be lost to frost under normal Northeast conditions. Under protected culture (High tunnels) however, high yield and extended delay (Thanksgiving berries!) are a possibility. Milder climates in the southeast US and Western US are prime areas for this system.

Earlier fruiting with new varieties.

To extend the season on the later end, the advanced selections from the Cooperative Breeding Program that have high quality and very large fruit. The new variety 'Josephine' (JEF-F1) has been a superior performer in commercial trials, with very large fruit, long season of harvest, excellent flavor, and leafhopper resistance. **MBT-F1, ND-F1, NC-F1, and QEG-F1** are new advanced selections with very large fruit, but need more testing. Contact Davon Crest Farms to obtain plants for trial.

Summary

'Heritage' and other primocane-fruiting red raspberries can be induced to fruit earlier with the use of FRC. Covers are installed immediately after "mowing" in late-winter/early spring, and removed when warm weather arrives. Covered area will start and peak fruit production earlier than non-covered areas. During seasons that have early frosts and/or wet September, common in the Northeast, this technique can add significantly to the profitability of primocane-fruiting brambles. By covering only a portion of the total area, the first picking and peak yields can be staggered, allowing an extended PYO season.

Primocane tipping can be very successful in delaying the onset peak of fruiting. The duration of the delay depends on the type of tip (soft or hard) and timing (early or late) of the procedure. Combinations of FRC and tipping treatments along with mixing varieties can be used to stagger crops for different durations and maximize the primocane raspberry season.