

Double Cropping of Primocane Fruiting Raspberries

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Primocane fruiting (PF) raspberries are very popular in many U.S. states, partly because they can be cut to the ground mechanically, resulting in a single crop of fruit produced in one year-old primocanes in the late summer and fall. However, PF varieties can produce a second crop in June or July if canes are retained. Producing a primocane crop in the fall and a floricanes crop in the summer is referred to as “double cropping”. The introduction of spotted wing drosophila (SWD) has made double cropping more appealing since in the Midwest and Northeast, SWD populations are low in June and early July when the summer fruit ripen. Populations escalate rapidly thereafter so that control is very difficult during the primocane harvest in the late summer and fall. Double cropping may also provide a period of time between the floricanes and primocane harvests when no ripe berries are present to “break the SWD growth cycle”.

Information on the double cropping potential of PF cultivars is limited because they are typically tested for their primocane fruiting ability. To choose cultivars for double cropping, growers need to know their summer cropping yield potential, fruit quality or relative harvest season. With this information, it may be possible to choose groups of varieties that provide a continuous harvests of high yields and superior quality through the summer and fall. Harvest times of primocane fruiting types can also be manipulated by tipping and cane removal (Carew et al., 2000; Oliveira et al., 1996; Pritts, 2008) or by using high tunnels or greenhouses (Demchak, 2009; Hanson et al., 2011). Double cropping types need adequate hardiness to overwinter floricanes and sufficient vigor to support both floricanes and primocane bearing.

This project dovetails with a new USDA-NIFA Specialty crop Research Initiative Project titled “*Optimizing Protected Culture Environments for Berry Crops*”, which runs until 2019.

Objective:

Identify primocane fruiting cultivars suitable for double cropping in cold climate regions.

Methods and Results:

The work is being conducted in multiple bay high tunnels (Haygrove tunnels Ltd.) at the Southwest Michigan Research and Extension Center (SWMREC) in Benton Harbor MI (200 x 24 foot tunnels) and at the Horticulture Teaching and Research Center in east Lansing MI (200 x 26 foot tunnels). The raspberry tunnel at SWMREC was split in two and the halves were covered with experimental plastics that were either opaque to ultraviolet light (UV-O) or transmitting (UV-T). Tunnels were

covered with plastic from May through October. Plants at SWMREC were grown in three-gallon plastic Gro-bags filled with a 70% composted pine bark and 30% peat media, and irrigated as needed with one 0.5 gph emitter per pot and fertilized via fertigation with a complete soluble fertilizer delivering 100 ppm nitrogen.



In-ground raspberries in East Lansing (L) and potted in Benton Harbor

In-ground raspberry plants were used in East Lansing MI. Tunnels were split and half of each was covered from May through October with either Luminance THB (partial UV transmitting) or Lumisol (completely UV transmitting). The plants were managed organically and trickle irrigated. Three tunnels were used; each containing a row of Himbo Top, Joan J, and Polka. Three pruning treatments were assigned in each row, where plants were pruned to retain either no floricanes, or medium or high numbers. Floricane numbers were determined based on the number of healthy canes in the spring. However, cold injured most canes in 2014 so only a few healthy canes were retained. Cold injury was significant in 2015 too but we were able retain canes and impose treatments averaging 0, 0.65 or 1.3 canes per linear foot of row (None, Low, High). Floricane and primocane harvests ran from 22 June to 22 July, and 4 Aug to 14 Oct, respectively. Himbo Top harvest beginning and ending the latest.

The PF varieties Josephine and Nantahala were pruned to retain 2 canes per plant. The FF varieties Encore, Nova and Prelude were also pruned to two canes per plant, for comparison. Highest total yields were picked from the double cropped Josephine and Nantahala plants. Harvest periods for floricane fruit were from 29 June to 2 Aug., and the primocane harvest extended from 31 Aug. to 6 Nov. The order of ripening of the floricane crop (earliest to latest was Prelude, Nova, Josephine and Nantahala, and Encore. Primocane fruit of Josephine began ripening a few days earlier than Nantahala.

Cultivar	Yield (g/plant)		
	Floricane	Primocane	Total
Encore	432	--	432
Josephine	595	296	891
Nantahala	442	297	739
Nova	505	44	549
Prelude	336		336

In-ground plants in East Lansing MI were also used to study double cropping. Himbo top, Joan J, and Polka were planted in each of three, organically-managed high tunnels in 2009. Our plan was to impose three pruning severities in the spring of 2014 and 2015 by retaining different numbers of floricanes. However, cold injured most canes in 2014 so only a few healthy canes were retained. Cold injury was significant in 2015 too but we were able retain canes and impose treatments averaging 0, 0.65 or 1.3 canes per linear foot of row (None, Low, High). Floricane and primocane harvests ran from 22 June to 22 July, and 4 Aug to 14 Oct, respectively. Himbo Top harvest beginning and ending the latest.

Floricane yields from the High treatment were equivalent to 5,400 lb per acre, even though the cane number (1.3 per foot of row) was low due to cold injury. Primocane yields were equivalent to 10-12,000 lb per acre and total yields (floricane plus primocane) were as high as 17,000 lb. Retention of floricanes did not appear to affect primocane harvest times, but there was a trend towards high primocane yields when floricanes were retained.

Variable	Variety	Floricanes retained	Yield (lb/acre)		
			Floricane	Primocane	Total
Variety	Himbo		3384	11824	15,200
	Joan J		2635	12457	15,100
	Polka		2575	10649	13,200
Floricanes		None	0	10187	10,200
		Low	3153	12562	15,700
		High	5373	12168	17,500
Var x Flor	Himbo	None	0	10314	10,300
	Himbo	Low	3590	13026	16,600
	Himbo	High	6419	12108	18,500
	Joan J	None	0	11176	11,200
	Joan J	Low	2962	13173	16,100
	Joan J	High	4606	13022	17,600
	Polka	None	0	9089	9,100
	Polka	Low	2908	11486	14,400
	Polka	High	4766	11373	16,100

Primocane and florican raspberry harvest times, E.L., 2015.

