Annual Report 2009: Hard Cider

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TITLE : Evaluation of Apple Cultivars for Hard Cider Production

PERSONNEL:

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OBJECTIVES:

1. To evaluate hard cider apple cultivars and determine productivity (fruit yield and quality) in northwest Washington.
2. To produce ciders for evaluation and describe the ciders using sensory evaluation criteria.
3. Provide professional development and make results available to growers and cider producers.

SUMMARY: In 2009 juice of 65 cider apple varieties grown in a \block at WSU Mount Vernon NWREC was analyzed for percent tannin, brix, pH and titratable acid. Ciders were produced from 3 cider apple varieties. Bottling of 2008 ciders was done in January 2010. In cooperation with WSU Mount Vernon NWREC, Peter Mitchell of Worcestershire, England, an international cider judge and expert, led two Cider School sessions, an introductory course June 23-27, 2009, and an advanced course December 7-11, 2009, in addition to a one day workshop on sensory evaluation of cider on Decmeber 12, 2009. There were 20 participants in the June course, 23 in the advanced course, and 30 in the sensory workshop. Participants came from Washington, Oregon, and British Columbia, also from more distant states. In the advanced course, most of the participants had already established cideries from taking the beginning course previously and returned to improve their technical knowledge in the second course. These intensive laboratory courses featured hands-on training in the methods of cider production and quality analysis.

METHODS:

An unreplicated study of 6 cultivars with 5 trees per cultivar was established in 1994, 14 cultivars were added and one removed in 1999-2002, and 7 cultivars were added in 2005 so the planting now includes 25 cultivars. A cultivar screening study consisting of 35 single tree specimens was planted in 2004, and includes classic American cider cultivars and other cultivars from the

European cider making centers of England and France. Observations for cultivars not previously evaluated included recording of bloom date and density once a week, beginning in late April to the end of May 2009. Fruit maturity was evaluated weekly during the harvest season using the starch conversion iodine test as a ripeness indicator for picking. Juice of 65 varieties was analyzed for brix, titratable acid, pH and tannins.

The methods utilized for cider fermentation, sensory analysis, and evaluation followed those developed by Peter Mitchell of Mitchell F & D Limited, Worcestershire, England. Mitchell is a professional cider consultant and sensory trainer and has taught courses in cider production and food technology at Worcestershire Agricultural College for many years. His methods are currently used in classes at Cornell University, Geneva, NY as well as at WSU Mount Vernon NWREC. Mitchell has developed an analytic method for the exact description of cider characteristics using sensory evaluation.

Professional Cider School sessions, taught by Peter Mitchell, were conducted emphasizing hands-on experience of cider production, laboratory techniques, and sensory analysis of cider products. Staff and cooperating cider makers were trained to evaluate ciders. Workshops and field days to familiarize growers with basic information on cider varieties, orcharding, and production were held. Annual reports were made public through the Fruit Horticulture web pages and information disseminated at field days.

RESULTS AND DISCUSSION:

Objective 1. To evaluate hard cider apple cultivars and determine productivity (fruit yield and quality) in northwest Washington.

In 2009 most of the newer acquisitions were productive in the field. Observations made of bloom dates and bloom density from 2000 to 2009 indicated that some varieties bloomed abundantly each year, while others appear to have a tendency to alternate bearing (Table 2). Early blooming varieties such as Granniwinkle, Jouveaux, and Golden Russet are of special interest as their early bloom date makes them less susceptible to fire blight (*Erwina amylovora)* infection than late bloomers; this is of particular importance in areas such as Central and Eastern Washington where that disease is problematic. Harvested fruit was processed, and fruit juice analyzed (Table 1). Varieties with higher tannins tend to impart more body and viscosity to ciders when blended with standard dessert apples.

Objective 2. To produce ciders for evaluation and describe the ciders using sensory evaluation criteria.ualities.

In 2009 fruit of 4 cider apples (Kingston Black, Dabinett, Frequin Rouge, and Brown Snout) was pressed for cider on October 14

Objective 3. To make results available to growers and cider producers.

Cider School sessions were conducted June 23-27, 2009 (introductory), and December 7-11, 2009 (advanced), in addition to a one day workshop on sensory evaluation of cider on Decmeber 12, 2009. Annual reports were made public through the Fruit Horticulture web pages and information disseminated at field days.

This research has provided growers with information on the characteristics of apple cultivars selected for hard cider production. Several local commercial cideries have been established, and plantings of cider cultivars were initiated. The Cider School classes in 2009 drew participants from Washington, Oregon, and British Columbia, also from more distant states.

ACKNOWLEDGEMENTS

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OUTSIDE PRESENTATIONS OF RESEARCH:

Moulton, G.A., 2009. Class and Field Demonstration, "Orchard Technology in Hard Cider Production," workshop class, June 24, 2009.

Moulton, G.A. 2008. Basics of Hard Cider Making and Orcharding, workshop for commercial and private cider makers, Sultan, Snohomish County, August 22, 2009.

FUND STATUS

Wine Advisory Board, Washington State Department of Agriculture - $ 4,000
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Table 1. Percent tannin, brix, pH and titratable malic acid in juice of apples grown and tested at WSU Mount Vernon NWREC in 2008 and 2009, listed in descending order by % tannin in 2009.

Sample	Tannin %		Brix		pH		Malic Acid g/L	
	2009	2008	2009	2008	2009	2008	2009	2008
Medaille D'Or	1.75	-[1]	17.2	-	4.37	-	3.54	-
Vilberie	0.91	0.41	12.0	14.2	3.60	3.89	3.43	3.86
Amere de Berthcourt	0.68	DNF[2]	14.0	DNF	4.47	DNF	2.26	DNF
Reine des Pommes	0.67	DNF	14.9	DNF	4.21	DNF	3.38	DNF
Nehou	0.61	0.22	14.2	15.0	4.56	4.01	3.10	3.81
Frequin Rouge	0.57	0.19	12.2	10.8	4.57	4.20	2.58	2.73
Red Jersey	DNF	0.26	DNF	11.0	DNF	4.38	DNF	1.72
Domaines	0.52	0.24	15.0	16.0	4.53	4.16	2.09	2.79
Lambrooke Pippin	0.51	-	14.4	-	2.86	-	10.61	-
Stembridge Jersey	0.48	-	12.9	-	4.69	-	2.41	-
Coat Jersey	0.48	-	11.8	-	3.72	-	1.93	-
Doux Normandie	0.48	-	13.0	-	3.58	-	3.86	-
Kermerrien	0.46	0.34	12.8	14.0	3.86	4.00	2.47	2.23
Royal Jersey	0.45	DNF	12.2	DNF	4.13	DNF	1.50	DNF
Stoke Red	0.43	0.30	13.2	13.0	4.04	3.50	6.22	7.50
Chisel Jersey (NY)	0.43	-	14.2	-	4.93	-	1.88	-
Yarlington Mill	0.38	0.11	14.0	11.0	4.97	4.04	1.72	2.68
Foxwhelp	0.33	-	14.0	-	3.01	-	10.18	-
Cimitiere	0.33	-	11.2	-	4.90	-	1.39	-
Breakwell Seedling	0.32	0.12	11.0	10.4	3.17	3.43	5.36	6.97
Muscat de Berney	0.32	-	12.0	-	3.68	-	2.57	-
Ribston Pippin	DNF	0.11	DNF	14.8	DNF	3.48	DNF	6.54
Dabinett	0.32	0.23	14.0	14.2	4.90	4.47	1.34	1.93
Blanc Mollet	0.30	-	11.4	-	4.27	-	1.50	-
Harry Masters' Jersey	0.30	DNF	12.0	DNF	4.18	DNF	1.72	DNF
Metais	0.30	-	12.0	-	4.33	-	1.29	-
Major	0.29	0.22	13.4	14.8	4.24	4.42	1.82	1.82
Frequin Tardif	0.28	-	12.0	-	4.36	-	2.58	-
Tremlett's Bitter	0.28	0.17	11.8	12.2	2.88	3.44	9.86	10.34
Campfield	0.27	-	13.0	-	4.63	-	2.63	-
Cap O'Liberty	0.26	0.18	11.0	12.0	2.89	3.38	9.87	13.67
Kingston Black	0.26	0.13	13.4	13.0	3.22	3.70	5.63	5.90
Brown Snout	0.26	0.08	12.0	13.0	3.73	4.10	3.00	2.95
Bulmer's Norman	0.25	0.17	11.2	11.8	3.94	4.06	1.88	1.77
Muscadet de Dieppe	0.24	DNF	14.0	DNF	3.84	DNF	2.30	DNF
Marin Oufroy	0.24	-	14.2	-	4.47	-	2.84	-
Frequin Audievre	0.23	-	12.0	-	4.75	-	1.40	-
Dymock Red	0.21	0.19	13.0	14.4	4.07	4.29	1.82	2.03
Peau de Vache	0.19	0.09	11.0	12.4	3.71	4.08	3.00	2.52
Taylor's	0.19	-	12.2	-	4.15	-	1.66	-
American Forestier	0.19	-	11.8	-	3.63	-	1.98	-
Harrison	0.19	-	16.0	-	2.94	-	10.08	-
Taliaferro	0.19	-	10.2	-	2.87	-	6.81	-
Golden Russet	0.18	0.10	15.0	18.0	3.93	3.72	7.93	6.38

Sample	Tannin %		Brix		pH		Malic Acid g/L	
	2009	2008	2009	2008	2009	2008	2009	2008
Track Zero Seedling	0.17	-	12.0	-	3.97	-	1.61	-
Bouteville	0.16	-	12.0	-	4.43	-	1.17	-
Bramley's Seedling	0.16	0.11	10.0	12.8	3.63	3.35	10.18	10.29
Zabergau Reinette	0.16	0.10	11.9	16.4	3.85	3.66	6.27	8.95
Tom Putt	0.16	0.08	11.0	11.2	3.77	3.52	6.27	7.24
Whidbey	0.15	0.07	11.9	14.4	3.96	3.53	4.88	8.30
Grindstone	0.15	-	11.4	-	3.18	-	5.25	-
Sweet Alford	0.15	0.06	11.0	14.6	4.77	4.32	1.34	2.89
Finkenwerder Herbstprinz	0.15	0.06	14.6	14.0	2.96	3.44	11.36	10.13
Redstreak	0.15	0.06	12.0	12.0	2.99	3.36	8.74	9.86
Smith's Cider	0.12	-	11.0	-	3.15	-	4.28	-
Mott Pink*	0.11	-	12.0	-	3.16	-	7.08	-
Roxbury Russet	0.11	0.07	16.4	17.0	3.31	3.85	4.77	5.41
Crow Egg	0.10	0.10	10.2	14.0	4.01	3.66	3.27	5.63
Reine des Hatives	DNF	0.10	DNF	14.0	DNF	4.34	DNF	2.47
Granniwinkle	0.10	0.05	10.4	12.0	1.58	3.80	1.82	3.48
Maude	0.10	-	12.0	-	3.40	-	4.82	-
Court Pendu Plat	0.10	-	13.0	-	2.93	-	7.72	-
Freyberg*	-	0.01	-	14.0	-	3.96	-	3.48

[1]Blank (-) indicates data not collected (young trees, dessert apples, etc.)

[2]DNF = Did not fruit, mature tree in alternate year;

*dessert apple

Table 2. Mean date of full bloom in cider apple cultivars observed at WSU Mount Vernon NWREC, 2000-2009, listed in order from earliest to latest bloomers (data not collected 2005 and 2006).

Cv	Mean	2009	2008	2007	2004	2003	2002	2001	2000
Golden Russet	5/3	5/13	5/10	4/30	4/14	5/6			
Roxbury Russet	5/3	5/7	5/10	4/28	4/16	5/6	5/15	5/2	4/28
Track Zero Seedling	5/5	5/7	5/9	4/28					
Granniwinkle	5/6	5/7	5/5						
Tom Putt	5/6	5/13	5/16	5/7	4/23	5/13			
Grimes Golden	5/7	5/7							
Grindstone	5/7	5/7	5/7						
Jouveaux	5/7	5/7	5/7						
Maude	5/7	5/7							
Muscat de Bernay	5/7	5/7							
Reine des Pommes	5/7	5/13		5/7	4/23	5/13			
Bramley's Seedling	5/8	5/13	5/16	5/7	4/23	5/11			
Foxwhelp	5/8			5/7	4/23	5/13	5/15	5/9	5/11
Redstreak	5/8	5/13	5/16	5/7	4/26				
Brown's Apple	5/8				4/23	5/13	5/15	5/16	
Smith's Cider	5/9	5/9							
Bouteville	5/9	5/7	5/13						
Cap O' Liberty	5/10	5/7	5/16	5/7					
Frequin Rouge	5/10	5/7	5/16	5/7					
Tremlett's Bitter	5/10	5/7	5/16	5/7					
Bulmer's Norman	5/10	5/13	5/16	5/7	4/28	5/19			
Sweet Alford	5/11	5/7	5/16						
Crow Egg	5/11	5/7	5/16						
Michelin	5/12	5/15	5/18	5/7	4/25	5/13	5/21	5/16	
Muscadet de Dieppe	5/12	5/13	5/18	5/7	4/28	5/13	5/21	5/16	5/11
Reine des Hatives	5/12	5/13	5/18	5/5					
Taylor's	5/12	5/13						5/11	5/11
Zabergau Reinette	5/12	5/7	5/16						
Bramtot	5/12	5/13							
Campfield	5/13	5/13							
Doux Normandie	5/13	5/13							
Fillbarrel	5/13	5/13							
Finkenwerder Herbstprinz	5/13	5/13	5/18	5/7					
Kingston Black	5/13	5/19	5/25	5/7	4/25	5/13	5/21		
Metais	5/13	5/13							
Stembridge Jersey	5/13	5/13							
Vagner Ascher	5/13	5/13							
Amere de Berthcourt	5/15	5/15							
Kermerrien	5/15	5/13	5/16	5/15					
Taliaferro	5/15	5/13	5/16						
Whidbey	5/15	5/13	5/16						
Chisel Jersey	5/16	5/19	5/18	5/15	4/30	5/19	5/21	5/19	
Harrison	5/16	5/13	5/18						
Yarlington Mill	5/17	5/13	5/18	5/15	4/30	5/19	5/21	5/19	5/11

Cv	Mean	2009	2008	2007	2004	2003	2002	2001	2000
Dabinett	5/18	5/19	5/25	5/17	5/3	5/22	5/21	5/17	
Harry Masters' Jersey	5/18	5/19	5/30	5/15	5/3	5/19	5/21	5/19	
Major	5/18	5/19	5/16						
American Forestier	5/18	5/19							
Blanc Mollet	5/19	5/19							
Brown Thorn	5/19	5/19							
Coat Jersey	5/19	5/19	5/18						
Frequin Audievre	5/19	5/19							
Frequin Tardif	5/19	5/19							
Lambrooke Pippin	5/19	5/19							
Peau de Vache	5/19	5/19	5/18						
Sweet Coppin	5/19	5/19							
Royal Jersey	5/21	5/21							
Brown Snout	5/23	5/27		5/22	5/4	5/22	5/31	5/29	
Breakwell Seedling	5/24	5/27	5/22	5/22					
Vilberie	5/24	5/27	5/30	5/22	5/4	5/22	5/31	5/29	
Cort Pendu Plat	5/25	5/19	5/30						
Cort Pendu Rose	5/25	5/19	5/30						
Red Jersey	5/25		5/25						
Cimitiere	5/29	5/27	5/30						
Medaille D'Or	5/29	5/29							