DEVELOPMENT OF NEW HOP AROMA VARIETIES FOR CZECH BEER

Nesvadba V., Charvatova J., Stefanova L.

Hop Research Institute Co., Ltd., Kadaňská 2525, Žatec, Czech Republic, nesvadba@chizatec.cz

Czech Republic is famous for production of fine aroma hops with excellent brewing quality, which ensues from historical tradition of growing Osvald clones (Saazer). Nevertheless, since the nineties of the last century new hop varieties (Sladek, Premiant, Harmonie, Saaz Late, etc.) have been grown here as well. Hop breeding aimed at getting new aroma varieties still continues with the objective to register new aroma varieties with stable qualitative and quantitative parameters and excellent brewing characteristics. Breeding of new generation aroma cultivars was started in 1999. Each year nearly twenty crossings was made and the genotypes were at first tested at susceptibility to downy and powdery mildew. The best genotypes were selected within tolerant and resistant progenies and tested within our breeding program. Five perspective aroma genotypes were transferred into registration trials in 2015 and four others in 2016.

Genotypes 5045 and 5227 were the most productive with the average yield of 2.8 t/ha resp. 2.56 t/ha (Figure 1). Average values from chemical analyses of hop resins obtained in 2013 - 2016 are shown in Table 1. All genotypes have lower ratio of cohumulone, which is a very important brewing characteristic. The best results show genotypes 4801, 4979, 5045 and 5227. Genotype 5044 is the riches on essential oils (2.2 g/100 g). The composition of essential oils in the dwarf hops is very varied (Table 2). Beta-farnesene, terpenic hydrocarbon typical for Saazer, was found in higher amount (> 10 % rel.) in a few genotypes (4799, 4801, 4975, 4979, 4980, 5030 and 5045).

The best results show genotypes 4801, 4979, 5045 and 5227. As genotypes 5045 and 5227 had the highest yield they were planted in another hop garden so as to be submitted other research. In 2016, we managed to harvest sufficient amount of hops for chemical analyses and trial brews in our pilot brewery and other breweries in CR. Susceptibility to agrotechnical operations needed for successful growing of these hops is found out within field trials in practical conditions of hop gardens. Registration of new aroma varieties is supposed in 2018. We expect interest of brewers not only from Czech but from brew masters all over the world as well.

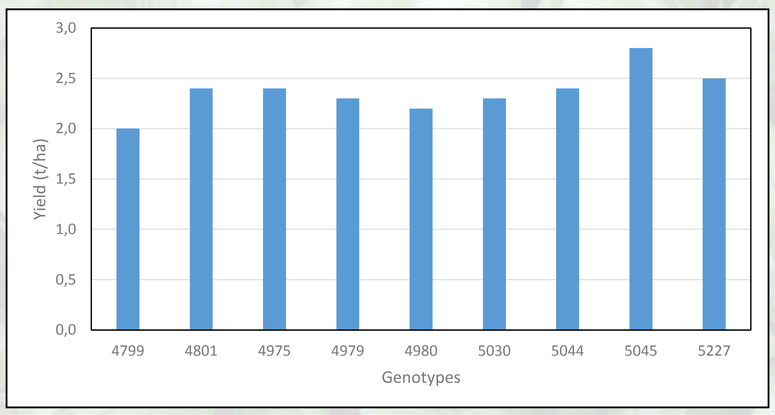
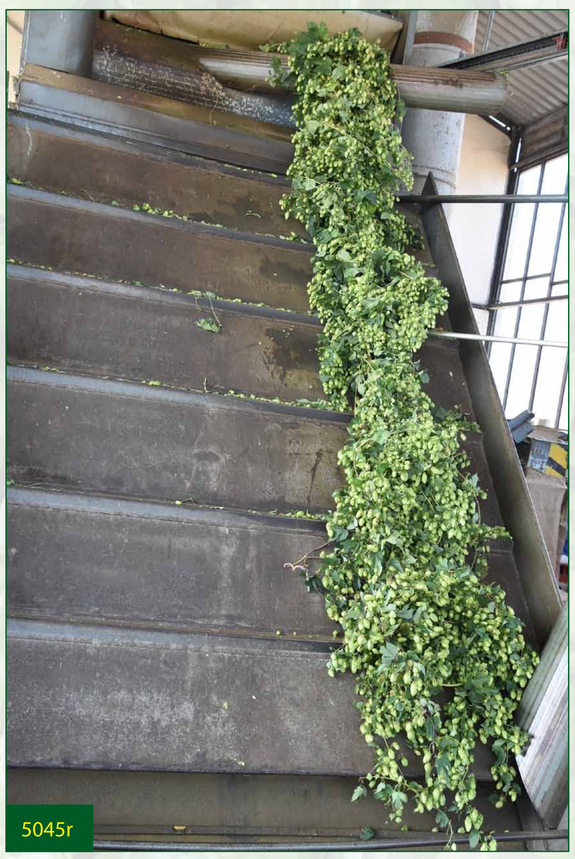


Table 1: Average contents of hop resins in perspective aroma genotypes (2013 - 2016)

Genotype	Alpha acids	Beta acids	Ratio	Cohumulone
	(% w/w)	(% w/w)	(alpha/beta)	(% rel.)
4799	4,8	4,1	1,2	22
4801	4,1	4,0	1,0	26
4975	6,4	6,5	1,0	18
4979	2,9	4,4	0,7	24
4980	5,2	4,2	1,2	26
5030	5,3	5,3	1,0	21
5044	8,2	7,4	1,1	25
5045	3,7	3,8	1,0	24
5227	2,4	7,6	0,3	31

Table 2: Average yields and contents of hop essential oils in perspective aroma genotypes (2013 - 2016)

Genotype	Content	Myrcene	Caryophylene	Pharnesene	Humulene	Selinenes
	(% w/w)	(% rel.)	(% rel.)	(% rel.)	(% rel.)	(% rel.)
4799	0,7	33,2	7,8	14,3	17,5	7,0
4801	0,4	19,2	9,4	14,7	31,2	1,4
4975	0,8	23,8	8,2	16,8	5,1	20,0
4979	0,3	17,3	10,0	18,8	29,4	2,4
4980	0,7	23,1	8,1	18,0	26,1	1,7
5030	1,1	23,0	10,9	14,9	25,6	1,7
5044	2,2	48,2	7,5	0,4	24,4	1,2
5045	0,8	29,7	9,1	10,4	30,2	2,2
5227	0,7	37,3	6,6	1,7	4,6	25,2



ACKNOWLEDGEMENT

This work was supported by Czech Ministry of Education within the Research Project TE02000177 „Centre for Innovative Use and Strengthening of Competitiveness of Czech Brewery Raw Materials and Products“.