

UTILIZATION OF IRRIGATION SYSTEMS IN HOP PRODUCTION

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ABSTRACT

Hop growing in the decisive hop regions within Czech Republic depends on precipitations. The fact, that irrigation is a very important factor under these conditions to cover rainfall deficits, is apparent at first in the recent years. The occurrence of the deficits in precipitations has a scholastic character within each locality and term.

Experimental as well as pilot trials show that new progressive irrigational systems (drip irrigation and micro-spraying) should be used for irrigation of hop gardens. Irrigational water becomes most effectively used under these systems. It is necessary to respect specific demands and characteristics of the individual kinds within the distribution of irrigational water in a hop garden.

Drip irrigation - underground



Drip irrigation placed in the space between rows 0.5 m under the ground does not provide uniform transmission of water inside a root system in a hop garden. Water loss by leakage is obvious under this type of irrigation. It depends on a soil type. Horizontal water spreading within the places between rows is another negative. Therefore, this type of irrigation is possible to use under its installation before planting of new hop plants, when the water piping with drip units is always placed in the axis of a planted row.

Drip irrigation



at the ceiling of a wirework



Micro-spraying



Micro-spraying placed on pole irrigates the whole area of hop gardens. Influence of wind at spraying has a negative share with uneven distribution of irrigation water. Increased requirement of water and hence a need of electrical energy insert to disadvantages of this irrigation system.

Hop irrigation system placed at the ceiling of a wirework as well as micro-spraying have a positive influence on the microclimate within a hop garden. It has a good effect on the growth of hop plants.

RESULTS

Hop irrigation means an important stabilization factor for effective hop growing. Influence of irrigation systems on yield is presented in Table 1. and 2. No statistically conclusive differences were found out between the compared variants. Important increase of hop yield (statistically conclusive) was revealed between the irrigational variants and a rain-fed plot. The average growth in hop yield reached 20-25 % (at fine aroma hops Saaž) and 18 % (at hybrid variety Agnus) in comparison with a rain-fed plot. Slight increase in the contents of alpha acids was found out as well.

Table 1: Yield of dry hops in 2003–2007 in tonnes per ha (t . ha⁻¹)

Variant	Year					Average	Index (%)
	2003	2004	2005	2006	2007		
SAAZ (Osvald's clone No 72, fine aroma hop)							
Control	1,22	1,31	2,01	1,69	1,32	1,51	100
Drip irrigation (underground)	1,54	1,81	2,19	2,11	1,78	1,89	125
Drip irrigation (at the ceiling)	1,35	1,84	2,30	1,86	1,70	1,81	120
Micro-spraying	1,51	1,78	2,12	2,08	1,86	1,87	124
AGNUS (high alpha hop)							
Control	-	1,95	2,36	1,69	1,89	1,97	100
Drip irrigation (at the ceiling)	-	2,32	2,68	1,89	2,46	2,33	118

Table 2: Alpha acids content in years 2003–2007 (% in dry matter)

Variant	Year					Average	Index (%)
	2003	2004	2005	2006	2007		
SAAZ (Osvald's clone No 72, fine aroma hop)							
Control	2,69	3,45	3,58	1,80	2,47	2,80	100
Drip irrigation (underground)	3,59	4,43	3,30	1,61	3,37	3,26	117
Drip irrigation (at the ceiling)	3,53	3,89	3,93	1,73	2,61	3,14	112
Micro-spraying	4,04	3,26	4,19	1,63	3,29	3,28	117
AGNUS (high alpha hop)							
Control	-	12,05	11,94	10,29	9,19	10,86	100
Drip irrigation (at the ceiling)	-	12,03	10,88	10,56	9,95	10,85	100

Expert design and realization of the irrigational system as well as good qualification of workers providing exploitation is necessary to reach above-mentioned effectiveness of modern irrigational systems in praxis.

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