Plant development and fruit quality of European blueberry (*Vaccinium myrtillus*) in Norway.

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Wild European blueberries (EB) are strongly influenced by environment, and investigations in Norway reveal that location , climate and NP-fertilization have influence on growth and development of *V. myrtillus* (Fig. 1). These findings are in accordance with other investigations (Kardell & Erikson1995, Lätti et al. 2008).

Effekt of clone and growing conditions

Northern (N) and southern (S) clones of EB (61- 69^{0}N) grown at 12° and 18°C under short and long days, showed that N- clones yielded earlier at low temperatures and long day, and generally more than S-clones. Clone S2 yielded best at short day (SD) and low temperature. However at SD and high temperature N clones had highest yield (Fig. 2).

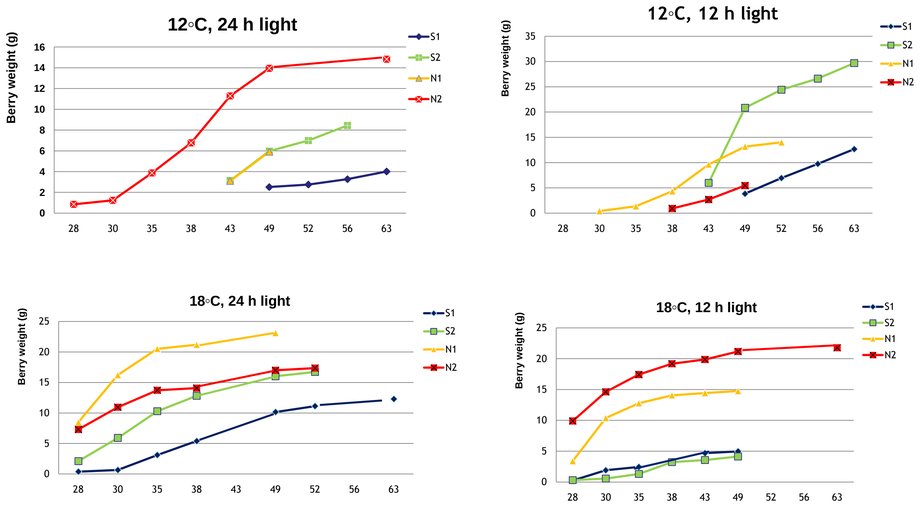

Figure 2. Accumulated production of berries at 12°C and 24°C at short and long day . Southern: ♦ clone S1, ■ clone S2, Northern: ▲ clone N1, × clone N2

Effect of fertilization

In forest field EB tended to yield more at intermediate NP levels in the second year of fertilization (Table 1) and grow longer short shoots in 2009 at high fertilization in half-cultivated forest fields. These short shoots developed from axil buds on three year old long shoots often together with fruits from one or two fruit buds (Flower-Ellis 1971, Tirmenstein 1990, Featherstone 2002).

Table 1. Effect of NP fertilization on fruit yield in kg haa^{-1} of *V. myrtillus*

Fertilizer	Year		
N - P	2008	2009	Mean
0 - 0	171	178	175
30 - 20	119	243	181
30 - 40	151	332	242
60 - 40	138	125	132
Mean	145	220	183
M.error	38^{ns}	59^{ns}	27^{ns}

Shoot number tended to be lowest at the highest fertilization rate and in control (Tab. 2). Fertilized seedlings sown in March 2008 and planted on farm land in July the same year, grew larger plants in 2009 compared with no fertilization, but developed no flowers in 2009 (Not tabulated).

Table 2. Effect of NP fertilization on short shoot length, diameter of fruits on short shoot and number of fruits per long shoot in 2009.

Fertilizer	length	diameter mm		No
N - P	mm	Fruit 1	Fruit 2	
0 - 0	32.2	8.9	8.7	3.4
30 - 20	29.7	9.4	9.7	4.7
30 - 40	34.0	9.5	10.2	3.6
60 - 40	34.8	9.4	10.3	2.3
Mean	32.2	9.3	9.7	3.5
M.error	4.7^{ns}	0.5^{ns}	0.4^{ns}	0.46^{ns}

Figure 1. From a typical EB-forest field dominated by *V. myrtillus* (L.) and some *Cornus suecica (L.)*. A black fruited type of EB is visible at the top of the photo.

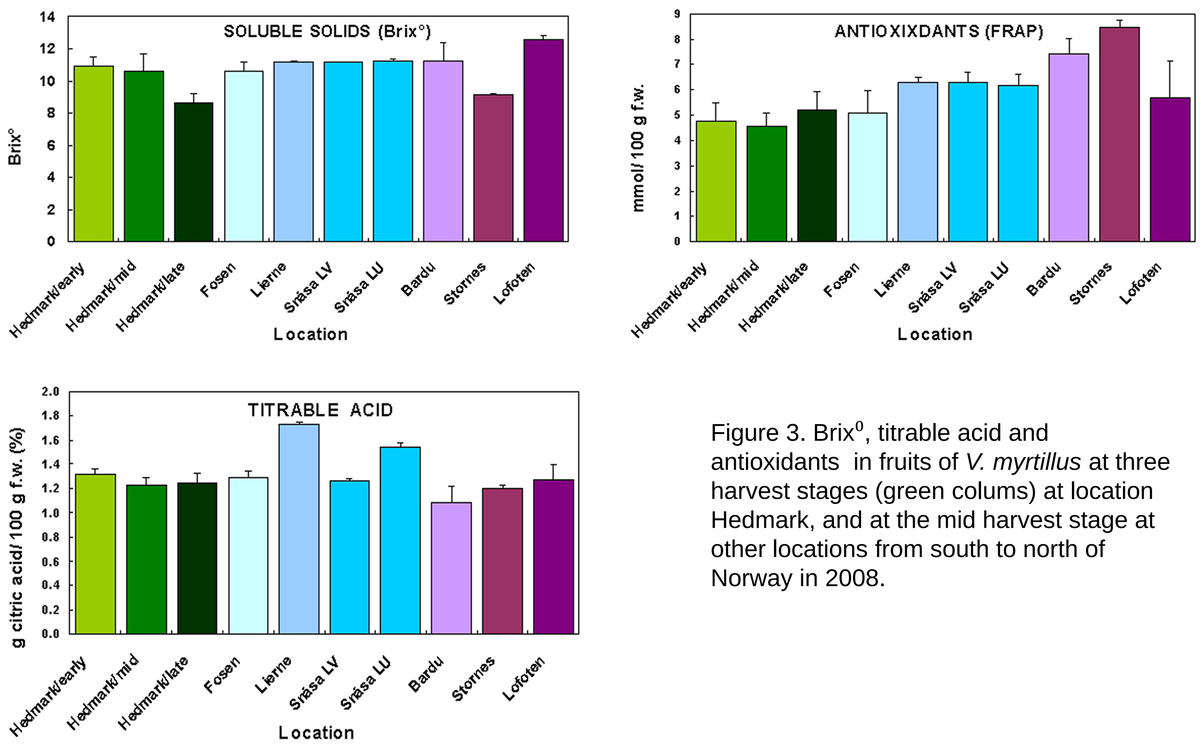

Figure 3. Brix^0, titrable acid and antioxidants in fruits of *V. myrtillus* at three harvest stages (green colums) at location Hedmark, and at the mid harvest stage at other locations from south to north of Norway in 2008.

Effect of location and fruit ripening stage on some biological fruit compounds

It was shown that level of sugars (Brix^0) in fruits dropped at the third ripening stage, which was two weeks later than first stage, while level of antioxidants increased and level of titrable acid was stable (Fig. 3). The Brix^0 levels in fruits from different locations were equal except for Stornes and Lofoten, which respectively were lower and higher than at the other locations. Levels of titrable acid in fruits were higher at Lierne and Snåsa LU than at the other locations which were quite equal. For antioxidants in fruits there was a tendency to increased levels from south to north (61 to 69^{0}N). Analysis undertaken in 2009 and 2010 will reveal if these profiles are typical.

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