

**Terroir is a well known term describing growing conditions, often including both environmental factors and cultivar, primarily used to distinguish vine quality. Here the effect of terroir is discussed for red raspberries grown in Mid-Norway.**

## THE FARMS

Three farms situated at the east shore of the Trondheim fiord are included. The farm soils are highly influenced by the last ice age. The land of the farms was below sea level just after the ice age, but became dry as the land rose, and are today 25, 10 and 100 m a.s.l., respectively at farm A, B and C. The soils are silt loams. However, at farm C it contains some coarse particles influenced by a nearby moraine and less clay. This effect water holding capacity and farm A had more easy available water at field capacity than farm B which in return had more than farm C (Tab. 1).

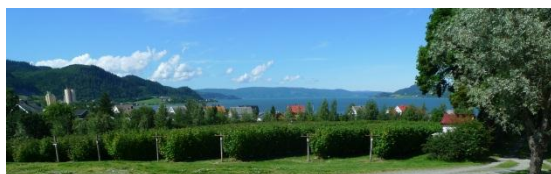


Figure 1. Farm A facing westwards towards the Trondheim fiord. Foto: R Nestby

The topography also differs. The field of farm A is relatively flat facing westwards (Fig. 1), while the two other fields are situated on slopes facing southwards.

Table 1. Water content in % of soil at three farms in Mid-Norway at sampling (S), field capacity (FC); % easy available (EA) water at FC and % water at the wilting point (WP).

Farm	S	FC	EA	WP
A	41,4	38,9	33,6	11,2
B	32,0	31,4	26,5	10,5
C	33,3	31,5	21,9	7,6

## TERROIR INFLUENCE

The climate parameters temperature (C°) relative humidity (RH%), rainfall (mm) and PAR light ( $\mu\text{mol m}^{-2} \text{s}^{-1}$ ), and soil water content ( $\text{m}^3/\text{m}^3$ ) were recorded continuously in two

years. Average fruit yield and fruit size were registered as well as fruit quality compounds like sugar (Brix°), titratable acid, pH, total anthocyanins, phenols, antioxidant capacity. There were significant differences for several parameters. But, it is not easy to link these differences to terroir since several factors are interfering. However, the local 'Stiora' varied less between sites, than 'Glen Ample' (not shown). Besides terroir yield differed, which would have an effect on fruit quality making it more difficult to describe terroir effects. As an example Brix level is shown in table 2.

Table 2. Sugar content (Brix°) of 'Stiora' and 'Glen Ample' at three farms in Mid-Norway in two years..

Cultivar/Farm	Brix°	
	2008	2009
<b>Stiora</b>		
A	9.93±0.40	9.53±0.03
B	10.49±0.28	11.21±0.13
C	12.12±0.02	8.56±0.07
<b>Glen Ample</b>		
B	11.75±0.49	9.75±0.07
C	10.92±0.39	7.30±0.02

In 2008 Brix of 'Stiora' was lower at farm A than at farm B and C. The field at farm C was planted in 2007 and did not give a full yield in 2008. The high Brix value is probably partly a result of that, demonstrated in 2009, when the yield was normal, and Brix was lowest at farm C. The difference between farm A and farm B, which had a similar pattern in the two years, could be a terroir effect, since the site at B is warmer than the site at A and closer to the sea (climatic data not shown). For 'Glen Ample' the difference in 2008 was little, but lower at farm C than at farm B. In 2009, however, when both fields had full yields, Brix was much lower at C. The low value at farm C is probably a terroir given mainly by the higher altitude than at farm B (and A). Field B is also close to the fiord and benefit of high light reflection, which is not the situation at C.

The descriptions of farms and their growing conditions can be used in marketing to pinpoint the attractiveness of locally grown berries.

## References

Wilson J.E. (1998). Terroir: The Role of Geology, Climate, and Culture in the Making of French Wines. University of California Press, Berkeley.