Täsmätietoa Lapin luonnontuotteista maakunnalle -LUTUNEN

Rainer Peltola, Luonnonvarakeskus

Tuntuuko siltä että nyt tarvitaan tietoa / tutkimusta?

- Kannattaa muistaa:

Maailma on täynnä tietoa!

- Ja toisaalta:

Myös tiedon hakuun on ammattilaisia!

Euroopan maaseudun
kehittämisen maatalousrahasto:
Eurooppa investoi maaseutualueisiin

Elinkeino-, liikenne- ja
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- LUTUNEN – hanke: Luonnonvara-alan tietoa eri kohderyhmien tarpeisiin
  - Popularisoituja (tarinallisia) esimerkkejä onnistuneista luonnontuotealan yrityksistä, niiden toimintatavoista ja tuotelanseerauksista
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    - käyttötavoista
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  - Painettua materiaalia
    - esitteitä
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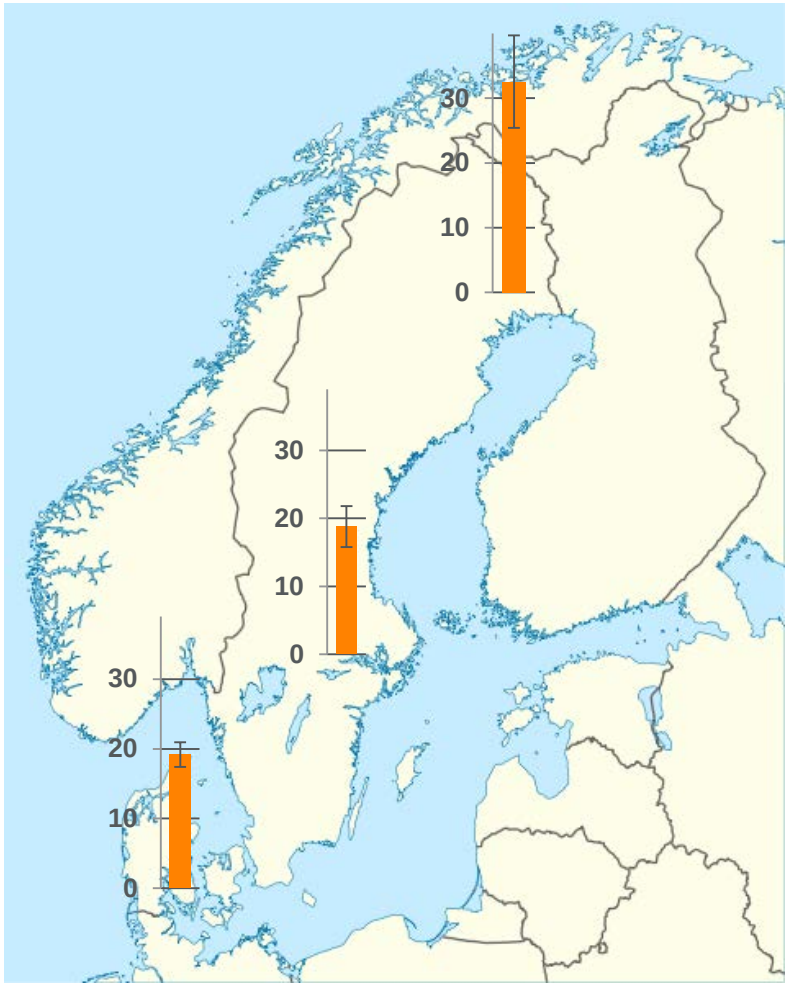
Tietoa on monenlaista



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Effects of Latitude-Related Factors and Geographical Origin on Anthocyanidin Concentrations in Fruits of *Vaccinium myrtillus* L. (Bilberries)

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Two data sets are presented to identify the effect of growth location and origin of parental plant on anthocyanidin concentrations in *Vaccinium myrtillus* fruits. Bilberries were collected from wild populations growing at different latitudes and from cultivated plants originating from different geographical locations but grown in the same location for over 10 years. High-performance liquid chromatography analysis showed that anthocyanidin concentrations varied significantly with latitude and with geographical origin, with higher values from northern latitudes or from a more northerly origin of parent plants. The results show that anthocyanidin concentrations in bilberries are under strong genetic control but are also influenced by climatic factors. Furthermore, the proportions of specific anthocyanidins differed between latitudes and between plants with different parental origins. The diversity in anthocyanidin concentration and composition has important implications for plant breeders and for future development of varieties with high antioxidant capacity.

KEYWORDS: Anthocyanidin composition; breeding; genome; climate; cyanidin; delphinidin

INTRODUCTION

Because of their health-promoting effects, the anthocyanin content in fruits and berries is becoming an important quality factor for the industry and the general public. However, the variation of anthocyanin content within and between populations on both spatial and temporal scales can be very high. The concentration and composition of anthocyanins in small berries are influenced by both genetic factors, such as genotype (*1*), and environmental factors, such as temperature (*2–4*), light quality (*3, 5–8*), nutrient availability (*9, 10*), and the timing of harvest (*9*).

Climate can have a great effect on berry-producing plants. Krebs et al. (*11*) showed that in *Vaccinium vitis-idea* and other species, the following year's yield could be predicted from climate factors and previous yields with a certainty of 80–96%. They found no periodicity in berry yields in their study as previously reported by Sedlås (*12*) when looking at a 50 year time line of bilberry yields in Norway. In a 3 year study in northern Sweden, a periodicity was also suggested to explain observed variations of anthocyanidin concentrations in bilberries that could not otherwise be explained by climate parameters (*4*).

Differences in latitude were interpreted by Strong and Redburn (*13*) as a factor causing understory vegetation to respond to cooler and slightly drier conditions and PAR (photosynthetically active radiation) availability to understory species being reduced by 20%. Temperature effects on anthocyanidin concentrations in berries are apparently inconsistent. Low temperatures (10–15 °C) have been reported to increase the amounts of anthocyanidin in berries of various species (*2, 3, 14*), and high temperatures (> 30 °C) have been reported to limit their production (*15, 16*). However, in strawberries, high temperatures (30 °C day, 22 °C night) have been found to be more favorable than low temperatures (18 °C day, 12 °C night) on anthocyanidin concentrations (*17*). In a 2 year study by Rieger et al. (*18*), the anthocyanin contents of *Vaccinium myrtillus* fruits were found to decrease with altitudes increasing from 800 to 1200 m and 1500 m above sea level. Large differences in day and night temperatures have been suggested to promote anthocyanin formation, and this is supported by the results of Mori et al. (*19*) who found that accumulation of red grape skin anthocyanins decreased if night temperatures were elevated from 15 to 30 °C for grapes being grown under 30 °C day temperature. However, in strawberry, the antioxidant capacity increased when night temperatures were increased from 15 to 22 °C with a constant day temperature of 25 °C (*17*).

Anthocyanin production is photoinduced by light in the UV, visible, and far-red wavelengths (*16*) and inhibited by darkness in, for example, apple (*20*). However, UV-B (280–315 nm) light has been proven to inhibit anthocyanidin synthesis in juvenile *Syzygium* leaves due to DNA damage (*21*). Elevated amounts of red light in the light spectra promote anthocyanidin biosynthesis (*22*). Long days and increased amounts of red light in the light spectrum are two factors that typify growing conditions in northern Scandinavia. Moreover, *V. myrtillus* plants from the same clone produced a better fruit set when grown in climate chambers under long day (24 h) than under short day (12 h) conditions (*5*).

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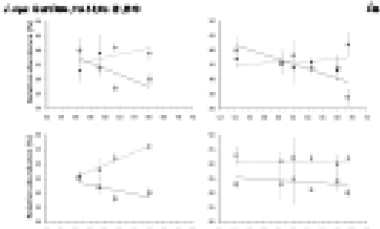

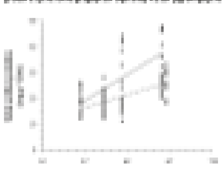

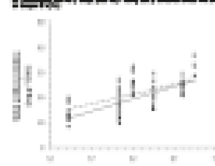

Ollaan yhteydessä!

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