The plants should be pruned since they start cropping. The rejuvenesce pruning should be done when the plantation is about 15 year old.
It is recommended to use in rows organic substances like sawdust from coniferous trees, acid peat, bark and stow.
It is also possible to spread in rows the black plastic.

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CLOUDBERRY BREEDING IN NORWAY
LĀCEŅU SELEKCIJA NORVĒĢIJĀ

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Abstract
Two female and two male cultivars have previously been released as a result of clone evaluation at Bioforsk Nord Holt. The selection criteria were the number of pistils or stamens per flower, the number of flowers and the number of shoots per m^2. Currently a new group of clones are being evaluated with the aim of finding new cultivars for release. The preliminary results on flowering and berry production show a strong variance in these traits. Over three years of registration, the number of produced flowers varied from under 100 for the weakest clone to more than 1000 for the best clone. The number of produced berries varied from 9 for the weakest clone to 242 for the best clone. The three clones that produced the most flowers all had very low berry production and deviated from the rest of the clones by having high numbers of flowers per harvested berry. New selection criteria will be considered before selection of new cultivars for release. In addition to the production traits, new selection criteria will most likely include berry contents, such as the levels of antioxidants.

Kopsavilkums
Klonu izvērtēšanas rezultātā Bioforsk Nord Holt tika izveidotas divas sievišķās un divas vīrišķās lāceņu šķirnes. Izlases kritēriji bija drīksnu vai putekšņnīcu skaits ziedā, ziedu un dzinumu skaits uz kvadrātmetru. Pašlaik tiek izvērtēta jauna klonu grupa, lai iegūtu jaunas šķirnes. Iepriekšējie rezultāti parāda lielas atšķirības starp klonu ziedēšanu un ogu ražošanu. Trīs gadu laikā ziedu skaits uz m^2 svārstījās no mazāk nekā 100 sliktākajam klonam līdz vairāk nekā 1000 labākajam klonam, bet izveidoto ogu skaits – no 9 līdz 242. Trīs kloni, kuriem novēroja visbagātīgāko ziedēšanu, veidoja ļoti maz ogu un atšķīrās no pārējiem ar lielu ziedu skaitu, attiecībā pret izveidoto ogu skaitu. Pirms jaunu šķirņu izdalīšanas tiks izstrādāti jauni izlases kritēriji – neskaitot ražošanas īpatnības, tiks iekļauts arī ogu sastāvs, piemēram, antioksidantu saturs.

Key words: cloudberry, clone evaluation, selection criteria

Introduction
Two female (‘Fjellgull’ and ‘Fjordgull’) and two male (‘Apollen’ and ‘Apolto’) cultivars of cloudberry (*Rubus chamaemorus*) have previously been released as a result of clone evaluation at the Norwegian Institute for Agricultural and Environmental Research. The evaluation consisted of comparisons of different clones under controlled environmental conditions. Selection criteria were

the number of pistils (female clones) or stamens (male clones) per flower, the number of flowers and the number of shoots per m^2 (Rapp, 1991). Currently a number of clones collected from different wild populations are being evaluated at Bioforsk Nord Holt. The group consists of 11 female and 1 male genotype collected around 1995. The aim of these evaluations is to find new genotypes suited for cultivar release. Preliminary results from these evaluations are presented here, focusing on the female clones for the parameters of the number of flowers and numbers of berries.

Materials and methods

The evaluations were performed at Bioforsk Nord Holt in Tromsø (latitude 69º40', altitude 30 meters above sea level). The different clones were planted on peat in open benches outdoors. The different clones were planted in separated squares that contained 16 plants of the clone, and every clone was represented in two different squares at random positions on the bench. The bench was established in 2003, the square size within the bench was 0,8 m^2. The squares were separated to avoid rhizomes propagation between the squares.

Table 1. Description of the evaluated clones.

Number	Origin	Sex	Latitude	Altitude
002	England	Female	54º30'	.
102	Aust Agder	Female	58º30'	50
104	Aust Agder	Female	58º30'	350
105	Aust Agder	Male	58º30'	650
106	Aust Agder	Female	58º30'	650
202	Hedmark	Female	62º30'	50
206	Hedmark	Female	62º30'	650
208	Hedmark	Female	62º30'	950
304	Nordland	Female	66º30'	350
306	Nordland	Female	66º30'	650
404	Finnmark	Female	70º30'	350
602	Svalbard	Female	78º38'	80

Table 1 gives a brief description of the evaluated clones. Ten clones were collected from four different Norwegian counties; two in Northern Norway (Finnmark and Nordland), and two in Southern Norway (Aust Agder and Hedmark). In addition, one clone was collected in England and one at Svalbard. The clones were collected at altitudes ranging from 50 to 950 meters above sea level. One of the clones was male. In addition, 5 male clones were located on nearby benches, thus 6 different male clones were available for the pollination of the evaluated female clones.

The first berries were produced in 2005, and from 2006 flowering and berry production have been registered. Number of flowers are registered once every season, thus both number of flowers, number of buds and number of withered flowers are registered and added up to a measure of total number of flowers. Berries are harvested at maturity and are registered several times every season. Registrations are made for number of drupes and berry weight.

Results and Discussion

Figure 1 shows the number of flowers produced by the different clones. There are large differences in the total number of flowers over the three years, with clone 106 being the best with just over 1000 flowers registered and clone 202 the poorest with fewer than 100 registered flowers.

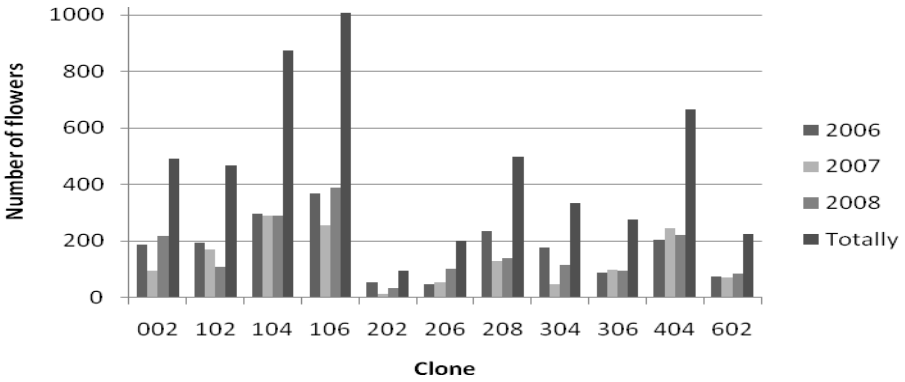

Figure 1. Number of flowers produced by the different clones
in the years 2006, 2007 and 2008.

Figure 2 shows the berry production of the clones. The results are surprising based on flower production as the clones that produced the most flowers would be expected to produce most berries. In this case, the three clones that produced most flowers have a very low production of berries. The three clones that produced the most berries, clones 002, 102 and 208, all had intermediate flower production.

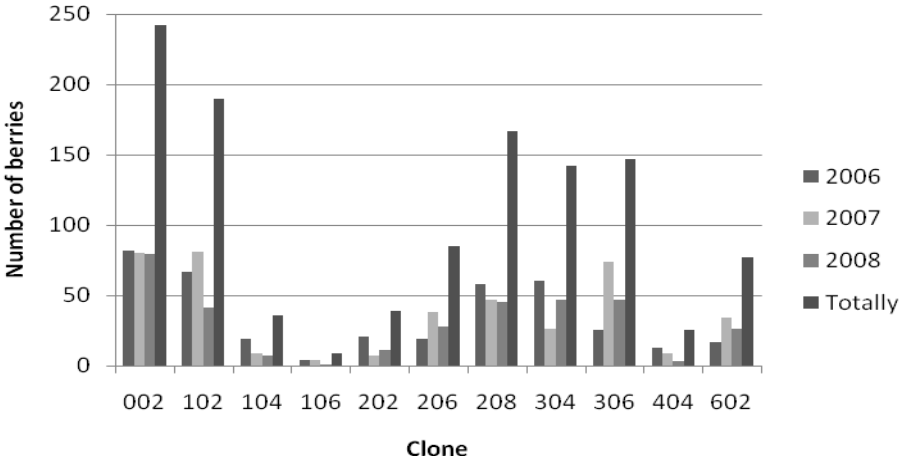

Figure 2. Number of harvested berries produced by the different clones
in the years 2006, 2007 and 2008.

Table 2 combines the results for the number of flowers and the number of berries and shows the number of registred flowers per harvested berry. In general, most clones show similar results, ranging from 1,88 to 2,90 flowers per berry over the three years. Three clones deviate from this. Clones 104, 106 and 404. Again, these are the clones that produced the most flowers and less berries.

Based on the registrations on flowering, the clones with high numbers of flowers per produced berry do not seem to be neither particularly late nor early flowerers and it also seems that there were male flowers available at the time of flowering. Thus, deviating flowering times do not explain the small amount of berries produced from the abundance of flowers, but as flowering is registered only once per year it still may be that some tendencies that the registered data are not showing up.

In this case there were 6 different male clones available for pollination. It may be that the female clones with low berry production combine poorly with the available male clones, which might explain the low production.

Table 2. Number of flowers per harvested berry for the different clones in the years 2006, 2007 and 2008.

Clone	2006	2007	2008	Totally
002	2,26	1,16	2,72	2,04
102	2,88	2,07	2,56	2,45
104	15,63	32,11	41,29	24,31
106	92,00	63,25	389,00	112,22
202	2,52	1,57	2,73	2,41
206	2,37	1,39	3,61	2,34
208	4,05	2,68	3,02	2,98
304	2,93	1,69	2,38	2,34
306	3,48	1,30	1,98	1,88
404	15,54	27,11	73,33	26,64
602	4,29	2,03	3,12	2,90

The northern clones might be expected to be best adapted to the environmental conditions in Tromsø. However, the clones with the highest berry production all had a southern origin. At the same time other southern clones produced few berries, so there were no obvious tendencies concerning origin when berry production was considered. For flower production, the three clones from Aust Agder (102, 104 and 106) all produced above average, while the clones from Nordland and Hedmark produced at different levels. In total, origin did not explain the variations in production.

Based on these evaluations, selection based on the number of flowers and the number of pistils may theoretically entail a risk of selecting genotypes with high potential, but low ability for production under certain environmental conditions. Thus, there may be genotype-environment interactions involved, such that specific genotypes are adapted to specific environmental conditions. More knowledge about the genetic and environmental basis for berry production is needed to find the optimal selection criteria. The genotypes evaluated here are also planted at different natural sites in Norway. Registrations from these sites may provide additional information about the different genotypes and environmental factors influencing berry production.

Further evaluations will be done before the selection of new cultivars for release. In addition to production traits, the new selection criteria most likely will include berry contents, such as the level of antioxidants.

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FUNGAL DISEASES OF *VACCINIUM MACROCARPON* IN LATVIA
VACCINIUM MACROCARPON SLIMĪBAS LATVIJĀ

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Abstract

The American cranberry (*Vaccinium macrocarpon* Ait.) has been known for fifteen years, but fungal diseases have been investigated only last years in Latvia. Upright dieback and berries rot were observed several years ago, but growers did not know the causal agents of these symptoms. The aim of the study was to detect the causal agents of cranberry diseases in Latvia. Samples of upright dieback (in summer) and berries (during the harvesting) from different regions of Latvia were collected for causal agent detection. *Botrytis cinerea, Fusiccocum putrefaciens, Phomopsis vaccinii, Pestalotia vaccinii, Discosia artocrea, Physalospora vaccinii* were detected from upright