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In vitro propagation of Arctic Mouse-ear Chickweed (*Cerastium arcticum* Lge.) in high temperature

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ABSTRACT

An effective *in vitro* preservation and propagation conditions of higher polar plant Arctic Mouse-ear Chickweed (*Cerastium arcticum*) were investigated in higher temperature. With slightly modified Murashige and Skoog (MS) media, *Cerastium arcticum* has been able to propagate at higher temperature than its ecological growth temperature. The optimal flowering conditions in growth chamber system were 15℃/10℃ (day/night), 3000±100 Lux, and 21/3h (day/night) of temperature, light, and photoperiod, respectively. For *in vitro* preservation, suspension culture with modified MS media showed the highest growth rate in the temperature of 23±1℃. The biomass of suspension cultures *Cerastium arcticum* were doubled by every 7days after sub-cultured.

key word : Polar, Arctic plant, genetic resource, *in vitro* preservation

Objective

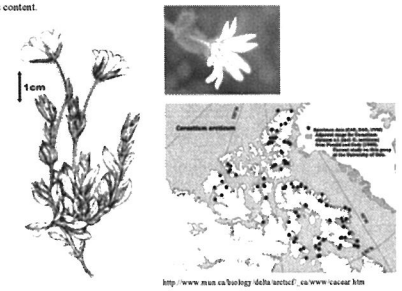
◆ Establishment of effective preservation system of genetic resources collected from the polar region.

◆ Investigation of optimal conditions for *in vitro* propagation of *C. arcticum*.

Material and Method

◆ ed (*C. arcticum*) was collected from The Dasan Korean Arctic Station (Svalbard, Norway, 78° 55′N, 11° 56′ E) of Korea Polar Research Institute (KOPRI) and cultured in growth chamber for flowering and collecting the seeds.

Ecology and habitat. Substrates: hummocks, snow patches, river terraces, tundra, slopes, ridges; imperfectly drained moist areas, or on solifluction slopes, or dry, or moderately well drained areas; acidic, or calcareous, or nitrophilous; rocks, gravel, sand, silt, clay; with low organi c content.



Morphological characteristics and geological distribution of *Cerastium arcticum*.

◆ **Method**

Sterilized seeds with 0.5% sodium hypochrolite were germinated on 0.8 % water agar and transfer the excised shoot segments were horizontally cultured on media contained vitamin mixture supplemented with different concentration of growth regulator.

◆ **Media modification**

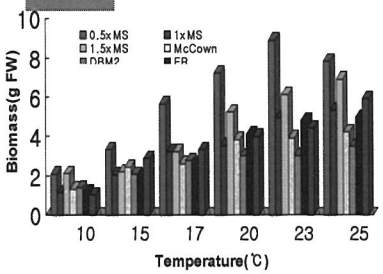
B5 : 2 mg/L of glycine is contained as vitamin. $CaCl_2$ is increased to 332.02 mg/L and NH_4NO_3 was substituted for $(NH_4)_2SO_4$.

DBM2 : 300 mg/L of KCl was added to MS salts and $MgSO_4$ was increased to 1000 mg/L and H_3BO_3 was decreased to 0.3mg/L. In vitamin, Thiamine HCl was increased to 100 times.

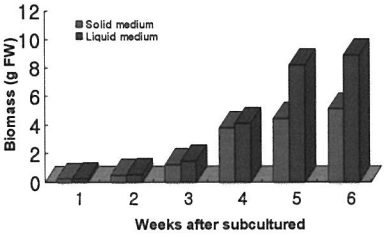
McCown : Cobalt and KI are absent from MS salts and KNO_3 was replaced to K_2SO_4. Vitamin was same content except 10 times increased Thimine·HCl..

ER : 10% reduction of MS microelements and 450 mg/L reduction of NH_4NO_3. Equimolar replacement of $ZnSO_4 \cdot 7H_2O$ by $ZnNa_2EDTA$.

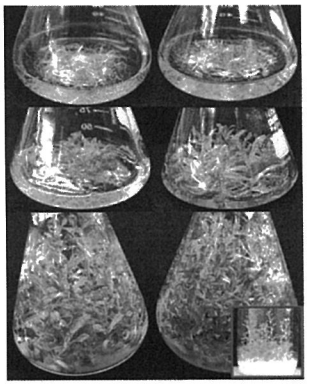
Results



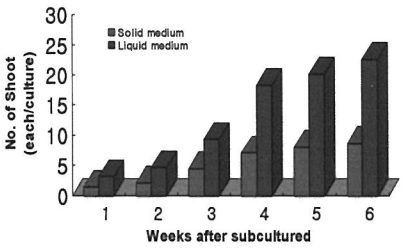
Effect of the temperature and medium differences on biomass (g FW) increment of suspension cultured *C. arcticum*.



Comparison of biomass increment of *C. arcticum* between solid and liquid medium of 1xMS supplied with 1.0 mg/L GA_3.



***In vitro* suspension cultures of *C. arcticum* cultured in M1 medium supplied basal MS salts, basic vitamins and 1mg/LGA_3 at 23±1℃. Inset is the 6 weeks culture on solid medium with same recipe and condition except stationary culture.**



Shoots number increment of *C. arcticum* in suspension and on solid media of 1xMS with 1.0 mg/L GA_3 every week interval.

Discussion

◆ *Cerastium arcticum* is morphologically and genetically heterogeneous. And there still are some unsolved questions about taxonomy of the Genus *Cerastium*. But for the wide range of ecological distribution, *C. arcticum* might be contained various useful genes and metabolic substances. Before genetics and related physiological research, the establishment of optimal *in vitro* culture system is indispensable.

◆ The successful culture with high growth rate of the genetic resources collected from polar region in high temperature might have also the advantages to economical preservation and effective material preparation for related

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