

Cryopreservation of shoot tips of garlic (*Allium sativum* L.) genetic resources by vitrification



Marta Olas-Sochacka

Research Institute of Horticulture, Konstytucji 3 Maja 1/3
96-100 Skierniewice, Poland, e-mail: marta.olas@inhort.pl

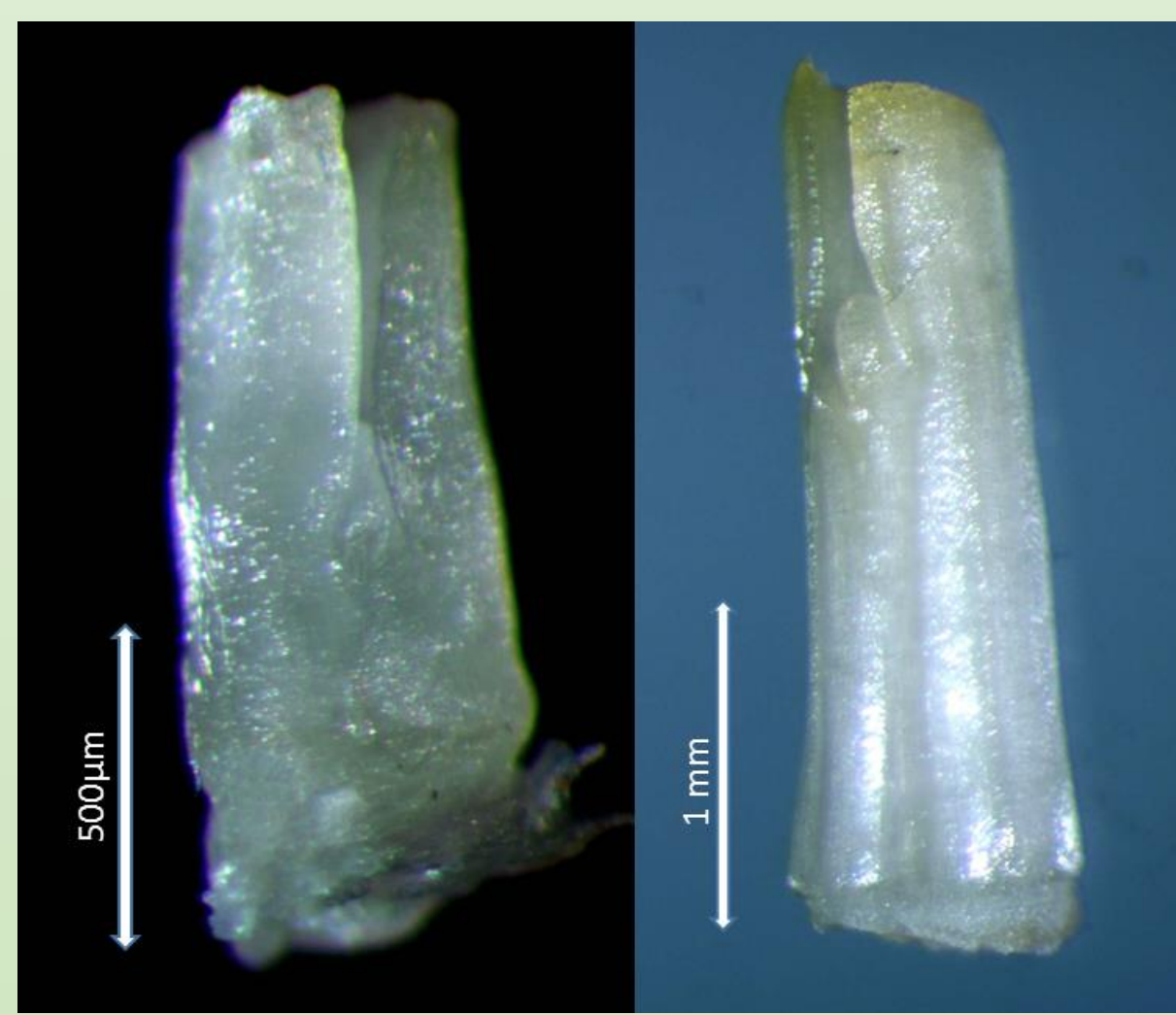
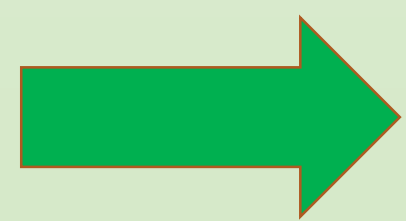
Since 1986, in the Research Institute of Horticulture in Skierniewice, genetic resources of 539 garlic accessions (*Allium sativum* L.) have been maintained in a field collection. In this collection, two forms of garlic: bolting (281 accessions) and non-bolting (236 accessions) are distinguished.

MATERIAL AND METHODS:

For this investigation, the plant material from the Polish genebank's collection were used. For the vitrification protocol, shoot tips of two experimental accessions (331K, 358K) isolated from garlic bulbils were pretreated in loading solution (0.4 M sucrose and 2 M glycerol for 20 minutes), dehydrated in PVS3 solution (50% w/v sucrose, 50% w/v glycerol) for 0, 30, 60, 90, 120, 150, 180 minutes and then directly plunged in liquid nitrogen (LN). The size of garlic explants: 0,5–1 mm, 1–2 mm, 2–3 mm were tested.



Garlic bulbil – accession no. 358K



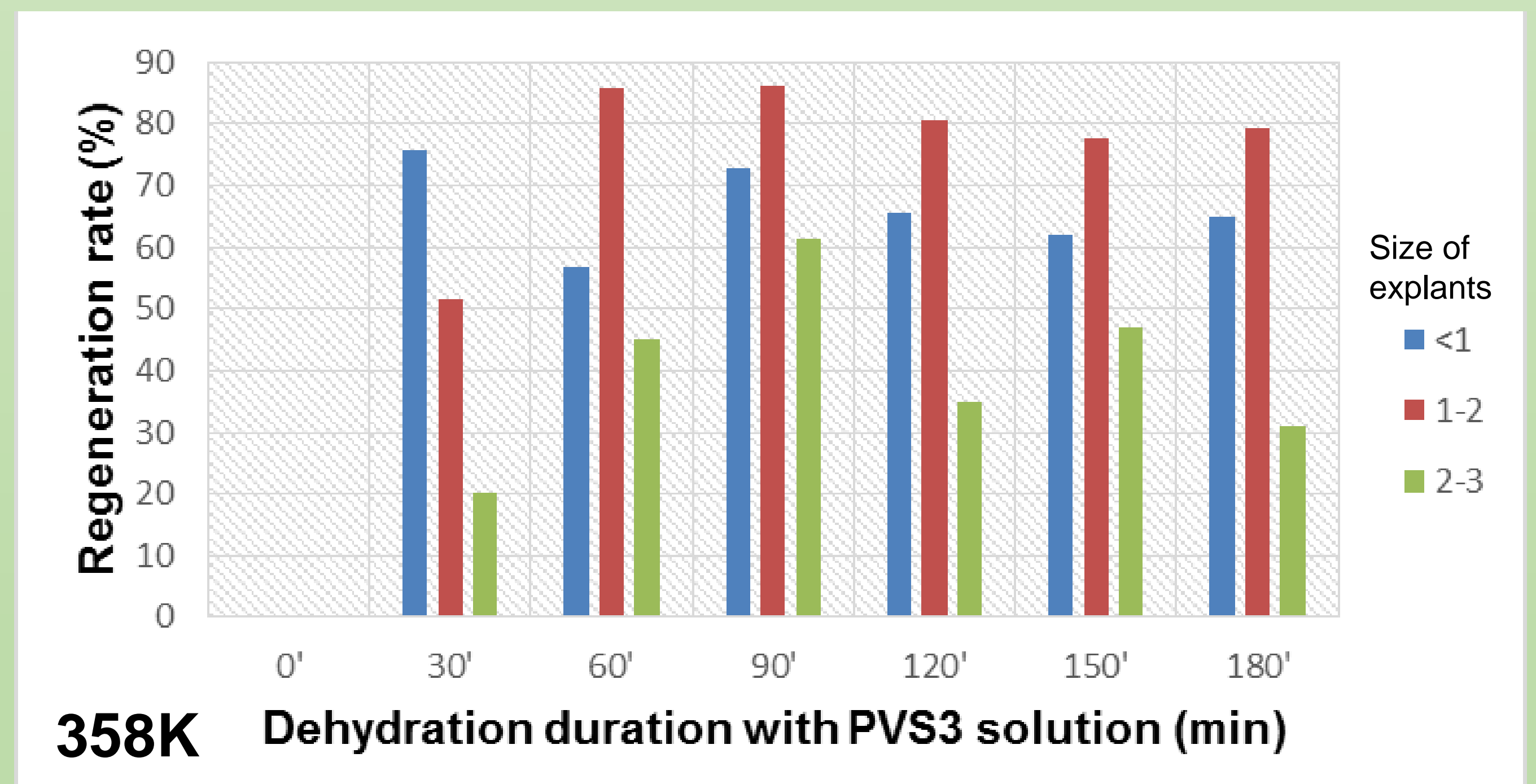
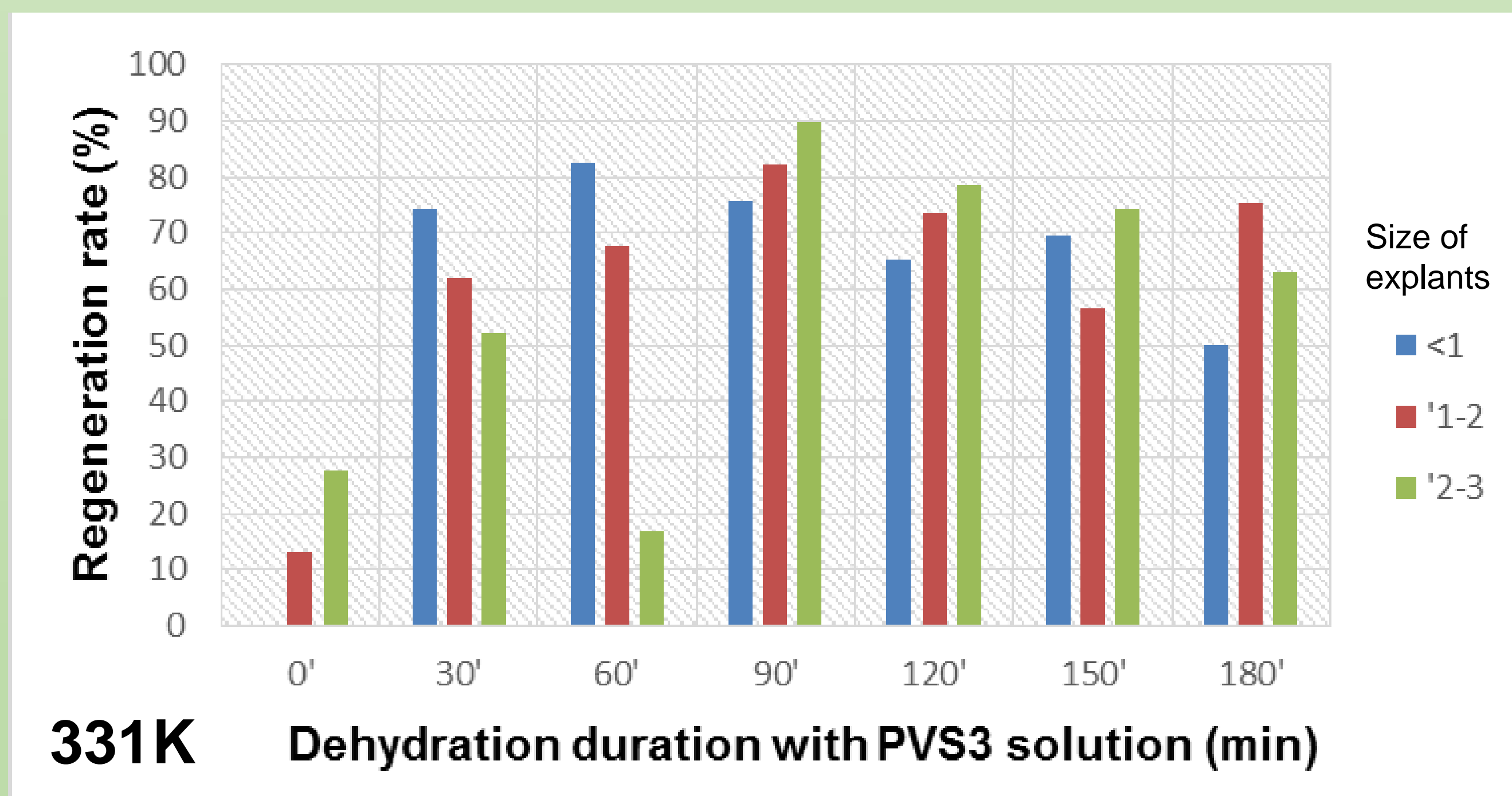
Isolated shoot tips



Dewar with cryopreserved garlic samples

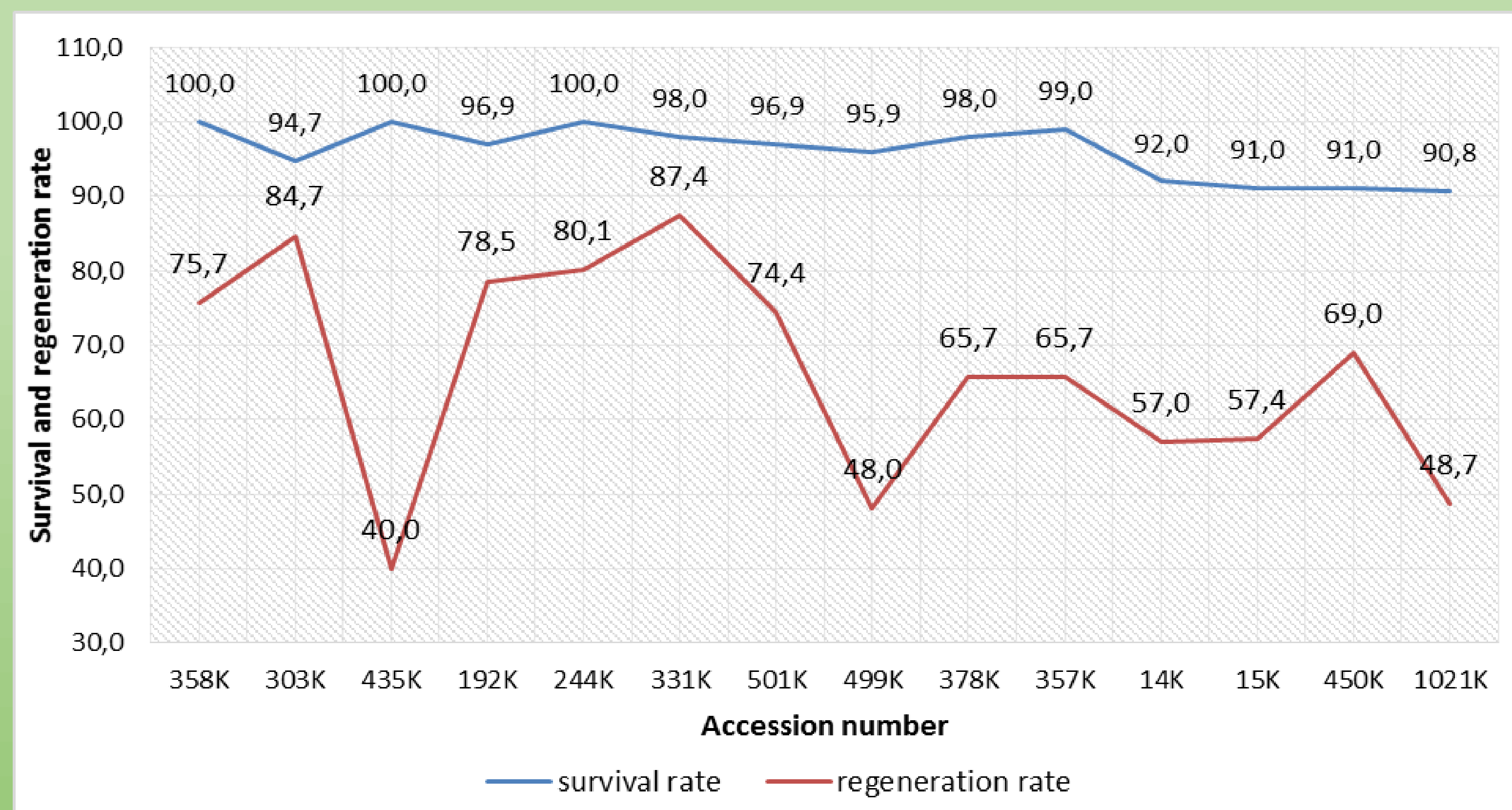
RESULTS:

After cryopreservation of two experimental accessions (331K, 358K) for further research size of explants 1–2 mm and 90 minutes of PVS3 treatment have been chosen (graph 1. and 2.).



Graph 1. and 2. Regeneration rate of 331 K and 358 K shoot tips (0-180 minutes treatment in PVS3, size of explants: <1, 1–2, 2–3 mm)

Survival rate of cryopreserved garlic accessions ranged from 90.8% to 100% (average 96%), whereas regeneration rate ranged from 40% to 87.4% (average 66.6%). In case of bolting garlic accessions (358K, 303K, 435K, 192K, 244K, 331K, 501K, 499K, 378K, 357K) survival rate was from 94.7% to 100% (average 98%), regeneration rate ranged from 40% to 87.9% (average 70%). Survival rate of non-bolting accessions (14K, 15K, 450K, 1021K) ranged from 90.8% to 92% (average 91.2%) and regeneration rate was from 48.7 to 69% (average 58%).



Survival and regeneration rate of bolting and non-bolting garlic accessions.

CONCLUSION:

Actually, in Polish cryobank are maintained 167 garlic accessions from the European field collections: 82 accessions come from the Polish collection, 51 accessions from the Czech collection and 34 from the German collection. All accessions were cryopreserved using vitrification method.