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The explant type as a key factor in adventitious organogenesis succes of *Galanthus nivalis* in vitro

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INTRODUCTION & AIM

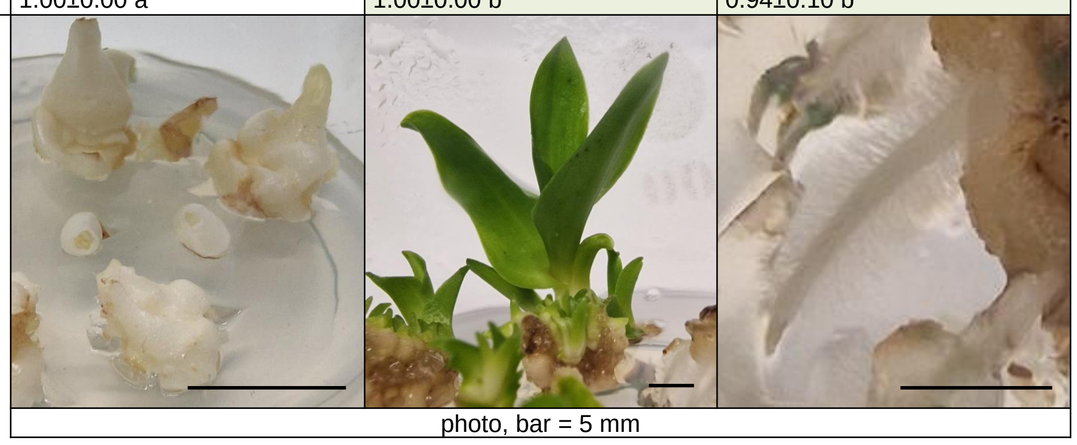
Fig. 1. *Galanthus nivalis* (B. Prokopiuk)

Galanthus nivalis (snowdrop) is a popular ornamental, bulbous plant, widely admired for its early spring bloom and delicate white flowers. It also has medicinal significance, with reported health benefits including antioxidant and anti-inflammatory properties (Schramm, 2016). In vitro propagation of these plant remains challenging and the literature reports on its micropropagation is limited (Tilly-Mandy et al., 2004). The objective of this study was to determine how explant type (leaf or bulb-derived) affects biometric parameters during adventitious organogenesis.

RESULTS

Table 1. Regeneration rate of *G. nivalis* after 6 weeks of in vitro adventitious organogenesis: bulbs (closed, without developing leaves), shoots (without bulbs at the base) and roots.

Eksplant type	Regeneration rate		
	Bulbs	**Shoots**	**Roots**
Bulb-derived	0.90±0.09 a	0.21±0.04 a	0.00±0.00 a
Leaf-derived	1.00±0.00 a	1.00±0.00 b	0.94±0.10 b



photo, bar = 5 mm

Table 2. Biometric prameters of adventitious organogenesis of *G. nivalis cultured* in vitro for 6 weeks.

Eksplant type	Mean number of			Mean dimension (mm)		
	Bulbs	Shoots	Roots	Bulbs diameter	Shoots length	Roots length
Bulb-derived	2.33±1.45 a	6.83±4.37 a	0.00±0.00 a	2.90±0.52 a	6.50±3.97 a	0.00±0.00 a
Leaf-derived	7.04±1.71 b	5.92±0.58 a	2.33±0.58 b	2.27±0.36 a	5.36±1.68 a	5.79±1.46 b

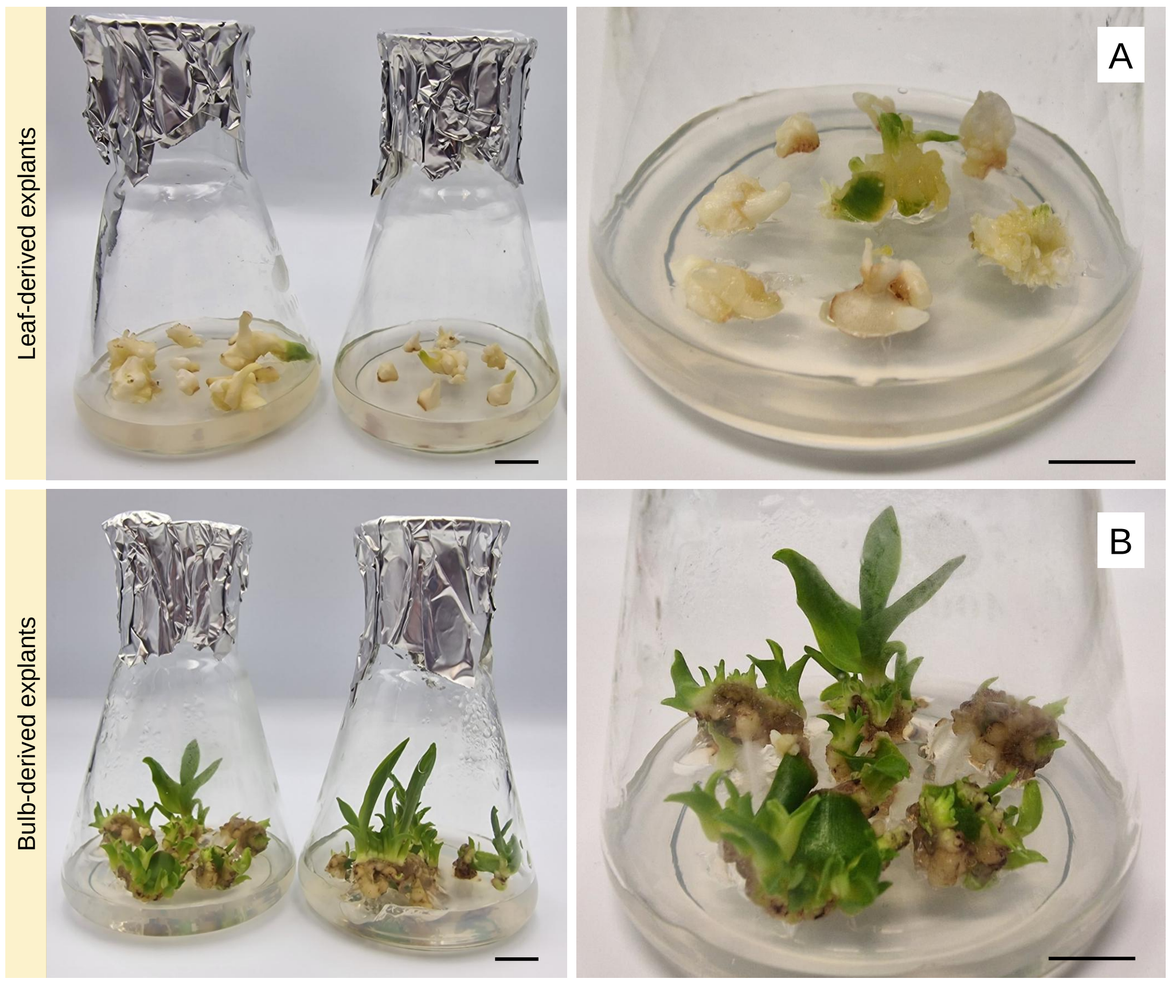


Fig. 2. *G. nivalis* adventitious organogenesis after 6 weeks of culture, plantlets derived from: A) leaf and B) bulb explants; bar = 1 cm (M. Cioć)

METHOD

Two types of explants collected from in vitro cultures of *G. nivalis* were used: leaf blade fragments (leaf-derived explants) and bulb fragments (bulb-derived explants). Cultures were carried out on solidified Murashige and Skoog (1962) medium, enriched with 30g/L sucrose and growth regulators: 5 µM 6-benzyladenine cytokinin (BA) and 0,5 µM auxin 1-naphthaleneacetic acid (NAA). The conditions in a growth chamber with 16/8 h photoperiod (day/night) were: temperature 25/23 ± 1°C and 80% relative humidity, PPFD ~ 35 µmol $m^{-2}s^{-1}$. After 6 weeks of cultures biometric observations were carried out (callus, shoots, bulbs, roots regeneration).

CONCLUSION

- All used explants regenerated (100%) but only leaf-derived explants formed callus (in 80%).
- A higher regeneration of shoots (5 times higher) and higher number of bulbs (3 times more) were observed form leaf-derived explants compared to bulb-derived explants.
- Bulb-derived explants did not regenerate roots, while leaf-derived explants regenerated average number of 2.33 new roots with a mean length of 5.8 mm per explant.
- The explant type did not significantly affect the regeneration rate of bulbs, the average number of new shoots, nor the average diameter of the newly formed bulbs.

FUTURE WORK / REFERENCES

Leaf-derived explants of *G. nivalis* showed more effective regeneration during in vitro adventitious organogenesis compared. This potential can be used for improving propagation efficiency of these plant.

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Schramm, B. Snowdrops: science, myths, and folklore. *Voices: The Journal of New York Folklore* 42.3-4 (2016): 46-48.
Tilly-Mandy, A.; Jambor-Benczur, E.; Szabo, J. Results with the micropropagation of *Galanthus elwesii* and *Galanthus nivalis* 'Flore Pleno'. In: *V International Symposium on In Vitro Culture and Horticultural Breeding 725*. 2004. 439–444.