

# ***HERACLEUM SOSNOWSKYI* MANDEN. DRY-FRUIT DEVELOPMENT UNDER EXOGENOUS GA<sub>3</sub> AND TIBA APPLICATION**

Tautvydas Žalnierius, Dalia Koryznienė, Sigita Jurkonienė

Nature Research Centre, Institute of Botany, Laboratory of Plant Physiology, Lithuania  
t.zalnierius@gmail.com

Sosnowsky's hogweed (*Heracleum sosnowskyi* Manden.) is invasive plant entered into list of Invasive Alien Species of Union concern [1]. It is highly toxic plant to humans and well established in seven EU countries where transforms the landscape. Sosnowsky's hogweed propagates only by dry-fruits i.e. seeds and produce them once in lifetime. Well known the important role of gibberellins and auxins on seed development of fleshy fruits [2,3]. To figure out the role of gibberellic acid (GA<sub>3</sub>) in dry-fruit i.e. seed development, we applied Sosnowsky's hogweed's unpollinated ovaries in satellite and stem branch umbels by different concentrations (0.07 mM, 0.14 mM, 0.28 mM, 0.43 mM) of exogenous GA<sub>3</sub>. GA<sub>3</sub> treatment didn't have a significant effect on size of *H. sosnowskyi* seeds, however it caused changes in shape. Longitudinal sections of mericarps and SEM micrographs of embryos revealed that embryos after GA<sub>3</sub> (0.43 mM) treatment were at torpedo stage, whilst mature embryos in control seeds had been observed (Fig. 1).

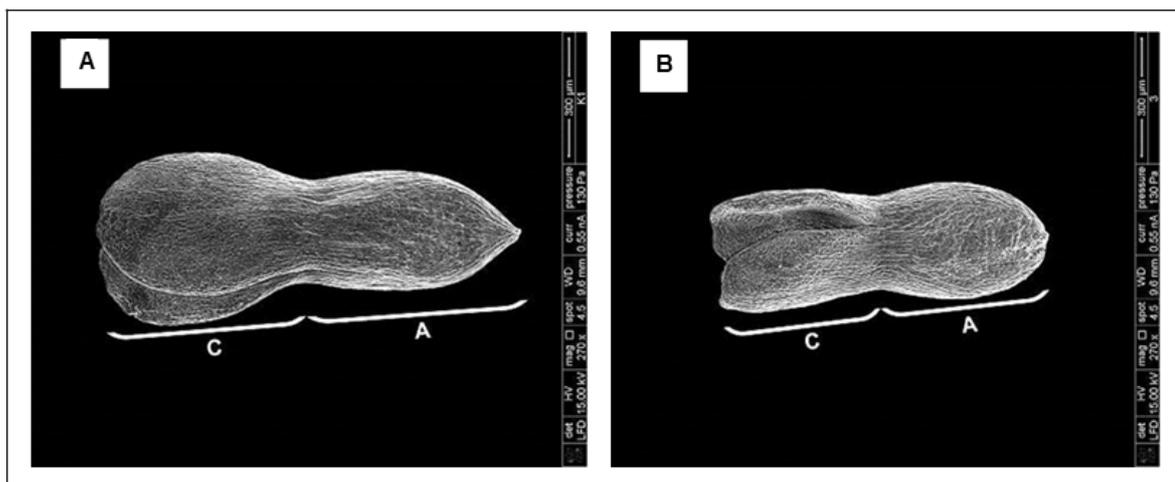


Fig. 1. Scanning micrographs of embryos received from mericarps of *H. sosnowskyi*. Untreated (A) and treated with GA<sub>3</sub> at concentration of 0.43 mM (B) plants. Abbreviations: A – axis; C – cotyledons. Scale bar, 300μm.

Furthermore, we disclosed that GA<sub>3</sub> treatment significantly reduced the germination rate *in situ* conditions of *H. sosnowskyi* mericarps from 98.0% to 16.5% in control and GA<sub>3</sub> (0.43 mM) treatments respectively. Auxin transport inhibitor (1,3,5-triiodobenzoic acid, TIBA) was used to affect auxin and gibberellin crosstalk in fruit development. [3]. Inhibition of auxin transport from the apical shoot by TIBA decreased seed germination rate in field conditions (98.1% and 29.8%; control and TIBA), the auxin effect on seeds' sufficient development was negated by indoleacetic acid (IAA) application on unpollinated ovaries right after the TIBA treatment (germination rate 96.1%). All these results suggest that exogenous GA<sub>3</sub> application has influence on dry Sosnowsky's hogweed seeds development and affects germination rate. Thus, it could be assumed that GA<sub>3</sub> could be used to inhibit the spread of this invasive plant.

[1] European Union, List of Invasive Alien Species of Union concern, – [http://ec.europa.eu/environment/nature/invasivalien/list/index\\_en.htm](http://ec.europa.eu/environment/nature/invasivalien/list/index_en.htm) [accessed 2019-01-28].

[2] J.C. Serrani, M. Fos, A. Atares et al., Effect of gibberellin and auxin on parthenocarpic fruit growth induction in the cv. Micro-Tom of tomato, *Journal of Plant Growth Regulation* **26**, 211-221 (2007).

[3] J.C. Serrani, E. Carrera, O. Ruiz-Rivero et al., Inhibition of auxin transport from the ovary or from the apical shoot induces parthenocarpic fruit-set in tomato mediated by gibberellins, *Journal of Plant Physiology* **153**, 851-862 (2010).