ARPHA Conference Abstracts 9: e202462
doi: 10.3897/aca.9.e202462

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Conference Abstract

CamAlien: High-Speed Monitoring of Invasive and Expansive Plants in Mountain Ecosystems

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Received: 03 Jun 2026 | Published: 03 Jun 2026

Citation: Vítková M, Sádlo J, Pipek P, Čuda J, Hejda M, Pyšková K, Pyšek P (2026) CamAlien: High-Speed Monitoring of Invasive and Expansive Plants in Mountain Ecosystems. ARPHA Conference Abstracts 9: e202462. https://doi.org/10.3897/aca.9.e202462

Abstract

As a consequence of biogeographic isolation and pronounced environmental heterogeneity, mountains represent exceptional biodiversity hotspots, with numerous endemic species. However, ecosystem transformations driven by global environmental changes result in irreversible biodiversity loss and a reduction in the essential ecosystem services provided. Invasive plants, but also native expansive species, are spreading upslope along roads, forest tracks and bike or hiking trails, to further exacerbate the environment pressure.

Given that restoration in alpine ecosystems is often slow and uncertain, early detection and rapid management responses to new incursions of alien species are critical. Traditional botanical monitoring, albeit reliable, is limited by time and workforce. To address these challenges, we plan to use CamAlien, a novel high-speed camera system mounted on a vehicle, that allows roadside vegetation surveys with substantially greater spatial coverage than conventional field methods.

We will apply this system in the Krkonoše Mountains (Czech–Polish border, Central Europe), a bilateral national park and UNESCO Biosphere Reserve, shaped by differing land-use histories: the relatively undisturbed, steep Polish side and the more intensively modified Czech side, forming a heterogeneous landscape mosaic.

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Images obtained by the CamAlien system will be automatically classified using Pl@ntNet model, generating high-resolution, georeferenced records suitable for near real-time detection of invasive and expansive species and their repeatable monitoring across heterogeneous mountain landscapes.

Keywords

early detection, innovative technologies, mountains, plant invasion and expansion, road verges

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Presented at

Neobiota 2026, the 14th International Conference on Biological Invasions

Acknowledgements

This project is funded by the TACR SQ02010073 and long-term research development project RVO 67985939 (Czech Academy of Sciences).

Conflicts of interest

The authors have declared that no competing interests exist.