## Workshop MathAIEOapp



Contribution ID: 11

Type: not specified

## Optimal spatiotemporal resource allocation for the control of Ailanthus altissima in Alta Murgia National Park

Thursday, 6 July 2023 12:25 (25 minutes)

"Invasive alien species (IAS) are non-native organisms that are introduced, intentionally or unintentionally, into ecosystems outside their natural range and have negative impacts on the environment, economy, or human health. These species can disrupt natural ecosystems, outcompete native species for resources, alter ecological processes, and cause economic and social harm.

In the context of the Alta Murgia National Park, Ailanthus altissima has been recognized as an IAS, posing challenges to the park's native ecosystems and biodiversity. The park management and conservation efforts focus on addressing the spread and control of A. altissima within its boundaries.

In this work, we implemented a spatiotemporal model to address the spread and control of A. altissima in the Alta Murgia National Park. The objective of the model is to find the the most effective resource allocation strategy for the eradication of the plant, while considering the budget constraints associated with the control program. Remote sensing data and expert knowledge were utilized to estimate the initial distribution of the species and its habitat suitability. These inputs were derived from a land cover map of the study area, generated using very high-resolution satellite images. As a result, we developed the web service COINS (COntrol of INvasive Species), a decision support tool to be integrated into IAS management, which was ported to Virtual Research Environments.

This is a joint work with: Christopher M. Baker, Palma Blonda, Francesca Casella, Fasma Diele, Carmela Marangi, Francesco Montomoli, Nicholas Pepper, Cristiano Tamborrino and Cristina Tarantino.

Funder: Project funded under the National Recovery and Resilience Plan (NRRP),Mission 4 Component 2 Investment 1.4 - Call for tender No. 3138 of 16 December 2021, rectified by Decree n.3175 of 18 December 2021 of Italian/Ministry of University and Research funded by the European Union –NextGenerationEU; Award Number: Project code CN 00000033, Concession Decree No. 1034 of 17 June 2022 adopted by the Italian/Ministry of University and Research, CUP B83C22002930006, Project title "National Biodiversity Future Center –NBFC

## References

Baker C. M., Blonda P., Casella F., Diele F., Marangi C., Montomoli F., Pepper N., Tamborrino C. and Tarantino C. Using remote sensing data within an optimal spatiotemporal model for invasive plant management: the case of Ailanthus altissima in the Alta Murgia National Park. Submitted.

Marangi, C., Martiradonna, A. and Ragni, S. Optimal resource allocation for spatiotemporal control of invasive species. Appl. Math. Comput. 439, 127614 (2023).

Baker, C. M., Diele, F., Marangi, C., Martiradonna, A. and Ragni, S. Optimal spatiotemporal effort allocation for invasive species removal incorporating a removal handling time and budget. Nat. Resour. Model. 31, e12190 (2018)."

Primary author: MARTIRADONNA, Angela

Presenter: MARTIRADONNA, Angela