

ESAF Dipartimento Territorio e Sistemi Agro-Forestal









A new and sustainable approach for truffle management

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Dott.ssa Alessia Sartori Dott. Enrico Vidale Prof. Giai Petit



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A general overview....

- Truffles are fungi feeding on carbon exudation;
- Truffle is one of the most economically important nonwood forest production...the market is growing worldwide! (1);
- The natural truffle production is contracting, mainly due to land abandonment and climate change (2);
- Climate changes are altering precipitation patterns (3);
- Huge impacts on tree physiology and on truffle production.

MiPAAF M delle politiche agricole alimentari e forestali (2018) Piano Nazionale Della Filiera del Tartufo 2017-2020. 1–153
IPCC, 2014: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzer

^{1.} Reyna S, Garcia-Barreda S (2014) Black truffle cultivation: A global reality. For Syst 23:317–328. https://doi.org/10.5424/fs/2014232-04771





STUDY AREA

- TESAF Dipartimento Territorio e Sistemi Agro-Foresta
- Veneto Region
- Vicenza Province
- Surface 2428 m²
- 500 m a.s.l.
- Ostrya carpinifolia Scop. plantation
- Tuber aestivum Vitt.
- Productive and nonproductive plants







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The focus of our analyses is on the plant's physiological responses to water availability







Sensors...how do they work?









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Results

Differences between productive and non-productive plants: non-productive plants have strong periodic fluctuations, compared to productive plants





Results



In non-productive plants, periodic fluctuations are strongly linked to soil moisture. The plant undergoes dehydration (wider fluctuations indicate greater dehydration, **and less osmoregulation**).

In productive plants, the amplitude of daily fluctuations is reduced at the beginning of the season, while it increases in the second part of the season. Soil humidity goes down **under a certain threshold**.



Results



- High production after high water stress and recovery
- High production in June (maximum light)



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Conclusions

- Truffle productivity is linked both with environmental parameters and plant's physiological parameters;
- It is possible to improve the productivity of plants and truffles by applying a management model that considers the water stress and recovery cycles;
 - Monitoring the plant means being able to choose when it is necessary to intervene (not always!);
- This new approach could save useful resources (like water) and make truffle cultivation more sustainable (smart use of irrigation and thinning treatment).







Thank you for attention!

