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Eutypella parasitica in Europe: review of the situation and recent research

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Eutypella parasitica R.W. Davidson and R.C. Lorenz is the causative agent of Eutypella canker of maple, a destructive disease of maples in North America and Europe. *Eutypella parasitica* represents a considerable risk for an extensive area of naturally distributed maples in Europe, where most frequently infects sycamore (*Acer pseudoplatanus*), field (*A. campestre*) and Norway maples (*A. platanoides*).

SITUATION IN EUROPE

HOST SPECIES INDEX + CLIMATE VARIABLES

SPREAD RISK MODEL

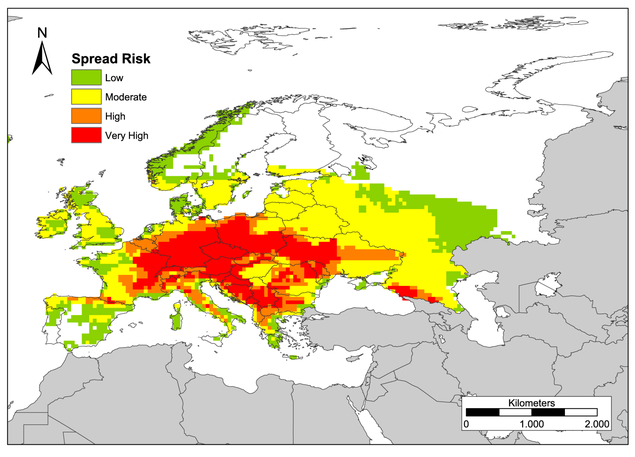
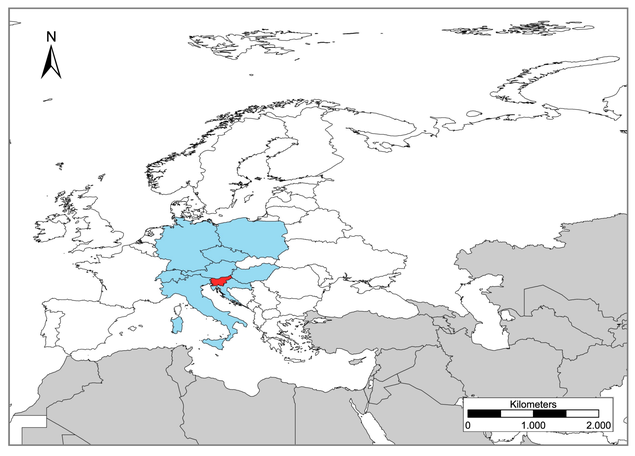


Figure 1: Predicted spread risk map for E. *parasitica* in Europe (Ogris et al., 2006).

FIRST REPORT IN EUROPE FROM SLOVENIA (2005)

***Eutypella parasitica* findings in Europe agree with the results of a spread risk model.**

Austria (2007)
Croatia (2008)
Germany (2016)
Hungary (2016)



The Czech Republic (2017)
Poland (2017)
Italy (2018)
Switzerland (2022)

Figure 2: *Eutypella parasitica* known distribution in Europe.

RECENT RESEARCH

1) Inventory of Eutypella canker of maple in five sampling sites (100 x 100 m) in the central part of Slovenia.

2) Sampling of 40 dead branches of *A. pseudoplatanus* from each sampling site.

3) Isolation and identification of fungi.

- *Eutypella parasitica* was isolated also from visually healthy wood.
- *Eutypella parasitica* was 1.5 times more frequent in discolored wood of trunks, than in the outer parts of dead branches.
- The most frequent fungal species isolated from samples with *E. parasitica* were *Eutypa* sp. and *Neonectria* sp.
- No fungal species was strictly associated with the occurrence of *E. parasitica* — all co-isolated species were also present in samples without *E. parasitica.*
- No significant difference ($p > 0.05$) in diversity or fungal community was found between samples with and without *E. parasitica*.

Evaluation of *in vitro* antagonistic activity of the ten most frequently isolated fungi from wood of the dead branches of *A. pseudoplatanus* against *E. parasitica* in dual cultures.

- *Eutypella parasitica* is a weak competitor and has a weak impact on the success of tissue colonization with other fungal species.
- *Eutypa* sp., *Eu. maura*, *Neonectria* sp., and *Peniophora incarnata* were recognized as the most promising candidates for biocontrol of *E. parasitica*.

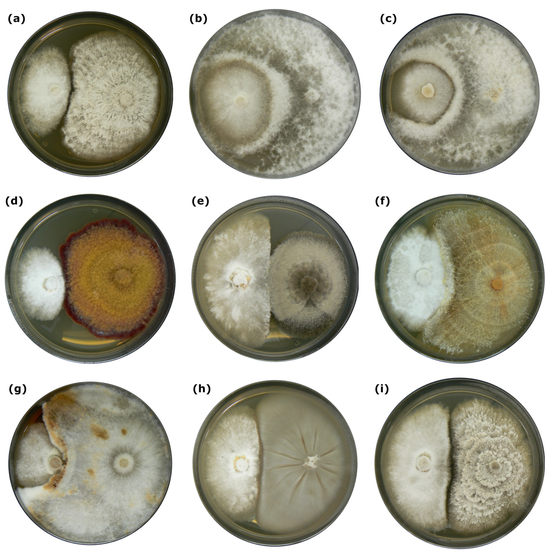


Figure 3: Mycelial interactions after 18 days of co-incubation between the response isolate of *E. parasitica* (left) and the challenge isolate (right): (a) *Diaporthe* sp.; (b) *Eutypa* sp.; (c) *Eu. maura*; (d) *F. avenaceum*; (e) *N. acerina*; (f) *Neonectria* sp.; (g) *P. incarnata*; (h) *Pe. irregularis*; and (i) *Ph. pustulata* (Brglez et al., 2020b).

1) 15 weeks of exposure of *A. pseudoplatanus*, *A. platanoides*, and *A. campestre* wood samples to four isolates of *E. parasitica* according to the modified EN 113 standard.

2) Light and scaning electron microscopy of *A. pseudoplatanus* wood samples

3) Histometric analysis.

- The highest average mass loss was recorded in *A. pseudoplatanus* (6.6%).
- Statistically significant differences in mass loss between different *E. parasitica* isolates.
- Microscopical observed changes in degraded wood suggest that *E. parasitica* can degrade lignin and could therefore be considered as a white rot fungus.

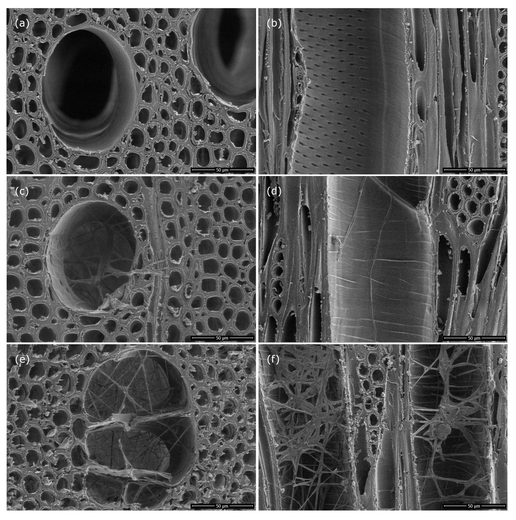


Figure 4: SEM images of cross and tangencial sections of a,b) control samples and wood samples after 15 weeks of exposure to c, d, e, f) two *E. parasitica* strains (Brglez et al., 2020c).

- Preliminary results are showing differences between European and north American populations of *E. parasitica*.

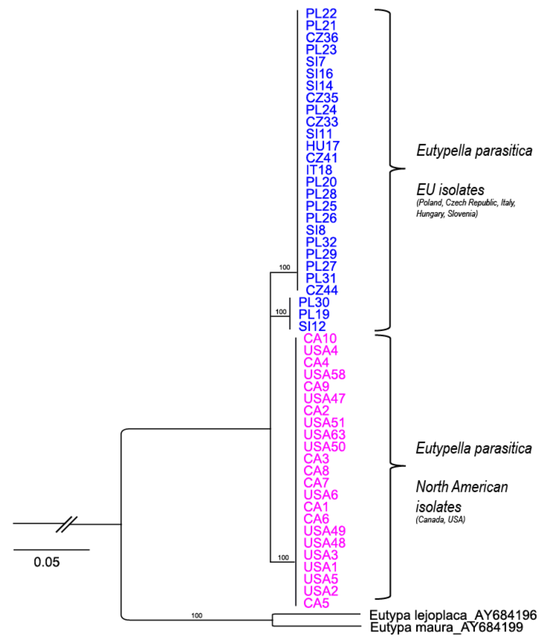


Figure 5: Maximum-likelihood tree based on the beta-tubulin region of 50 *E. parasitica* isolates. Bootstrap values ≥65 based on 100 bootstrap replicates are shown. The phylogeny was constructed in GeneiousPrime 2022.1. using RAxML. The isolates were generously provided by D. Jurc, N. Ogris, B. Piškur, I. Munck, T. Kowalski, K. Cerny, P. Manion, A. Bergdahl, McGowan, R. Lidster, S. Greifenhagen, M. Francis, V. Chaimbrone, C. McVeety. Isolates are deposited in the Culture Collection of the Laboratory of Forest Protection at the Slovenian Forestry Institute, ZLVG.

REFERENCES

Brglez A., Piškur B., Ogris N. 2020a. *Eutypella parasitica* and other frequently isolated fungi in wood of dead branches of young sycamore maple (*Acer pseudoplatanus*) in Slovenia. Forests, 11, 467, doi:10.3390/f11040467.
Brglez A., Piškur B., Ogris N. 2020b. *In Vitro* Interactions between *Eutypella parasitica* and Some Frequently Isolated Fungi from the Wood of the Dead Branches of Young Sycamore Maple (*Acer pseudoplatanus*). Forests, 11, 1072, doi: 10.3390/f11101072.
Brglez A., Piškur B., Humar M., Gričar J., Ogris N. 2020c. The effect of *Eutypella parasitica* on the wood decay of three maple species. Forests, 11, 671, doi: 10.3390/f11060671.
Davidson R. W., Lorenz R. C. 1938. Species of *Eutypella* and *Schizoxylon* associated with cankers of maple. Phytopathology, 28: 733-745.
French W. J. 1967. Eutypella canker on species of *Acer* in New York state: PhD Thesis. Syracuse, New York, State University College of Forestry at Syracuse University: 160 str.
Jurc D., Ogris N., Slippers B., Stenlid J. 2006. First report of Eutypella canker of *Acer pseudoplatanus* in Europe. Plant Pathology, 55, 4, doi: 10.1111/j.1365-3059.2006.01426.x: 577.
Ogris N., Jurc D., Jurc M. 2006. Spread risk of Eutypella canker of maple in Europe. Bulletin OEPP/EPPO Bulletin, 36, doi: 10.1111/j.1365-2338.2006.01047.x: 475-485.

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