

Biological control of highly invasive Tree-of-Heaven (*Ailanthus altissima*) in urban areas

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Tree-of-Heaven (*Ailanthus altissima*)

- **Highly invasive Neophyte** in Europe and **on all continents** except Antarctica
- Abundant in **urban habitats** & along **transportation corridors**
- **Low requirements** on soil fertility



Tree-of-Heaven (*Ailanthus altissima*)

- **Destruction of the fundamentals of buildings, monuments & infrastructure and damage on archeological sites** due to its high root energy



Verticillium nonalfalfae

- newly described Verticillium-species (2011)
- soil-borne **wilt fungus**
- **narrow host range** compared to the more common species *V. dahliae* & *V. albo-atrum* s.s.
- within the species there are **biotypes** with **distinct host specificity** (hop, tree of heaven, tomato, spinach, ...)
- 2011: **virulent and native strain** obtained from naturally dying *Ailanthus*
- Now the **active agent** of the bioherbicide **Ailantex®**



Topics to be presented

1. **Effectivity** of the *V. nonalfalae*-isolate Vert56 (Ailantex[®]) on *A. altissima* on different sites and age classes
2. **Spread** of the wilt fungus from inoculated (treated) trees via root grafts to neighbouring *Ailanthus* trees
3. **Demonstration** of easy to handle application techniques
4. Current **status of admission**/registration of Ailantex[®]

1a) Effectivity of Ailantex[®] on saplings of *Ailanthus*

2013-07-19



2014-07-24



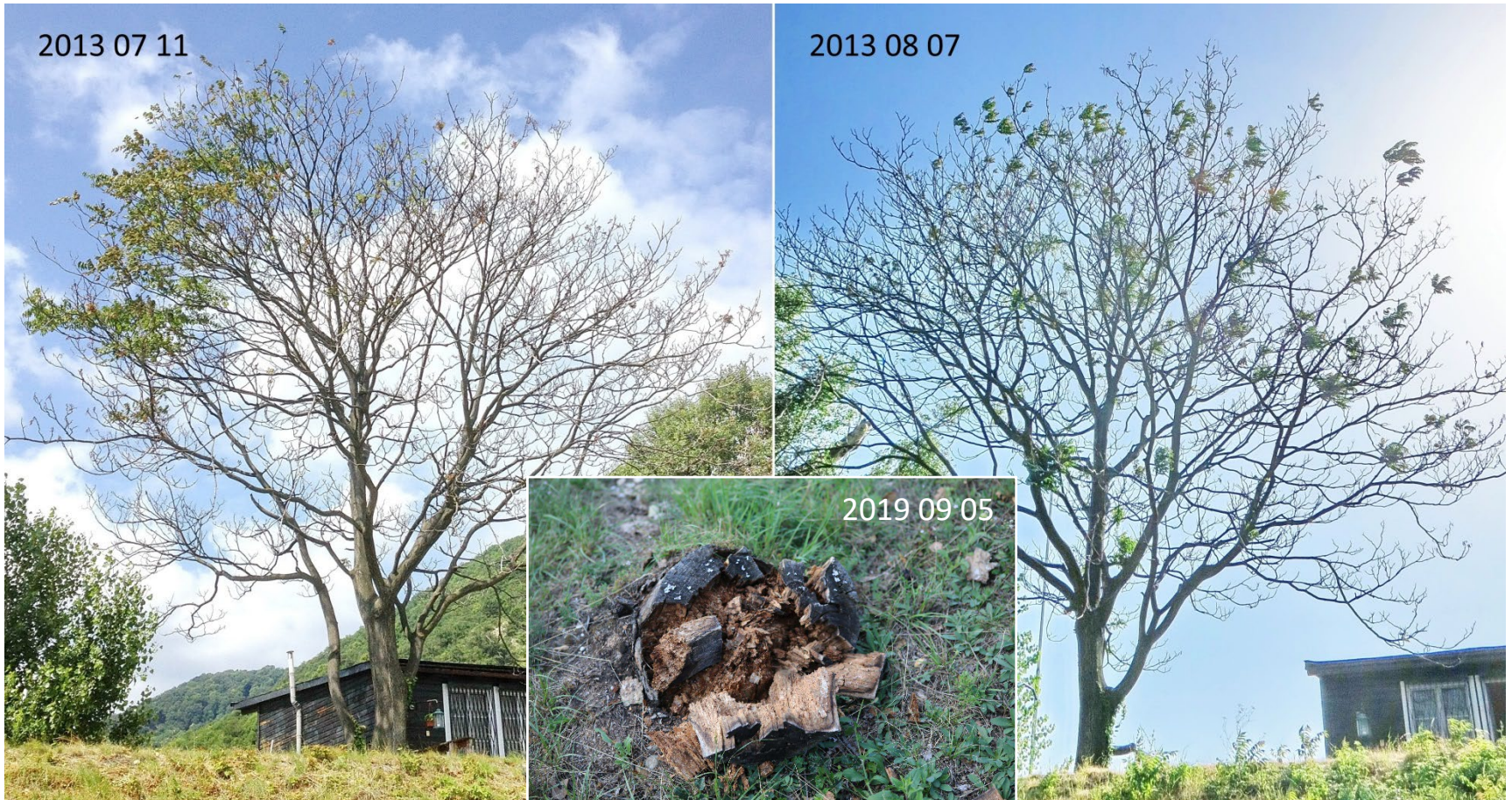
2014-10-13



2019-09-05

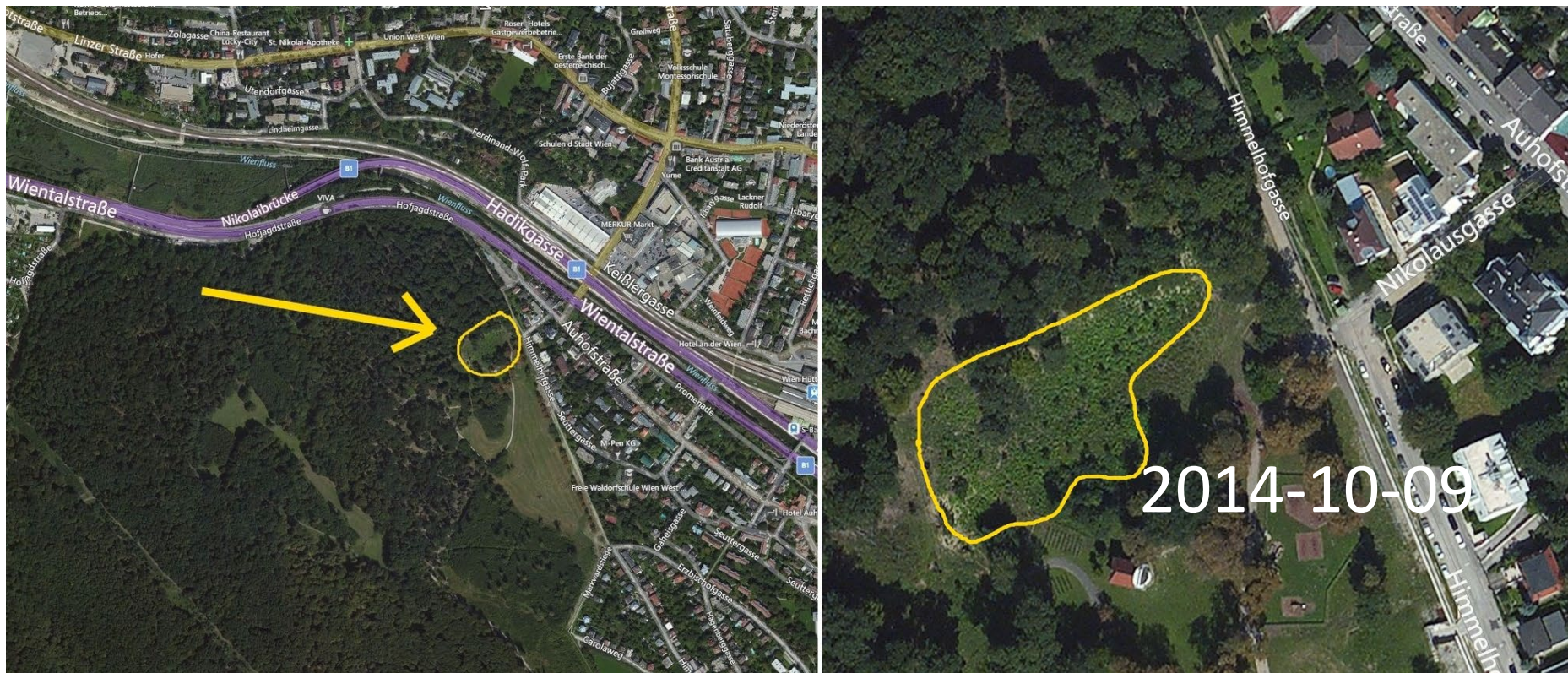


1b) Effectivity of Ailantex[®] on mature *Ailanthus*



2) Spread of the wilt fungus from inoculated trees via root grafts to neighbouring *Ailanthus* trees

- Forest regeneration site at the Viennese Recreation Forest „Lainzer Tiergarten“



2) Spread of the wilt fungus from inoculated trees via root grafts to neighbouring *Ailanthus* trees

- Pure stand of *Ailanthus*-saplings with admixed single individuals of service tree (*Sorbus domestica*) (indicated by red arrows!)

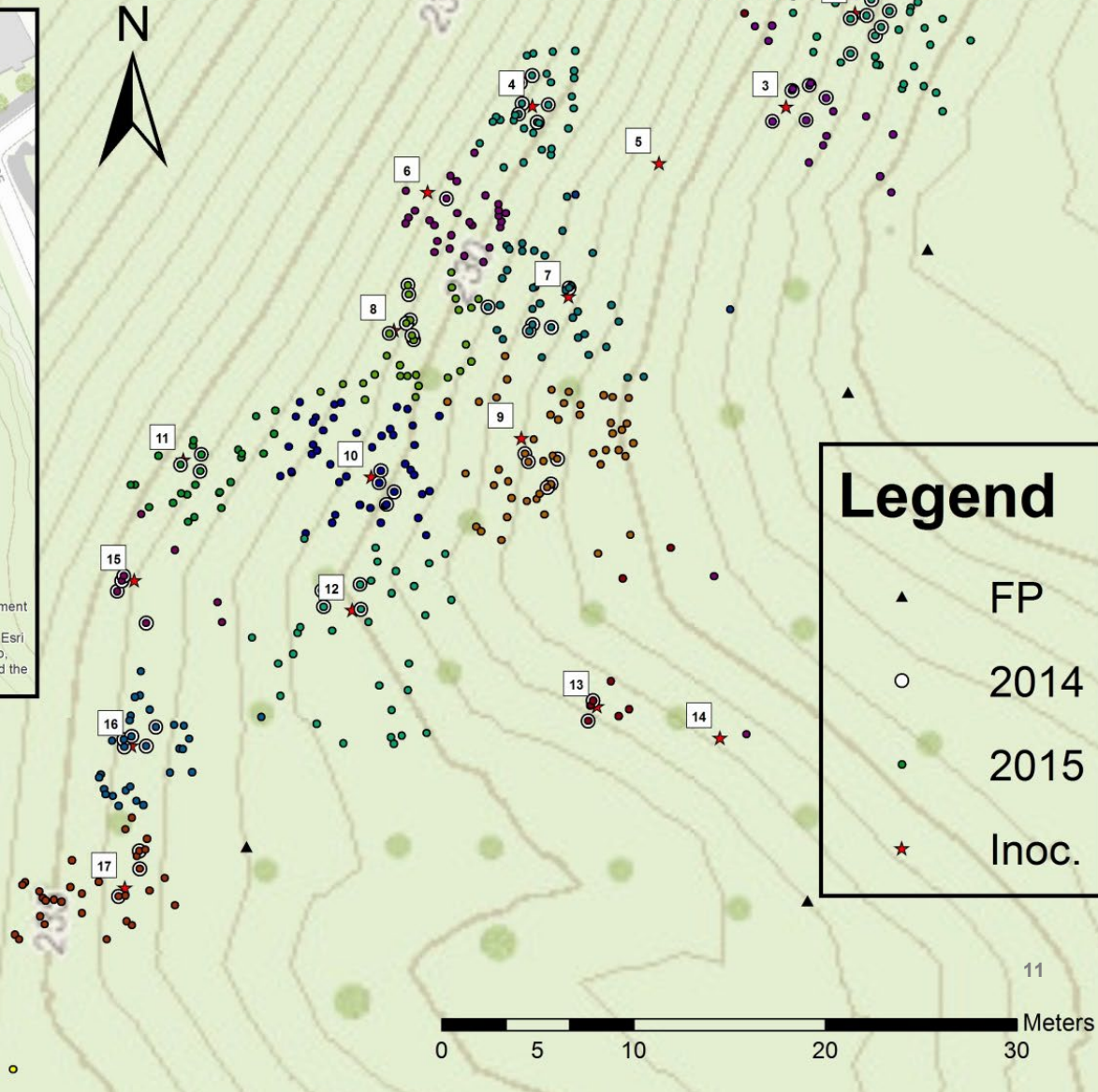
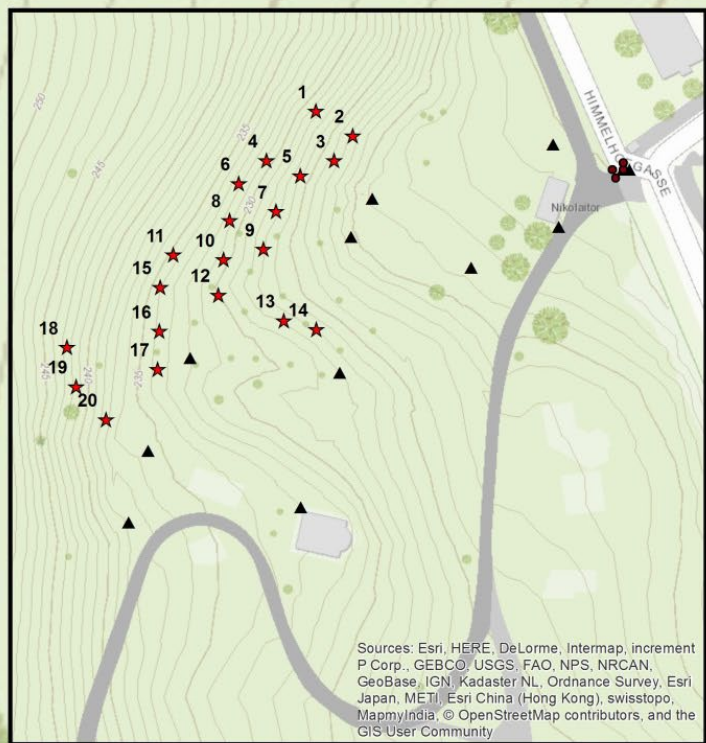


- in the past *Ailanthus*-saplings were crosscut annually at breast height
- only 20 saplings treated in June 2014
→ monitoring of the spread of the wilt pathogen to neighbouring trees by root connections in 2014 and 2015
- → within only 2 years wilt and mortality could be achieved on more than 700 *Ailanthus*-saplings!!



2016-02-16¹⁰

Spread of *V. nonalfalfae* from inoculated to neighbouring *Ailanthus* trees



Legend

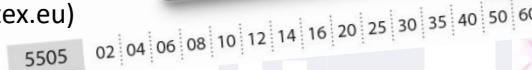
- ▲ FP
- 2014
- 2015
- ★ Inoc.

3) Application techniques

- Easy-to-handle application technique developed using
 - **chisel with rounded blade**
 - **mallet**
 - **syringe**
(10 or 20 ml)

(vgl. video clip under: <http://www.ailantex.eu>)

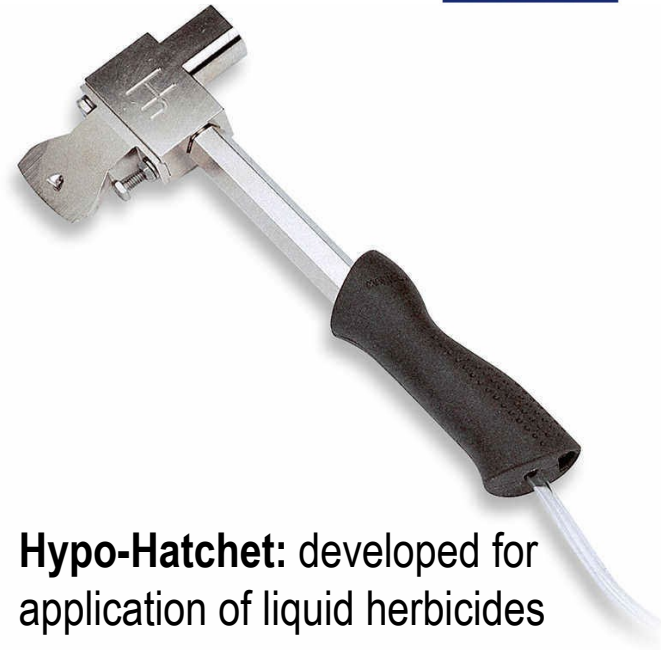
Gerades Hohleisen
Straight Gouge



- further application techniques:

Hypo-Hatchet® Tree Injector, EZ-Ject™, Herbicide System, Sidewinder Tree Injector, Arborjet QUIK-jet Air™ and **BITE** [„Blade for Infusion in TrEes“])

3) Application techniques (cont.)



Hypo-Hatchet: developed for application of liquid herbicides

3) Application techniques (cont.)



BITE Tree Injector: developed for application of active agents/ products that are transported via the sap flow

4) Current status of admission/registration

- Ailantex[®] was approved as plant protection product in **Austria** already in **2017** and **all following years**
- In the meanwhile it received **emergency registration** also in **France** (for railroad lines), the **Czech Republic** & just recently also in **Greece** (for railroad lines)
- Furthermore, applications for emergency registration are under consideration in Germany and Switzerland
- **The EU admission procedure** for Ailantex[®] is under way (the respective dossier has been submitted to the EU approval authority in 01/2022)

Summary / Recommendations

- new, **biocontrol method** for Ailanthus
- in **2019** available for the first time on the market in Austria under the brand name **Ailantex®**
- **efficient & sustainable** control (leads to dieback of roots!)
- **spread** to neighbouring trees **via root grafts** (in the case of clonal spread of Ailanthus!)
- applicable in **urban areas**, in **near to nature ecosystems** and also near **waterbodies** (contains no poisonous substances!)
- various **easy-to-manage application techniques** available

Publications

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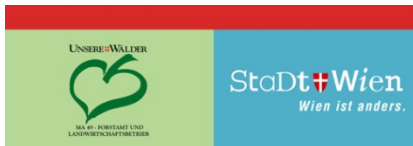
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