



FA1203: Sustainable management of *Ambrosia artemisiifolia* in Europe (SMARTER)

Short Term Scientific Mission Report

Assessing risk of *Ophraella communa* feeding on native endangered species and range expansion.

STSM details

COST STSM Reference Number: ECOST-STSM-FA1203-300916-081202

Timing of STSM: 30-09-2016 to 16-10-2016

Applicant details

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Work plan

In the European project SMARTER, management strategies for the noxious weed *Ambrosia artemisiifolia* are being developed and evaluated. Mechanical control (weeding) and chemical control have been implemented in agricultural fields. Next to being a weed in agricultural fields, the plant also thrives along lineal infrastructures, like railways, roads, and rivers. Along these often extensively managed structures, mechanical and chemical control of the weed appears to be too expensive and cumbersome.

An option to extend the toolbox to fight the invasive weed is biological control. Recently, *Ophraella communa* has arrived in Italy. The leaf beetle is used successfully as a biocontrol agent in China and Japan, and seems to have an impact on overall pollen production in the Milano region. The beetle has most likely been introduced accidentally via Malpensa airport. Originally, the beetle was not amongst the candidates to control common ragweed because of its ability to feed and conclude a full life-cycle on sunflower. Several studies on the risk of *Ophraella* attacking sunflower in Europe have been conducted by the research group of Heinz Müller-Schärer (University of Fribourg). There is still a knowledge gap about the risk of *Ophraella* feeding on native endangered species (from now on 'NES'), which we are aiming to address in this STSM.

Additional to that we are interested in the spread of *Ophraella communa* in Italy. In the summer of 2015, the research groups of Sandra Citterio, Heinz Müller-Schärer, and Urs Schaffner published an article about a new Occurrence of *Ambrosia artemisiifolia* and *Ophraella communa* in Valtellina, Northern Italy, in 'Natura Bresciana'. We found only adults of the beetle in the end of August, indicating that this was a phase of early infestation by the beetle. We aim to do a follow-up monitoring late in the season of 2016 to investigating if the beetle has established and how far it has spread.

The action points for the STSM were as follows:

1. Assessing spread of *Ophraella communa* in Valtellina (3-5 October)
We could not find *Ophraella communa* in Valtellina in the 2016, while *A. artemisiifolia* is growing in high numbers along the main road of the valley (SS38, see picture 1), as described for the year before (AUGUSTINUS et al. 2015). This indicates that the beetle has not established in Valtellina yet, which is a surprising finding considering the beetle has established successfully in colder climatic regions in China and Japan.



Picture1: *Ambrosia artemisiifolia* growing along the SS36 in Valtellina. The plants are virtually undamaged by defoliators, and we could not find *O. communa*.

2. Assessing feeding damage risk of *Ophraella communa* to native endangered species by

- a. Identifying native endangered plant species that are closely related to *Ambrosia artemisiifolia* (30 September)
 Urs Schaffner (CABI) developed a list of closely related plants in Europe following the Centrifugal-phylogeny scheme. We searched for native endangered species on this list, and also checked for other native endangered species within the closely related tribes (Inuleae and Coreopsideae). We selected five species See the selection in table 1.
- b. Finding wild populations of these species in the Lombardy region (6-10 October)
 We contacted botanists from the Lombardy region in Rodolfo Gentili's and Sandra Citterio's network, as well as contacting the Centro Flora Autochtona for locations of NES populations. See table 1 and figure 1 for selected sites.

Table 1: Selected plant species belonging to the Inuleae and Coreopsideae tribes, location and protection status according to the IUCN criteria and categories at the regional level (Lombardy and Switzerland) and based on regional laws.

Species name	Tribe	Site Name	Latitude	Longitude	Status
<i>Carpesium cernuum</i> L.	Inuleae	Piani d'Erna parking	45.8598	9.4337	Endangered
<i>Inula conyzae</i> (Griess.) Meikle	Inuleae	Monte Barro	45.831	9.3701	Least concern
<i>Inula spiraeifolia</i> L.	Inuleae	Monte Barro	45.83002	9.37002	Endangered
<i>Inula hirta</i> L.	Inuleae	Monte Barro	45.83184	9.372301	Endangered
<i>Inula salicina</i> L.	Inuleae	Lago di Pusiano	45.79406	9.25149	Near threatened
<i>Xerolekia speciosissima</i> L.(Less)	Inuleae	Monte Barro	45.83176	9.372445	Absolute protection (Lombardy regional law)
<i>Bidens cernua</i> L.	Coreopsideae	Trezzo sul'Adda	45.61313	9.516826	Partial protection (Lombardy regional law)

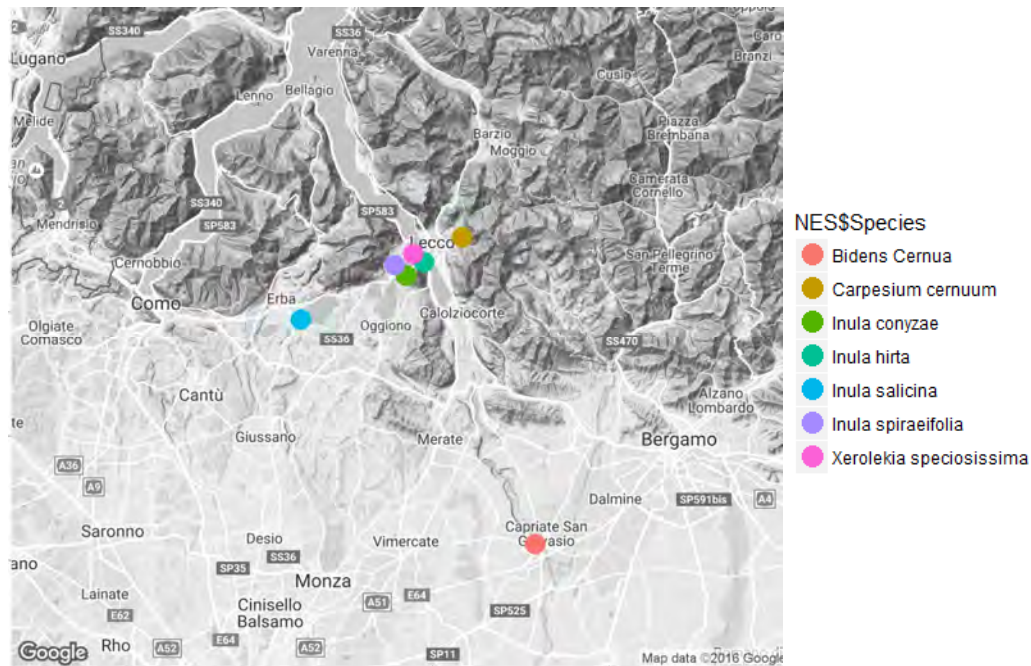


Figure1: Sites of populations visited. Colour of the dots indicates plant species name.

- c. Monitoring a selection of these populations for *Ophraella communa* presence (11-15 October). Whenever populations were bigger than 50 individuals, we used an established sampling protocol, for which we divided the site with the plants into 4 equally big sectors. After that, we sampled at least 10 plants per sector. The aim was to sample 50 plants per plant species and site. If the populations were smaller than 50 individuals, we sampled all plants.

We did not find *O. communa* on any of the host plants, while *A. artemisiifolia* plants in the vicinity (<1km) where either damaged or killed by the beetle. However, we found the beetle on two *Centaurea* species, inflicting light damage.

Conclusion

We did not find feeding damage of *O. communa* on the selected populations, while the beetle had clear impact on *A. artemisiifolia* in the vicinity. Based on these observations, it appears that *O. communa* does not pose a high risk for native European plants from the *Inuleae* and *Coreopsideae* tribes.

We will continue monitoring the populations of this year's study, and aim to expand the species range with *Inula britannica*, and *Dittrichia graveolens*. *Ophraella communa* has been observed feeding and depositing eggs on latter plant, a Mediterranean herb which is used for medicinal purposes and biopesticides.

Additionally, we will keep monitoring the *A. artemisiifolia* population in Valtellina for *O. communis* occurrence in collaboration with the University of Fribourg and the University of Milano-Bicocca. Together with the climate suitability data for the beetle we collect in other experiments, this can give us information which makes it easier to predict the potential range of *O. communis* in Europe.

We expect to publish a paper in a peer-reviewed international journal, merging the data obtained in this STSM with ongoing research conducted in the lab and the field of the research group of Heinz Müller-Schärer at the University of Fribourg.

References

AUGUSTINUS, B. A., M. F. GUARINO, F. COLOMBO, and S. CITTERIO. 2015. *nUOVE SeGnALAZioni di AMBROSIA ARTEMISIIFOLIA e OphRAELLA COMMUNA in VALTeLLina (ALPi cenTRALI, LOMBARDia)*. NATURA BRESCIANA **39**.