WP5 Rumex trial in Slovenia (Location: Ajdovščina and Murski Črnci)

Rumex obtusifolius is a widespread troublesome perennial weed species and therefore represent a good candidate for biological control. Previous studies conducted in Switzerland (CABI) showed a potential of inundative applications of a Sesiidae species *Pyropteron chrysidiforme* to control *R. obtusifolius*. Larvae of the insect feed on *R. obtusifolius* roots thus weaken its growth capability and in case of high larvae infestation also plant mortality.

Objectives

A three years study which aims to apply the method of mass-release of *P. chrysidiforme* to environmental conditions more favourable for a population build-up is being conducted. Establishment of *P. chrysidiforme* after targeted release as well as impact of the insect on *R. obtusifolius* mortality will be studied in the following years of the study.

Materials and methods

Two locations in Slovenia were selected for field trials. One in southwest-Vipavska dolina region (Location 1) with a mild Mediterranean climate and the other in northeast of Slovenia - Prekmurje region (Location 2), with continental climate (cold winters with hot and dry summers). On each location a meadow with relatively high *R. obtusifolius* population was selected.

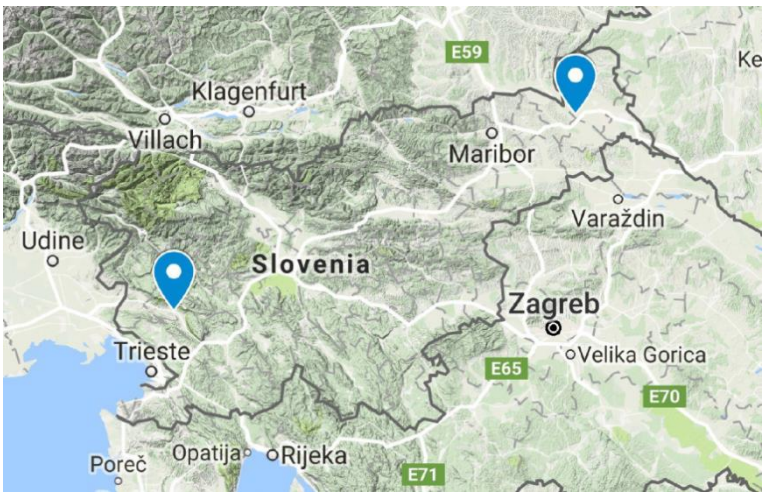

Figure 1 - Location of two selected Rumex study sites in Slovenia

Pupae and eggs of *P. chrysidiforme* were brought from CABI Switzerland to Agriculture institute of Slovenia (AIS) in spring of 2018. Emergence of adult insects was closely followed and mating was done following the protocol. Eggs that were laid by the female insects in plastic containers were picked and glued onto toothpicks (30 per toothpick). The toothpicks were stored for field inoculation.
On June 12th and June 21th 2018 first inoculation of *R. obtusifolius* plants was carried out on the two field trial locations. 275 plants were selected on each field. Four different treatments were applied (50 plants per treatment): a) inoculation with *P. chrysidiforme* in year 1, b) inoculation with *P. chrysidiforme* in years 1 and 2, c) inoculation with *P. chrysidiforme* in years 1, 2 and 3, and d) control (natural level of attack). Inoculation of plants will be repeated in following years according to the protocol, where the final plant mortality will be estimated in the last year of experiment.

Figure 2 - Toothpicks with eggs prepared for inoculation (left) and inoculated Rumex plant in the field (right)

Figure 3 - Inoculation of *R. obtusifolius* (left) and marking of inoculated plants with high-precision GPS (right)

Toothpicks with eggs were placed in the cores of 225 plants. Extra 25 plants were inoculated for annual establishment rate estimation. Position of each inoculated plant was marked with a coordinate recorded by high precision GPS (Stonex S9i, Stonex SRL, Lissone, Italy).
In addition some 100 plants were also inoculated at AIS grounds for the next year's rearing cycle and egg production for the field inoculation.

Figure 4 - Pattern of GPS marked Rumex plants on location 1 - Ajdovščina (left) and on location 2 - Murski črnci (right)

Primary results - annual establishment rate

On September 25th and October 2th the 25 *R. obtusifolius* plants intended for inspection of establishment rate were located with high precision GPS. Plants in stage between 1 and 3 rosettes were dug out and rootstocks were later inspected. Larvae in each rootstock were counted and root damage/decay was estimated. 24 out of 25 plants dug out on Location 1 showed signs of root damage (avg. 55 % damage) and 16 rootstocks had 1 or 2 larvae inside. Furthermore 8 inoculated plants were found to be dead.

Plants on location 2 were in higher development stage and had between 1 and 7 rosettes. Similar to location 1, from 25 dugout plants, 20 of them showed signs of root damage (30 % damage on avg.). 13 of those plants had 1-3 larvae inside, however all of the infested plants were still vital.

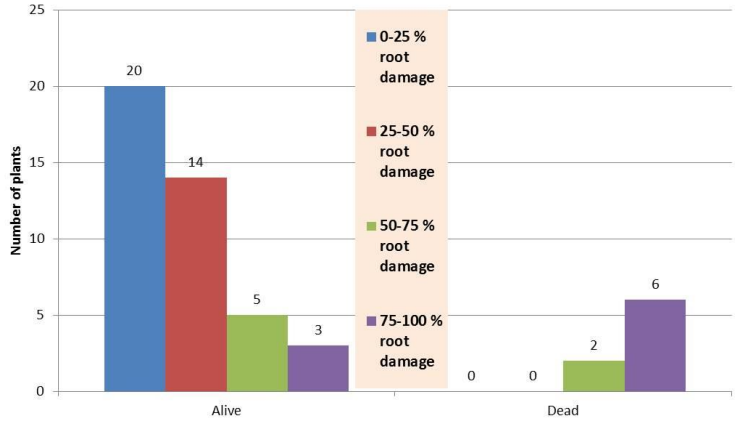

Figure 5 - Root damage and mortality of *R. obtusifolius* in the annual establishment rate estimation

Figure 6 - Annual establishment rate evaluation (left) and Rumex root damage caused by *P. chrysidiforme* larvae (right)