

Report on the 3rd International Symposium on Weeds and Invasive Plants in Ascona, Switzerland

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Scientists and practitioners from all over the world met from October 3 to 7, 2011 in Ascona, Switzerland for a symposium on terrestrial and aquatic exotic and invasive plants. This series of meetings, which began 2006 features bringing together specialists on biology, weed science, agronomy and practice. The delegates shared experiences on biology, ecology and control plant invaders and intractable weeds. The symposium in Ascona was after Ponta Delgada on the Azores (2006) and Osijek in Croatia (2008) again organized in a region – Ticino – where the problematic of invasive plants is everywhere visible. With its climate at the southern side of the Alps and with its role as international transit region for people and goods, Ticino is the Swiss region with highest abundance of invasive neophytes. This region illustrates the development of flora in a changing world. Because of intensive South-North traffic, invasive plant propagules are displaced mainly from southern to northern regions; therefore southern Switzerland could demonstrate how flora of northern Switzerland will be developing in future. Nicola Schoenenberger from the Cantonal Museum of Natural History in Lugano gave a nice introduction to the Ticino region featuring the changing flora. The symposium was a very good opportunity for all participants to broaden their view on interactions between agricultural weeds, aquatic weeds and invasive neophytes.

The topic of session 1 “causes and impact of plant invasions” mainly dealt with impact. Unfortunately, we have made only limited progress on understanding invasion impact in the past decade despite the fact that impacts of exotic species are a major reason why citizens, managers, agriculturalists and scientists are interested in invasions. Clearly, assessing general patterns regarding impact is difficult and we often do not know whether impact is simply a matter of demography or whether it is largely driven by different per-capita effects. The four oral talks dealt with approaches based on case studies, meta-analyses and mathematical modeling to explore the impact of exotic species on ecosystem properties and services (North American grasslands, post-fire establishment in Ticino, Mediterranean coastal habitats). One presentation explicitly described a proposal for a methodology to evaluate the environmental impact to be integrated into the framework of the present pest risk assessments protocols at the European level. The five poster of this session were also briefly presented, each dealing with a different case study (*Robinia*, *Solidago*, *Amaranthus* spp.) or impact assessments of plant invaders in a specific country (Romania, Hungary). Urs Schaffner, CABI Delémont gave an invited talk on: “Environmental impact of invasive plants: from case studies to meta-analyses”.

The general idea of session 2 was to draw attention to differences and similarities between weeds of arable fields and invasive plants of more natural habitats through a series of oral presentations and a poster session dealing mostly with biology and ecology of plant invaders. Mark van Kleunen (University of Konstanz) gave an invited talk in which he showed that invasive species are frequently characterized by “weedy” traits as predicted by Baker in 1965. The review

of its own past and present studies, highlights in particular that compared to non-invasive species, invasive plants are more often characterized by a rapid growth, a vigorous vegetative reproduction, self-compatibility and a tolerance to a wide range of environmental conditions. There is also a trend for invasive plants to be able to germinate in various conditions and to be pollinated by unspecialized species or by wind. This kind of invasive trait-syndromes may help to improve risk assessment schemes in order to identify sooner new invasive plants.

The first three talks were case-studies dealing about i) the distribution of alien plant species in an agricultural landscape in relation with their traits, ii) the case of *Gunnera tinctoria* in Ireland, which confirmed that habitat availability may be the more significant factor explaining plant invasions and iii) the importance of taxonomy and molecular identification in the case of invasive *Vitis* taxa threatening the native *Vitis vinifera* subsp. *sylvestris* and other species of European alluvial forests. The next three oral presentations compared native and introduced populations of invasive plants highlighting the importance of genetic diversity for introduction events (*Bromus tectorum* in USA) or differences in growth, reproduction or in herbivory predation (*Cirsium arvense* and *Centaurea stoebe*). Four posters were also presented during the plenary including a review of invasive weeds in agricultural fields in Lithuania, and studies about genetic structure (*Impatiens parviflora*) or populations biology (*Grindelia squarrosa*, *Pueraria lobata*) of invasive plants.

Motto of the session 3 was „How far are control methods transferable between agricultural weeds and plant invaders“. The session had the highest number of contributions with examples from different habitats and control methods, trying to find an generalizing answer. The main difference when choosing the weed control method is not only in a weed specificity but in the impact on habitat where the weedy plant is considered undesirable. The weed communities in agro-ecosystems are highly dynamics, containing historically many species of various origin. The farmers do not distinguish usually between native and non-native species and control both groups with the same methods with aim to reach economically acceptable competition level which means in some cases (like sugar beet) weed free crop. The control methods used in natural- and semi-natural habitats must be more selective and take into account also non target (native) plants and environmental impacts because the control is conducted often in sensitive areas like water courses, forests, parks, human settlements, etc. As resulted from many contributions, main attempt should be given to the prevention of introduction and colonization with support of functions of native flora at the same time. From direct methods, mechanical and biological approaches are preferred. Chemical methods are used mainly for eradication of some perennials and/or species with very high dominance. Usage of microbial and plant metabolites with herbicidal effects is more and more studied and was presented in some contributions. Choosing of control methods is site specific and should reflect both weed and habitat properties. Markus Hochstrasser from the cantonal plant protection service (Zurich, Switzerland) gave an invited talk on: “Control of invasive neophytes: using synergies in Swiss agricultural practice”.

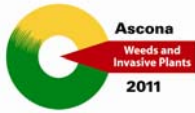
Session 4 featured on aquatic plants. The diversity in aquatic plants in Europe was presented. An overview was given on the current situation of introduced aquatic plants, as well as their pathways of introduction and their current status of spread. Species causing the most serious problems in European waters were highlighted. Changes in aquatic macrophyte communities by *Elodea Canadensis* in Finnish lakes; a survey on management of invasive alien plants in French aquatic ecosystems; impacts of *Ludwigia grandiflora* in Belgian waters and French meadows;

management options of *L. grandiflora* in France; *Cabomba caroliniana* in the Netherlands; the effect of nutrient reduction on growth rate of Lemnoid species – these were the topics of this session. Differences between plant invasions in aquatic and terrestrial habitats were discussed. Aquatic invasive plants benefit from their more effective CO₂ uptake and from their ability to build up dense stands in empty water space. These dominant stands suppress indigenous water plants and have impacts on other components of the ecosystem. Control in water is more difficult because the use of herbicides is restricted. Andreas Hussner (University of Düsseldorf) gave an invited talk on: “Aquatic plant invaders in European freshwater ecosystems: an overview”.

Ambrosia artemisiifolia from North America was the focal species in this extended session 5 that turned around the question whether Europe can “successfully fight the ragweed invasion” (invited talk of Uwe Staringer, Julius Kühn institute). Due to its impacts on agriculture, public infrastructure and human health, the plant is perceived as an undesirable addition to the countries where it occurs as a neophyte. *A. artemisiifolia* serves as model plant in Europe to demonstrate negative impacts of the alien’s spread on agriculture (yield loss) and human health (allergies). Resulting awareness of the general public and the strength of respective control activities by the policy makers are driving forces for transferring control methods from the agricultural field to zones of public infrastructure. Even if it does not appear that ragweed invasion has been stopped or slowed down significantly in heavily infested regions, some local or regional successes in the control of this arable weed and invasive plant were reported, e.g. the Swiss canton of Zurich or the city of Berlin, Germany. European initiatives on the management of ragweed are on their way to be launched (Commission regulation (EU) 574/2011 on “...maximum levels of *Ambrosia* spp. ... as undesirable substances in animal feed”). In particular, discussion was on the population structure and migration processes along routes, the “Berlin Action Program against *Ambrosia*” and some practical control methods as competitive suppression during re-vegetation and optimization of cutting regimes.

The motto of session 6 was „ Impacts to and answers from human society versus plant invasion“. Trying to answer the question about the origin of plants – is it from here or from elsewhere and since when? – it is not possible to define a zero point. “Normal” biological invasions are natural, while “abnormal” invasions are of anthropogenic origin. If nature is essentially good, it is man corrupting it in causing “abnormal” invasions. We admire nature, but we feel guilty for “modern” plant invasions. Modernity began with the beginning colonization of the world by western or European ideas – Columbus caravels being the symbol for the beginning of this process. Industrialization was the second step and now we face globalization which accelerates modern plant invasions. Answers to this guiltiness are all sorts of activities which were presented in this session. IASWATCH by the European Environment Agency; the prioritization of alien plant by EPPO’s risk analysis; the definition of “blacklist” and “watchlist” together with cantonal activities on administrative level in Switzerland; the CONABIO project in Mexico; the activities of AFEDA against *Ambrosia artemisiifolia* in France. Cécilia Claeys (University of Marseille) gave an invited talk on: “The perception and management of invasive plants : Between environment and social changes”.

Young scientists subsidized by EWRS working groups: EWRS supports young scientists for their outstanding work in giving grants for conference fees and travel costs. The WG on Biological Control and the WG on Invasive Plants subsidized in Ascona the following students:



- **Gabriele Bassler**, Institute of Botany, University of Natural Resources and Life Sciences, Vienna Austria: Spread and control of the poisonous grassland weed *Senecio aquaticus* (Gabriele.bassler@boku.ac.at)
- **Min Hahn**, University of Fribourg, Switzerland: Differences in population dynamics between native and invasive *Centaurea stoebe*: the role of life cycles and the impact of specialist herbivores (min.hahn@unifr.ch)
- **Ines Abela-Hofbauerova**, Department of Ecology, Faculty of Science, Charles University in Prague, Czech Republic: Growth, reproduction and plant damage of *Cirsium arvense* in its native and invasive range (abela_h1@natur.cuni.cz)
- **Miia Jauni**, University of Helsinki, Finland: Linking species traits of alien plants with environmental characteristics of agricultural habitats (miia.jauni@helsinki.fi)
- **Nataša Kočiš Tubić**, University of Novy Sad, Serbia: Microsatellite variability of *Ambrosia artemisiifolia* L. in populations of Serbia and Croatia (natasa.kocis@dbe.uns.ac.rs)
- **Tiziana Pedrotta**, University of Fribourg, Switzerland: Biological control of *Rumex* spp. in Europe: Biosafety studies of a native root boring sesiid moth (tiziana.pedrotta@unifr.ch)
- **Mohammad Alebrahim Taghi**, University of Mashhad, Iran: The effect of some treatments on breaking seed dormancy in Mesquite (m.t.alebrahim@gmail.com)
- **Anna Maria Väisänen**, Finnish Environment Institute, Oulu University, Finland: Changes in aquatic macrophyte communities in large oligotrophic Lake Ala-Kitka, northeastern Finland – effects of aquatic macrophyte *Elodea canadensis* (anna.vaisanen@ymaristo.fi)

We welcome these young people as members of our society !

The **excursion day** of this four-days symposium was dedicated to diverse geographical zones where invasive neophytes occur and may cause problems to nature. In the morning 75 delegates visited the nature reserve of “Bolle di Magadino”. This is found in the estuary of the river Ticino to the Lago Maggiore. Nicola Patocchi, scientific leader of the foundation for the nature reserve explained how this area is in between human and natural impacts concerning the pressure of invasive plants. Some invasive neophytes are unintentionally brought by man as *Aster lanceolatus*, *Bidens frondosa*, *Reynoutria japonica*, *Robinia pseudoacacia*, *Solidago Canadensis* or *Solidago gigantea*. Some species are under strict control, as seeds of *Amorpha fruticosa* are brought by floodwaters of the lake, and they germinate in the nature reserve; but other neophytes are tolerated as newly arriving plants (*Impatiens glandulifera*). A lot of sensibility is needed for guiding the development of the natural reserve in a region where urban pressure is extremely high and land reserves are extremely short.

In the afternoon the delegates were confronted with problems of invasive plants in an area where man is moving mountains. A 15 km tunnel – part of a high-speed North/South bound railway link crossing on low altitude below the Alps – is presently excavated under the Monte Ceneri. Millions of m³ of granite stone powder are stocked in a mountainous valley between Bellinzona and Lugano. Alptransit – the constructing company – has employed specialists for re-naturalization of gravel deposit and construction sites. These engineers explained how they integrate aspects of invasive plants free re-naturalization right at the beginning of works. The majority of plant species listed on the Swiss “black list” for neophytes was found at Sigirino construction site.

The conference dinner was held on the Isole di Brissago. These are two little islands in the Lago Maggiore sheltering a botanical garden, which is run under the government of the canton Ticino. Guido Maspoli, director of the botanical garden, gave a short overview of the history and

collection of plants in this place. These islands are the warmest locality in Switzerland representing a wet (!) Mediterranean climate with about 2000 mm annual rainfall.

The symposium offered a broad spectrum of questions and answers around native terrestrial and aquatic flora and introduced plant species. More than 100 delegates from 26 countries of all continents came to Ascona. 39 oral presentations were given, 49 posters were exposed. All information including the abstracts book is presented on www.invasive.weeds.ascona.ewrs.org. Several people expressed their wish to give continuity to this type of symposium – which EWRS will certainly back. In fact, the symposium will have a future: the fourth edition will be held probably in the end of September 2014 in Southern France (Montpellier). More information is coming soon!



Guido Maspoli talks about the botanical garden on Isole die Brissago.



In the plenary hall.



More than 100 participants from 26 countries of all continents !



Nicola Patocchi explains the management of the nature reserve “Bolle di Magadino”.




A place where man moves mountains. Excavated granite “gravel powder” is stocked in a mountainous region in Ticino, Switzerland.



Subject of interest *Ambrosia artemisiifolia* in the hands of two delegates.

Summary

Trying to answer the question about the origin of plants – is it from here or from elsewhere and since when? – it is not possible to define a zero point. “Normal” biological invasions are natural, while “abnormal” invasions are of anthropogenic origin. If nature is essentially good, it is man corrupting it in causing “abnormal” invasions. We admire nature, but we feel guilty for “modern” plant invasions. Invasive alien species introduced intentionally or unintentionally by man can undoubtedly cause damage to the countries where they occur. Only limited progress on understanding invasion impact is made in the past decade despite the fact that impacts of exotic species are a major reason why citizens, managers, agriculturalists and scientists are interested in invasions. A general idea for this symposium was to draw attention to differences and similarities between weeds of arable fields and invasive plants of more natural habitats. Farmers do not usually distinguish between native and non-native species and control both groups with the same methods with aim to reach economically acceptable competition level which means in some cases (like sugar beet) weed free crop. The control methods used in natural- and semi-natural habitats must be selective to species and take into account also non target (native) plants and environmental impacts. The diversity in aquatic plants in Europe was presented. An overview was given on the current situation of introduced aquatic plants, as well as their pathways of introduction and their current status of spread. Species causing the most serious problems in European waters were highlighted. *A. artemisiifolia* serves as model plant in Europe to demonstrate negative impacts of the alien’s spread on agriculture (yield loss) and human health (allergies). Resulting awareness of the general public and the strength of respective control activities by the policy makers are driving forces for transferring control methods from the agricultural field to zones of public infrastructure. More than 100 delegates from 26 countries of all continents came to Ascona. 39 oral presentations were given, 49 posters were exposed.

 The circle symbolizes the life cycle of a plant (colors of *Solidago* spp.); the arrow stands for an effective and environmentally conscious control of weeds and invasive plants.