

18 November 2017

# BOTANICA SUDALPINA CONFERENCE

Museo cantonale di storia naturale, Lugano

[botanicasudalpina.ch](http://botanicasudalpina.ch)

Program and abstracts





*“Thus it is also in Ticino that travelers, descending from the Nufenen, the Saint Gotthard, or the San Bernardino to Locarno or Chiasso, see in a short period of time spread out in front of their admiring eye a succession of vegetation from climates most diverse, from the frigid cold of Lapland to the warm breezes of noon day sun, and there greet the plants from the cold North, those from cloudy Germany, those from alpine Helvetia, even the many which rejoice on the hills and plains of Lombardy and the Mediterranean flora.”*

Alberto Franzoni, 1922<sup>1</sup>

## SUMMARY

---

Program	4
General information	8
Welcome	10
Guest speakers	14
Talk abstracts	16
Poster abstracts	31
List of participants	40

---

<sup>1</sup> Translation by Brack Hale

## PROGRAM

---

### SATURDAY, 18 NOVEMBER 2017

**08:30 Registration (entrance)**

**09:30 Welcome (Conference room)**

09:45 *Adaptation of alpine plants to climate change*  
Prof. Dr. Rolf Holderegger

10:30 *Does glacial retreat amplifies microrefugia opportunities for alpine plants during warm stages?*  
Rodolfo Gentili

10:45 *The importance of stability throughout time in affecting the geographical pattern of endemism richness*  
Gabriele Casazza

11:00 *Learning from the past to forecast the future: a case study on Berardia subacaulis, a paleo-endemic species of the SW Alps*  
Maria Guerrina

**11:15 Coffee break & Poster session (Posters and coffee room)**

11:40 *Ain't no mountain high enough: the evolution of Asteraceae in Alpine ecosystems*  
Luca Pegoraro

11:55 *Festuca in the (Southern) Alps – still an open construction site*  
Peter Englmaier

12:10 *Reproductive ecology and phylogeography of a self-compatible alpine specialist, Primula halleri (Primulaceae)*  
Jurriaan M. de Vos

12:25 *What about extrafloral nectaries in European temperate zones? Answers from the Swiss Southern Alps*  
Brigitte Marazzi

**12:40 Lunch**

- 14:30 *Plant traits and strategies in vegetation analyses: concepts and applications*  
Prof. Dr. Bruno E.L. Cerabolini
- 15:15 *Changes in land use are a main driver of recent plant biodiversity shifts in Swiss Alpine grasslands*  
Constantin E. Pöll
- 15:30 *Successful restoration of abandoned terraced vineyards and grasslands in the canton Ticino, Switzerland*  
Denise Binggeli
- 15:45 *Settlements as a source for the spread of non-native plants into suburban forests in Southern and Northwestern Switzerland*  
Luca Gaggini
- 16:00 *Generative reproduction potential of Pueraria lobata in southern Switzerland*  
Nicola Widmer
- 16:15 Coffee break & Poster session**
- 16:40 *Val Grande National Park's Vascular Flora (Piedmont, NW Italy)*  
Roberto Dellavedova
- 16:55 *Plant cartography between Lago Maggiore and Lago di Como*  
Michael Kleih
- 17:10 *Flora of the dolomite cliffs of Southern Ticino*  
Philippe Juillerat
- 17:25 *Peculiarities in Red List assessments concerning the Southern Swiss Alps*  
Michael Jutzi
- 17:40 Final discussion**
- 18:00 Closing ceremony & Aperò**

### **Award for the best talks (18:00-18:30)**

The best talks will receive an award by the Botanical Society of Ticino (Società Botanica Ticinese, SBT).

The winners will be selected by a special jury of the scientific committee, and they will be awarded during the closing ceremony.

The award contest for the best poster was cancelled due to lack of participants.

## PROGRAM

---

### SUNDAY 19 NOVEMBER 2017

#### **Fall Beauties of Monte Caslano**

Outdoor excursion

A field excursion on the southern slope of the hill to observe its xeric meadow in fall and enjoy a stunning scenic view of Lake Ceresio. The excursion won't climb up too high, but the path is steep and at times moderately impervious. Therefore, good hiking shoes and no fear of heights are recommended.

With:

**Guido Maspoli**, Ufficio cantonale della natura e del paesaggio

Time schedule: 9:30-15:00

Max. 25 pers. (only upon previous registration)

#### **Front and Behind the Scenes of the Museum**

The Natural History Museum of Cantone Ticino and its collections enclose present and past of nature in the southern Swiss Alps; they will be unveiled with a visit of the museum's front and behind the scenes.

With:

**Pia Giorgetti**, Museo cantonale di storia naturale

Time schedule: 10:30-12:00

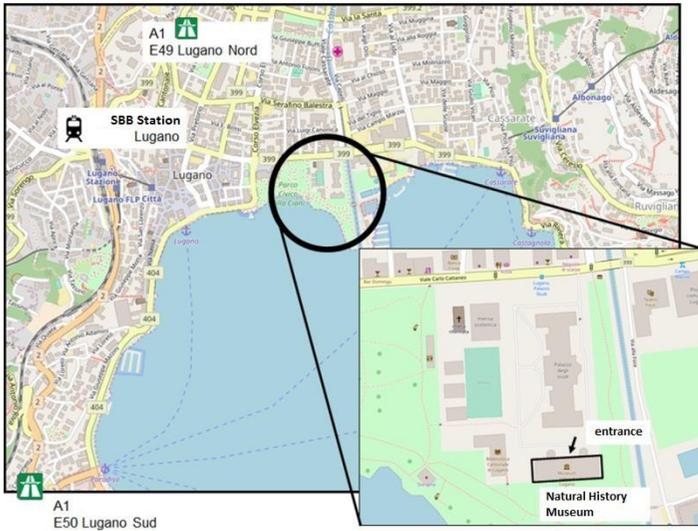
Max. 15 pers. (only upon previous registration)

## GENERAL INFORMATION

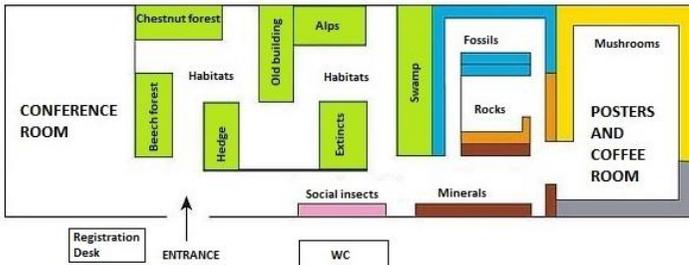
### Location

Museo cantonale di storia naturale  
Via Carlo Cattaneo 4  
CH-6900 Lugano.

The Museum and conference rooms are on the 1° floor.



### Map of the Museum (1<sup>st</sup> floor)



## **GENERAL INFORMATION**

---

### **Talks**

Each speaker's time slot consists of 15 min divided into 12 min for the oral presentation and 3 min for questions. We kindly ask the speakers to stick to these time limits.

Talks must be in English and in .ppt, .pptx or .pdf format.

Talks must be uploaded in the computer of the conference room during registration time.

### **Posters**

Posters can be in Italian or English.

Poster dimensions must be 84 x 119 cm (A0, portrait format).

Posters must be hanged up in the coffee room during the registration time, before the coffee break of the morning.

Presenting authors are invited to use the assigned poster place, labelled with their name.

## WELCOME

---

### **The Organizing Committee welcomes you at the Botanica Sudalpina Conference 2017!**

This conference aims at bringing together all parties active in the scientific research on the flora of the Southern Alps and in particular of the Canton Ticino.

Our purpose was to give, for the first time, an overview of such research and to celebrate the flora of Southern Alps. The conference is also an opportunity for promoting interesting collaborations and (hopefully) outlining prospects.

We are glad and impressed with the great international participation from so many institutions and the diversity of contributions submitted, ranging from aspects of biogeography, conservation, biodiversity, ecology, evolution, physiology, to floristics and systematics of spontaneous and alien plant species of the Southern Alps.

This wouldn't have been possible without the generous support of the organizing institution and sponsors and the passionate work and help of many people. In particular, we are grateful to the Scientific Committee for the valuable collaboration with the abstract reviews and the award contest. Finally, we'd like to thank also the guest speakers for their very interesting presentations.

We hope you will enjoy the conference!

The Organizing Committee,

**Brigitte Marazzi**, Info Flora & Museo cantonale di storia naturale

**Sofia Mangili**, Museo cantonale di storia naturale

**Alessio Maccagni**, University of Basel

**Laura Torriani**, Cantone Ticino, Servizio fitosanitario

**Daniela Scheggia**, Giardino Botanico Isole di Brissago

## **SCIENTIFIC COMMITTEE**

---

**Lorenzo Besomi**, Cantone Ticino, Ufficio della natura e del paesaggio

**Stefan Eggenberg**, Info Flora

**David Frey**, Swiss Federal Research Institute WSL

**Brack W. Hale**, Franklin University

**Mauro Jermini**, Agroscope

**Guido Maspoli**, Cantone Ticino, Ufficio della natura e del paesaggio

**Giorgio Moretti**, Cantone Ticino, Ufficio della selvicoltura e del demanio

**Marco Moretti**, Swiss Federal Research Institute WSL

**Andrea Persico**, Pro Natura Ticino

**Boris Pezzati**, Swiss Federal Research Institute WSL

**Filippo Rampazzi**, Museo cantonale di storia naturale

**Nicola Schoenenberger**, Innovabridge Foundation

**Jürg Stöcklin**, University of Basel

## **COLLABORATORS**

---

### **Webmaster**

Ivan Sasu, Meraviglioso.ch

### **Graphic design**

McKensy Powell, Franklin University

### **Museum staff on site**

Micaela Campagnoli

Pia Giorgetti (post-conference activity)

Lara Lucini

Alessia Vitalini

### **Franklin student helpers**

Jessica Borgert

Elizabet Faisman

Katherine Gannon

Gabriella Muñoz

Varaidzo Ndebele

McKenzie Reilly

Nitish Soundalgekar

Gemma Totten

Wadi Luca Watfa

### **Museum technical staff**

Antonio Castelli

Alberto Delmenico

Monica Regazzoni

## SPONSORS

---



[www.botaniculticinese.ch](http://www.botaniculticinese.ch)



[www.ti.ch/mcsn](http://www.ti.ch/mcsn)



[www.infofora.ch](http://www.infofora.ch)



[www.stsn.ch](http://www.stsn.ch)



[www.fus.edu](http://www.fus.edu)

## GUEST SPEAKERS

---



### **PROF. DR. ROLF HOLDEREGGER**

Member of WSL Directorate and head of Research Unit Biodiversity and Conservation Biology, WSL Swiss Federal Research Institute, Birmensdorf, Switzerland

President of the Swiss Botanical Society

### **Adaptation of alpine plants to climate change**

The ongoing global climate change (temperature and precipitation regimes) is supposed to be particularly strong in the Alps. Hence, also its effects on the alpine flora are assumed to be marked. The principal reactions of alpine plants to climate change are: (local) extinction, migration by seed to other sites or habitats, short-term ecological adaptation of individuals (plastic responses), and genetic (i.e. evolutionary) adaptation. However, for alpine plant species and alpine vegetation a very simplistic response is often assumed with species and plant communities simply migrating upwards when temperatures are increasing. But what do we really know about the reactions of alpine plants species to climate change? Are there any recordings of extinction due to climate change yet? Is there any evidence for migration to new sites? Are short-term plastic responses sufficient to deal with changing temperatures and precipitation patterns? Is genetic adaptation really so slow that it cannot keep step with climate change? During the last two decades, researchers from across the Alps have carried out substantial research and accumulated significant results and information on how the alpine flora reacts to climate change. These results are, however, sometimes contradictory. I will first review some of these results with respect to extinction, migration, ecological and genetic adaptation from such diverse fields as floristics, vegetation science, ecology, ecophysiology and genetics. I will then try to bring them together in a more general, though still speculative synthesis. In doing so, my focus will be on the Swiss and Southern Alps.



**PROF. DR. BRUNO E. L. CERABOLINI**

Full Professor of Environmental and Applied Botany, Dipartimento di Scienze Teoriche e Applicate Università degli Studi dell'Insubria, Varese, Italy

### **Plant traits and strategies in vegetation analyses: concepts and applications**

In the last decades several aspects of plant primary functioning have been confirmed at the global scale. These include the observation that the leaf economics spectrum forms part of an overall 'plant economics spectrum', or a trade-off between investment of resources in perennial tissues or the early use of resources in reproduction. A secondary spectrum, the 'plant size spectrum', is heavily involved in plant competitive ability and has been confirmed to involve the integration of size-related traits at the level of seeds, organs and whole plants. These major axes of plant functional variability work together to form the 'Global spectrum of plant form and function'. This provides a framework in which plant primary functioning can be quantified and compared amongst species and individuals, and has been recognized to represent major axes of variability predicted by theories such as Grime's CSR (competitor, stress-tolerator, ruderal) adaptive strategy theory. Recently, common traits collected world-wide have been used to produce a practical tool to allow adaptive strategy classification, in which plant life forms can be compared at the same scale. Can this become a routinized method to investigate vegetation processes like coexistence and biodiversity? Adaptation along successional stages? Plant communities response to disturbance or nutrient enrichment? Ecosystem properties and services? Nowadays the amount of researches across biomes world-wide comparing plant communities along environmental gradients seems to be encouraging.

## TALK ABSTRACTS

(In chronological order)

---

10:30-10:45

### **Does glacial retreat amplifies microrefugia opportunities for alpine plants during warm stages?**

Rodolfo Gentili<sup>1</sup>, Maria Cristina Salvatore<sup>2,3</sup>, Stefano Armiraglio<sup>4</sup>, Sandra Citterio<sup>1</sup> and Carlo Baroni<sup>2,3</sup>

<sup>1</sup> Department of Earth and Environmental Sciences, University of Milano-Bicocca, Piazza della Scienza 1, 20126 Milan, Italy

<sup>2</sup> Department of Earth Sciences, University of Pisa, Via S. Maria 53, 56126 Pisa, Italy

<sup>3</sup> Institute of Geosciences and Earth Resources - National Research Council, Via G. Moruzzi 1, 56124 Pisa, Italy

<sup>4</sup> Natural Sciences Museum of Brescia, Via Ozanam 4, 25128 Brescia, Italy

**Background and Aims** - Understanding how alpine flora will be able to face warm interglacial periods avoiding extinction is a new exciting and narrowly treated topic. Previous studies highlighted that alpine flora may be able to respond to increasing temperatures surviving in marginal or local microrefugia. In an alpine area we aimed: a) to assess the surface area available for plant colonization after the glacier retreats occurred during the last centuries; b) to investigate the possible microrefugium function of several active landforms and deposits depending on glacier dynamics, for 13 plant species.

**Methods** - In selected valleys of the Adamello massif (Raethian Alps, Italy), we investigated glaciers since the Little Ice Age (LIA) in terms of areal and frontal variations and mass balance. We collected presence/absence of 13 alpine plant species typical of peak areas and/or glacier forelands, within 3x3 m plots selected by a stratified random sampling on active alpine landforms and deposits of the valleys: peaks, moraines, channels, debris flow, rock/debris fall, and snow avalanche. Treeline and timberline were also investigated and mapped. Relationships between the species presence, treeline, timberline and landforms and deposits according to elevation were assessed by generalized linear models.

**Results** - The investigated glaciers experienced a strong shrinkage more than 50% between LIA and 2006 making available wide deglaciated terrains. Typical alpine species growing on these deglaciated areas and on the mountain peaks (~3000 m a.s.l.) were also found at low elevation (~1700 m a.s.l.), more than one thousand meters downvalley, within polygenic channels and on slope deposits, often reaching treeline and timberline.

**Conclusions** - Expected retreat of alpine glaciers may create new opportunities for all the studied alpine species colonization at both high and low elevation. Particularly, active landforms and deposits on alpine slopes are acting as widespread microrefugia for the selected species even at low elevation.

10:45-11:00

## **The importance of stability throughout time in affecting the geographical pattern of endemism richness**

Gabriele Casazza<sup>1</sup>, Luigi Minuto<sup>1</sup> and Dagnino Davide<sup>1</sup>

<sup>1</sup> Dipartimento di scienze della Terra, Ambiente e Vita, Università degli Studi di Genova, Corso Europa, 26, 16132 Genova, Italy

**Background and Aims** - Climate change is one of the greatest threats to plant endemisms, particularly in mountain ecosystems that often show a high rate of endemism. Studies suggest that current centers of endemism are typically located in areas where the rugged mountainous topography buffered the effect of past climate changes and will probably buffer also the future changes.

**Methods** - To evaluate climatic stability, we assessed shift in distribution of Köppen climatic types from last interglacial to present. Using species distribution models, we projected the climatic niche of 100 plant species endemic or subendemic to SW Alps (about 60% of all endemic and subendemic species) in past (i.e., last interglacial, last glacial maximum and middle Holocene) and future (i.e., year 2070 using both an optimistic and a pessimistic scenario) climates.

**Results** - We detected a higher current endemism richness (both potential and known) in areas that were climatically more stable during the past. We found a significant positive correlation between richness throughout past climates and both potential and known current endemism richness. Similarly, we found a significant positive correlation between future potential endemism richness and both past stability and current potential endemism richness. Nevertheless, endemic species in the SW Alps will experience high range loss (65.5% and 82.3% in the optimistic and pessimistic scenarios, respectively), not counterbalanced by range gain in adjacent areas because of low dispersal capabilities.

**Conclusions** - Our results suggest that, despite the ability of microrefugia to remain relatively stable and support high diversity in the future, absolute levels of endemism in the SW Alps will likely decline considerably, due to the inability of endemic species to disperse at a rate consistent with future climate change.

11:00 – 11:15

## **Learning from the past to forecast the future: a case study on *Berardia subacaulis*, a paleo-endemic species of the SW Alps**

Maria Guerrina<sup>1</sup>, Spyros Theodoridis<sup>2</sup>, Carmelo Nicodemo Macri<sup>3</sup>, Gabriele Casazza<sup>3</sup>, Luigi Minuto<sup>3</sup> and Elena Conti<sup>2</sup>

<sup>1</sup> Department of Plant Ecology and Evolution, Evolutionary Biology Centre (EBC)  
Norbymägen 18D SE-752 36 Uppsala, Sweden

<sup>2</sup> Department of Systematic and Evolutionary Botany, University of Zurich, 8008  
Zurich, Switzerland

<sup>3</sup> DISTAV, University of Genoa, Corso Europa 26, 16132, Genoa, Italy

**Background and Aims** - Future climate change may lead to a substantial loss of biodiversity. Endemic plants are exposed at an increased extinction risk because they are likely more dispersal-limited, less genetically variable, thus less able to rapidly adapt to climate change than species with broader distribution. In plants, global warming can lead to changes in distributional range, reproductive biology and plant-insect interactions. To produce reliable estimates of the risk, it is fundamental to investigate several aspects of the species under consideration. The present study is aimed at using *Berardia subacaulis* as a model to investigate possible effects of global warming on the survival of a paleo-endemic species restricted to the south-west Alps.

**Methods** - A multidisciplinary approach was carried out, examining the phylogeography, species distribution modelling and reproductive biology of *Berardia*.

**Results** - The phylogeographic structure resulted weak and complex, probably due to high levels of gene flow. Levels of allelic richness detected were low. Species distribution models forecast a contraction of potential suitable habitat similar to the potential contraction that *Berardia* seems to have already experienced during the past. For these reasons, future contraction in distributional range as response to a temperature increase might lead to a further impoverishment in the genetic diversity of *Berardia*.

Flowers are protandrous, favouring cross-fertilization, but self-fertilization is allowed. The flowers are pollinated by common pollinators, but visits are scarce. *Berardia* probably takes advantage of its self-pollination which assures reproductive success. For these reasons, *Berardia* seems to be less exposed to changes in plant-insect interaction.

**Conclusions** - The present study supports the importance of investigating demography, life history, ecology and genetics in conservation biology. Using this multidisciplinary approach, it is possible to better understand the possible effects of climate global change on biodiversity.

11:40 – 11:55

## **Ain't no mountain high enough: the evolution of Asteraceae in Alpine ecosystems**

Luca Pegoraro<sup>1,2</sup>, Ellen C. Baker<sup>1,2</sup>, Sarah Barlow<sup>3</sup>, Benjamin Coquillas<sup>1</sup>, Rolland Douzet<sup>4</sup>, Lin Fu<sup>1,5</sup>, Ilia J. Leitch<sup>1</sup>, Andrew R. Leitch<sup>2</sup>, Luis Palazzesi<sup>6</sup>, Clément Vignon<sup>1</sup>, Oriane Hidalgo<sup>1</sup> and Jaume Pellicer<sup>1</sup>

1 Jodrell Laboratory, Royal Botanic Gardens, Kew, Richmond, Surrey, TW9 3AB, UK

2 School of Biological and Chemical Sciences, Queen Mary University of London, London, E1 4NS, UK

3 Red Butte Garden and Arboretum, University of Utah, Salt Lake City, UT 84108, USA

4 Station Alpine Joseph Fourier, CNRS UMS 2925, Université Joseph Fourier, Grenoble 1, BP 53, 38041 Grenoble Cedex 9, France

5 South China Botanical Garden, Chinese Academy of Sciences, No.723, Xingke Road, Tianhe District Guangzhou 510650, P.R. China

6 Museo Argentino de Ciencias Naturales, CONICET, División Paleobotánica, Buenos Aires, C1405DJR, Argentina

**Background and Aims** - Most studies of Alpine ecosystems have focused on the roles that biological and environmental variables play in enabling plant colonization at high altitudes. Using Asteraceae as a model group, we seek to establish the relative contributions of polyploidisation, genome size, reproductive systems, and both chorological and ecological factors in enabling adaptation to alpine environments, integrated into a modern phylogenetic framework.

**Methods** - We are using flow cytometry to provide data on the ploidy level, genome size, and reproductive mode of the studied species. We plan to link ecologic with evolutionary relationships using phylogeny-informed models to capture trends across taxa. With existing and new genomic data, we will produce a scaffold phylogeny for the Asteraceae of the Alps, allowing us to disentangle traits' phylogenetic signals and test for ecological correlations. Furthermore, a novel automated pollinator monitoring system (Rana) is being used to survey pollinator visits in a mixed-ploidy population of *Senecio doronicum* in the SW Alps (France), to investigate pollinator-mediated consequences of polyploidisation. These data will be combined with inflorescence morphospace analyses, to compare reproductive traits of Asteraceae lineages throughout the elevation range and spectrum of cytotype diversity.

**Results** - So far, our results have revealed very limited intraspecific cytotype diversity within populations and across altitudinal zones. Between species, we have found that odd-ploidy levels (e.g. 3x, 5x) are significantly associated with an increased probability of apomixis. Apomictic species also flower significantly earlier than sexual ones, although there is no correlation with altitude.

**Conclusions** - Despite the potential advantages of apomixis (e.g. more rapid seed development, independent of pollinators), our results suggest that this trait is not selected for, but may rather be the product of intrinsic genomic processes. Gaining further insights into the relationship between polyploidy and apomixis will be essential to understand the role that these genomic processes play in enabling plants to evolve and adapt to high altitude environments.

11:55 – 12:10

## ***Festuca* in the (Southern) Alps – still an open construction site**

Peter Englmaier<sup>1</sup> and Thomas Wilhalm<sup>2</sup>

<sup>1</sup> Faculty of Life Sciences, University of Vienna, Althanstraße 14, 1090 Vienna, Austria

<sup>2</sup> Museum of Nature South Tyrol, Bindergasse 1, 39100 Bolzano, Italy

**Background and Aims** - Dealing with the genus *Festuca* is an ongoing challenge, be it for taxonomists or even more for practical application such as flora mapping and nature conservancy. Even though many new insights in the morphology, cytology and species distribution of single species groups have been gained in the past decades, there are still numerous open questions on taxonomy and distribution of single taxa.

First of all, the focus of attention lies on the ploidy cascade in the *Festuca valesiaca* group (2x, 6x, 8x, 10x). Other important questions concern the diploid and hexaploid members of the *F. varia* group and the *F. rubra* group including *F. nigrescens*, *F. microphylla*, and several mysterious "*F. asperifolia*"-records.

Such questions, before ultimately answered, need first to be recognized properly and named correctly, which is the aim of the present contribution.

**Methods** - Systematic fieldwork was done and, in the case of the *F. valesiaca* group, published and still unpublished karyological and molecular genetic results performed by S. Arndt, Jena, are interpreted.

**Results** - Among the *F. valesiaca* group, 8x and 10x-taxa seem to have evolved independently several times, during the late Pleistocene and Holocene, the western and eastern populations being more similar to each other, while those of the middle and Southern Alps are more isolated.

As a counterpoint, the 2x and 6x representatives of the *F. varia*-group show pronounced vertical interlock.

**Conclusions** - Due to the high complexity of – in particular – the *F. valesiaca* group in the Southern Alps, extending to the Western Alps, even to the Massif Central and the Northern Apennines, several improvements of the taxonomic concept are inevitable.

12:10 – 12:25

## **Reproductive ecology and phylogeography of a self-compatible alpine specialist, *Primula halleri* (Primulaceae)**

Jurriaan M. de Vos<sup>1</sup>

<sup>1</sup> University of Basel, Department of Environmental Science-Botany, Herbaria Basel, Totengässlein 3, 4051 Basel, Switzerland

**Background and Aims** - Pollinator-limited environments, such as those at high elevations, are thought to promote the evolution of self-compatibility, because selfing can provide reproductive assurance when outcrossing fails. Self-compatibility should also alleviate mate limitation, enhancing the re-colonization capacity of a species after glacial retreat. However, some self-compatible, alpine species avoid autonomous self-pollination by spatially separating anthers and stigma within flowers (herkogamy). The ecological and evolutionary consequences of herkogamy in alpine species remain unclear.

**Methods** - *Primula halleri* is a South-Alpine homostylous species with variable herkogamy that evolved from a heterostylous, self-incompatible ancestor. Field experiments, genetic (microsatellites), and morphometric data were employed to elucidate the reproductive ecology and phylogeography of the species.

**Results** - Microsatellites suggest that the species colonized the Alps from the Balkans. It shows a decrease in herkogamy during anthesis of individual flowers, which allows for delayed autonomous self-pollination when outcrossing fails. In consequence, individuals without herkogamy at the end of anthesis display selfing rates that vary but the seed sets are consistently high. Individuals with more herkogamy at the end of anthesis, in contrast, typically sire outcrossed seed, but quantities vary.

**Conclusions** - Herkogamy has profound effects on multiple aspects of the species' reproductive system. It is possible that the species' mixed mating system promoted the presumably recent re-colonization of the Alpine arc by alleviating mate limitation, while ensuring sufficient opportunity for outcrossing.

12:25 – 12:40

## **What about extrafloral nectaries in European temperate zones? Answers from the Swiss Southern Alps**

Brigitte Marazzi<sup>1</sup>

<sup>1</sup> Museo cantonale di storia naturale, Viale C. Cattaneo 4, 6900 Lugano, Switzerland

**Background and Aims** - Extrafloral nectaries (EFNs) mediate one of the most common ant-plant mutualisms. The EFNs secrete a sugary reward to attract the ants that, in return, defend the plant from herbivores. These interactions are abundant and well documented in tropical and subtropical habitats, whereas they are comparatively poorly studied in temperate zones, particularly in Europe, where they appear nearly absent. Here, I present results from a collaborative project that explores the systematic diversity of EFNs, their functionality and seasonal patterns in nectar secretion and interaction with ants in the flora of the Swiss Southern Alps.

**Methods** - A working list of potential species with EFNs in the flora of Cantone Ticino was used to field-check presence of functional EFNs and ants visiting them. In selected taxa subjected to the same weather conditions, activity of EFNs and ants (abundance) was regularly surveyed in natural populations, during almost two years, starting in Winter (February 2016).

**Results** - EFNs are present in at least one fern and 25 angiosperm species from 12 families, half of which are exotics. EFNs were functional and attracting ants in most species that differed in their nectar secretion period due to different phenologies of their EFNs. EFNs were active and ants present already in late Winter (early March), though most activity in native species was in Spring, while that of non-natives extended into Summer. Total ant abundance on EFNs was relatively low (up to 5 individuals, only sometimes up to 10 or more).

**Conclusions** - As expected, the Swiss Southern Alps are comparatively poorer in EFN-bearing species than tropical or subtropical floras, although exotic species contribute to such diversity. Indeed, exotics might also shape seasonal nectar availability, likely representing an additional food source for local ant communities and raising new questions about their role in the ecosystems where they occur.

15:15 – 15:30

## **Changes in land use are a main driver of recent plant biodiversity shifts in Swiss Alpine grasslands**

Constantin E. Pöll<sup>1</sup> and Jürg Stöcklin<sup>2</sup>

<sup>1</sup> University of Innsbruck, Department of Botany, Austria

<sup>2</sup> University of Basel, Department of Environmental Sciences, Switzerland

**Background and Aims** - One of the most burning questions for conservation biology is how species and habitat protection may stop and even reverse the loss of biodiversity. In grasslands of the Swiss Alps, land-use changes motivated by socio-economic pressure are among the strongest threats for biodiversity. Here, we asked whether biodiversity losses can be reversed by appropriate incentives to farmers.

**Methods** - In a long-term study we explored plant diversity in 202 grassland parcels at three altitudinal levels in 12 municipalities in the cultural landscape of the Swiss Alps. Diversity of these grasslands was assessed a first time in 2002/03. It was shown that the number of land-use types is positively correlated to plant species richness in municipalities. Moreover, the type of land-use influenced species-richness in parcels the most. Land use changes in the past had decreased plant species diversity considerably. Recently, the Swiss system of financial incentives for farmers was changed in order to promote biodiversity and maintain traditional use of alpine grassland. Therefore, we re-examined the previously studied parcels in 2014/15, to assess (1) changes in land-use, (2) their impact on plant diversity, and (3) which aspects of current conditions and changes contributes the most to shifts of diversity.

**Results** - We found a surprisingly high change in land-use over the relatively short time of 12 years. Although land-use intensification and abandonment are still ongoing, transitions to less-intensive land-use types were predominant in 9 villages indicating a positive response to incentives. Most of the recent land-use changes occurred at the bottom of valleys, whereas least of them occurred at the alp level. The overall shift towards land-use extensification increases in parcel heterogeneity, plant diversity, and number of Red List species.

**Conclusions** - The recent changes of the financial incentive system of Swiss agropolicy seem to have successfully influenced the type of land use by farmers in Swiss mountain grassland. By supporting extensification, further diminution of fertilizer utilization, landscape element diversity, and recultivation of fallows, the negative biodiversity trends observed until 2002/03 were alleviated.

15:30 – 15:45

## **Successful restoration of abandoned terraced vineyards and grasslands in the Canton Ticino, Switzerland**

Denise Binggeli<sup>1</sup>, Hans-Peter Rusterholz<sup>1</sup> and Bruno Baur<sup>1</sup>

<sup>1</sup> Department of Environmental Sciences, Section of Conservation Biology,  
University of Basel, St. Johannis-Vorstadt 10, 4056 Basel, Switzerland

**Background and Aims** - Traditionally managed terraced landscapes are characterized by a high structural diversity providing habitats for many different plants and animals. Due to the cessation of traditional management practices, especially in remote valleys and on steep slopes, forest areas are expanding and the species-rich open habitats became overgrown by shrubs and trees. Local organizations (APAV, ProLinescio) initialized the restoration of such abandoned terraced areas in several communities situated nearby and within the perimeter of the projected "Parco Nazionale del Locarnese". The study aimed to assess the potential success of restoration accompanied with a resumed extensive management on the species diversity of vascular plants on terraced vineyards, meadows and pastures.

**Methods** - We considered two different types of land use: Vineyards and grasslands (meadows and pastures). We investigated three study areas in both types of land use and three different types of land management in each area: Permanently used (> 100 years), abandoned (50 years) and restored (10–15 years ago) areas. The duration of abandonment of restored and abandoned areas are comparable. The vegetation assessment was conducted once in early summer and once in autumn 2016.

**Results** - Plant species richness and plant diversity (Shannon index) were both reduced in abandoned areas compared to the corresponding areas of permanently used and restored vineyards and grasslands. However, plant species richness, diversity and composition did not differ between the restored and the permanently used vineyards and grasslands.

**Conclusions** - The results of the present study demonstrate a successful restoration of the characteristic plant species composition of vineyards and grasslands within ten to fifteen years after several years of abandonment. The restoration of areas cultivated in the past do not only foster the landscape diversity, but also the successful preservation of the characteristic vegetation of vineyards and grasslands.

15:45 – 16:00

## **Settlements as a source for the spread of non-native plants into suburban forests in Southern and Northwestern Switzerland**

Luca Gaggini<sup>1</sup>, Hans-Peter Rusterholz<sup>1</sup> and Bruno Baur<sup>1</sup>

<sup>1</sup> Department of Environmental Sciences, Section of Conservation Biology,  
University of Basel, St. Johanns-Vorstadt 10, 4056 Basel, Switzerland

**Background and Aims** - Urbanization is a major driver for biotic homogenization and can promote the dispersal of invasive non-native plant species, which are considered as a threat to native biodiversity. This study examined the roles of suburban settlements and of the surrounding landscape composition for the spread of non-native plants into adjacent forests in Southern and Northwestern Switzerland.

**Methods** - We selected 15 mixed deciduous forest sites situated adjacent to settlements and 15 control sites far from settlements in two distinct regions of Switzerland (regions of Lugano, Southern Switzerland and Basel, Northwestern Switzerland) to examine the role of suburban settlements for the spread of non-native plants into forests. In each study site we recorded the number and abundance of native and non-native species in three 4 m x 4 m plots, and we assessed various habitat and landscape characteristics in their surroundings (100 m radius).

**Results** - In both regions, forest sites adjacent to settlements harbored a larger number and a higher abundance of non-native plant species than forest sites far from settlements. Furthermore, non-native species were more frequent in forests close to roads and in sites surrounded by a large percentage cover of garden. All these effects were more pronounced in Southern Switzerland, a region with milder winter climate and a longer history of introductions of non-native plant species, than in Northwestern Switzerland.

**Conclusions** - Our study showed that settlements are a source for the spread of non-native plant species into suburban forests, and that the composition of the surrounding landscape matrix also affects the establishment of non-native plants. Considering the ongoing climate warming, also Northern Switzerland could experience in the near future an increased frequency of invasion of non-native plants. Therefore, knowledge from the more advanced invasion in Southern Switzerland can provide basic data to develop management action plans for the prevention of plant invasions in Northern regions.

16:00 – 16:15

## **Generative reproduction potential of *Pueraria lobata* in southern Switzerland**

Nicola Widmer<sup>1,2,3</sup>, Hans Ramseier<sup>1</sup>, Romina Morisoli<sup>2</sup>, Simona Crivelli<sup>3</sup>, Marco Conedera<sup>3</sup> and Gianni Boris Pezzatti<sup>3</sup>

<sup>1</sup> Hochschule für Agrar-, Forst- und Lebensmittelwissenschaften HAFL,  
Länggasse 85, 3052 Zollikofen, Switzerland

<sup>2</sup> Gruppo Protezione dei vegetali al Sud delle Alpi, Agroscope Centro di Cadenazzo, a Ramél 18, 6593 Cadenazzo, Switzerland

<sup>3</sup> WSL, Swiss federal institute for forest, snow and landscape research, Research Group Insubric ecosystems, a Ramél 18, 6593 Cadenazzo, Switzerland

**Background and Aims** - *Pueraria lobata* is a vine native to Asia that builds fast growing lianas, climbing on trees or infrastructures and covering whole landscape spots. It is on the black list of invasive exotic plants in Switzerland and is considered among the 100 most dangerous invasive species worldwide. In Ticino *P. lobata* is known to be currently growing as feral plant at least 38 locations, of which 8 are old enough to allow the vine to produce flowers and seeds. Although the vegetative reproduction is supposed to be the main spreading mechanism of *P. lobata* and low germination rates are reported in literature for the species, possible high germination rates in the field may represent an additional propagule pressure and an unwanted seed bank making eradication actions more difficult. This study aims to evaluate the contribution of the generative reproduction to the invasive potential of *P. lobata* in southern Switzerland.

**Methods** - The germination of seeds collected in Ticino in winter 2016-17 (8 sites) and in winter 2011-2012 (1 site) was assessed both in climate-chambers and outdoor. Depending on seed availability, for each site five repetitions of 50 mature seeds and 50 apparently immature seeds were used.

**Results** - The average germination rate for mature seeds of 2016 was 74.6 % in the climate-chamber and 75.2 % outdoors, while it was 26.5 % and 28.2 % respectively for apparently immature seeds. The 5-year old seeds had a germination rate of 66 % in the climate-chamber and 69.6 % outdoors for the mature and 14 % and 11.2 % for the immature ones, respectively.

**Conclusions** - The assessed germination rates of mature seeds of *P. lobata* in Ticino are clearly higher as those reported from the USA (7-17%) and confirm the appreciable generative regeneration of the species in the study area. Although long distance seed transport through animals remains very unlikely, the results advice for undertaking rapid eradication measures. Such measures will also have to take into consideration the possibility of a functional seed bank, as hinted by the still noticeable germination rates of the 5-years old seeds.

16:40 – 16:55

## **Val Grande National Park's Vascular Flora (Piedmont, NW Italy)**

Roberto Dellavedova<sup>1</sup>, Nicola M. G. Ardenghi<sup>1</sup> and Graziano Rossi<sup>1</sup>

<sup>1</sup> Department of Earth and Environmental Sciences, University of Pavia, Via S. Epifanio 14, 27100 Pavia, Italy

**Background and Aims** - Val Grande National Park (PNVG), located in the Lepontine Alps (NE Piedmont), with about 15,000 ha, was established in 1992 and it is notoriously known as the largest wilderness territory in Italy. It is an area of difficult access and despite evidences of botanical explorations in the past and in particular after the institution of the protected area, a current checklist regarding the whole park's area is still lacking, so the principal aim is to update the knowledge of the Park's vascular flora from XIX century on.

**Methods** - Three approaches have been followed: a) survey of historical herbarium specimens; b) check of historical and recent literature; c) exploration of unknown and neglected areas. Resulting data have been georeferenced using geographical coordinates (ED 1950) and simultaneously archived into a database.

**Results** - During the first year of research, Emilio Chioyenda's and Oliviero Boggiani's collections, containing the oldest specimens available from this area, have been checked, for an amount of 550 and 166 herbarium specimens, preserved at BOLO and FI respectively. Approximately 400 specimens have been collected in the field, with particular attention to critical taxonomical groups (e.g., genera *Alchemilla*, *Festuca* s.l., *Hieracium* s.l., *Rubus*). About 3,000 bibliographical records have been archived and at least 12,000 original field data observations have been collected and stored in the database.

**Conclusions** - Currently, the vascular flora of PNVG amounts to 1,276 taxa: among these, 1,158 are native, 118 are alien and 86 are protected. *Hieracium arolae* (Murr) Zahn was recorded for the first time in Piedmont, while 7 species [*Alchemilla connivens* Buser, *A. effusa* Buser, *A. fallax* Buser, *A. flavicoma* Buser ex Schröt., *Melica transsilvanica* Schur, *Rubus ulmifolius* Schott, *Trinia glauca* (L.) Dumort. subsp. *glauca*] are new or confirmed for the Insubric sector of this region. Our research, still in progress, is expected to produce an updated checklist of the Val Grande National Park vascular flora by the end of 2018.

16:55 – 17:10

## **Plant cartography between Lago Maggiore and Lago di Como**

Michael Kleih<sup>1</sup>

<sup>1</sup> Società Botanica Italiana

**Background and Aims** - In the nineties of the 20th century many groups in northern Italy started detailed floristic cartography projects based on the widely used CFCE grid used in the countries around Switzerland (except France). The aim was to find out the distribution of all species in a systematic way, considering also areas that were considered “uninteresting” by botanists in the past.

**Methods** - The studied area was subdivided into a grid of cells of slightly more than 5 x 6 km. Checklists were compiled for all of the about 50 cells. Each of them was visited in different seasons and at different altitudes over several years, making sure that all habitats were covered. Exchanges with botanists and enthusiasts in Northern Italy allowed to clarify many critical groups and to take into account the most recent results in research on systematics and taxonomy. In addition, the Region of Lombardy with its representative Gabriele Galasso got convinced to support these projects, helping also in setting up the project for the province of Varese and in revising herbarium specimens.

**Results** - The area barley know before the start of the project in the nineties was studied in detail allowing the creation of distribution maps. The distribution of several plants classified differently according to recent research, newly arrived in the territory or described as new species will be discussed.

**Conclusions** - The studied area has a notable variety of habitats ranging from sub-Mediterranean ones near the Lake of Como to nearly alpine areas, which can be found on the highest tops like Monte Lema, Monte Galbigea and Monte Generoso. There are many humid habitats in the south-western part of the province of Varese, but also very dry ones in the Tremezzina (Lake of Como) or on the outskirts of the airport of Malpensa. The results of the project will be published in a book with distribution maps and also photos of almost all species together with brief descriptions and notes.

17:10- 17:25

## Flora of the dolomite cliffs of Southern Ticino

Philippe Juillerat<sup>1</sup>

<sup>1</sup> Rafour 7, 2024 St-Aubin, Switzerland

**Background and Aims** - In 2016 and 2017 a systematic field research of the flora of dolomite cliffs of Southern Ticino has been started. The Insubrian Southern Alps are home to many rare or endemic species. Most of them can be found between Lake Como and Garda, but some of them reach Canton of Ticino on the western side. Although the Lugano Prealps have been extensively studied by swiss botanists over the last century, the steep relief and rough mountains could still hide some overlooked taxa.

**Methods** - The base of most reachable cliffs and rock outcrop between Cima dell'Oress (Cima di Fojorina massif), Monte Generoso, Monte San Giorgio and Monte Caslano were selected. To take care of the phenology, at least two visits at different periods in the season were organized for each site. The alpine flora has been inventoried by means of stabilized binoculars. Some tests with a drone were also realized.

**Results** - *Asplenium seelosii* has been discovered in Ticino and Switzerland for the first time. The presence of *Saxifraga hostii* subsp. *rhaetica* has also been confirmed in Ticino. The distribution of some rare taxa like *Phyteuma scheuchzeri* subsp. *columnae*, *Lomelosia graminifolia* and *Valeriana saxatilis* has been refined.

**Conclusions** - Most endemic species of the Bergamasque Prealps do not occur in the Lugano Prealps. This could be due to a lack of sufficient suitable habitats, but also to barriers impeding species migrations at different time periods, like the piedmont glaciers of Como, Brianza and Lecco during the Last Glacial Maximum.

17:25 – 17:40

## **Peculiarities in Red List assessments concerning the Southern Swiss Alps**

Michael Jutz<sup>1</sup>

<sup>1</sup> Info Flora, Altenbergrain 21, 3013 Bern, Switzerland

**Background and Aims** - In 2016 the new Red List of Swiss vascular plants was elaborated by Info Flora (the Swiss Flora National Data Center) and published by the Federal Office for the Environment. Out of around 2600 evaluated taxa, 28% were classified as threatened or extinct, and an additional 16% as near threatened. Compared to the last Red List published 14 years ago, the percentage of threatened taxa is lower. The Red List Index, which summarizes the overall threat situation, is lower as well, indicating a slight negative trend. This trend results from both a higher number of extinct species and many more near-threatened species.

For this talk, results that emerged during the Red List assessment have been analysed with regard to peculiarities of the biogeographic region of the southern Swiss Alps.

**Methods** - The main data source for the Red List revision were field controls realized with a citizen science approach. About 400 volunteers checked over 6000 historical locations of 800 target species. 850 localities of 200 target species were situated in the southern Swiss Alps.

**Results** - In southern Switzerland, the overall proportion of confirmed locations was the same as in the entire country. Here as well, the proportion varied greatly among different habitat types. Compared to the entire country, in southern Switzerland the proportion of confirmed locations was lower for species occurring in swamps, shores, dry grassland, fields and vineyards. On the other hand, for species occurring in forests or rocky habitats, the proportion was higher.

**Conclusions** - The results of the field controls give additional evidence to the general observation that in southern Switzerland, dry grassland and habitats depending on extensive agriculture are under particular pressure. Species in aquatic habitats may suffer from the small surface those habitats are occupying. We conclude that for the mentioned habitat types, challenges in conservation are even greater than in other regions.

## POSTER ABSTRACTS

(In alphabetical order of the presenting author)

---

### La vegetazione della Valle Onsernone e le sue dinamiche evolutive

Gabriele Carraro<sup>1</sup> e Pippo Gianoni<sup>1</sup>

<sup>1</sup> Dionea SA, Lungolago Motta 8, 6600 Locarno, Svizzera

**Introduzione e obiettivi** - La vegetazione forestale della Valle Onsernone (Ticino) è stata studiata e cartografata 100 anni orsono da Johannes Bär. Un documento scientifico raro nelle nostre valli alpine, utile alla comprensione della dinamica evolutiva e allo sviluppo di strumenti per la gestione della biodiversità degli ecosistemi forestali. Al fine di poter confrontare lo stato attuale con quello passato e formulare scenari di sviluppo futuro, si è resa necessaria una cartografia aggiornata da affiancare a quella di Bär. In un territorio come la Valle Onsernone, esteso più di 60 km<sup>2</sup>, accidentato e a tratti inaccessibile, produrre una cartografia di dettaglio con soli rilievi terrestri risulta difficile e molto oneroso.

**Metodi** - Per ottenere una cartografia di qualità è stato adottato un metodo di lavoro valorizzando cartografie terrestri esistenti, completandole con il rilevamento mirato lungo transetti per un totale di 10 km<sup>2</sup> di superficie cartografata. A partire da questi dati è stata avviata una modellizzazione estesa a tutta l'area sulla base di un Random Forest Model. Fra i diversi parametri esplicativi considerati, un contributo importante che ha incrementato l'affidabilità del risultato è costituito proprio dall'aspetto evolutivo a partire dai confronti con la carta della vegetazione forestale di Johannes Bär, un dato prezioso che ha permesso di meglio comprendere anche la distribuzione attuale della vegetazione sul territorio. Grazie alla cartografia e alle immagini storiche, a rilievi supplementari, all'impiego di immagini aeree e di droni per controlli mirati è stato possibile migliorare ulteriormente il risultato della modellizzazione e la qualità della cartografia della vegetazione forestale.

**Risultati** - Sulla base di questi risultati e di altri contributi in materia di storia forestale, di paesaggio, di palinologia, di condizioni climatiche locali, è stato possibile fornire un'immagine della dinamica intercorsa della vegetazione forestale della Valle Onsernone, del suo potenziale evolutivo considerando anche degli scenari legati ai cambiamenti climatici.

**Conclusioni** - Questo studio, oltre a dare dei risultati utili al progetto di Parco Nazionale del Locarnese e alla pianificazione delle foreste, ha permesso di applicare un metodo di cartografia su grande scala che potrà essere esteso ad altre superfici nel contesto alpino.

## **Polyloidization in the context of the glacial cycles: a case study from the alpine primrose *Primula marginata* (Primulaceae)**

Gabriele Casazza<sup>1</sup>, Luigi Minuto<sup>1</sup>, Florian C. Boucher<sup>2</sup>, Christophe F. Randin<sup>3</sup> and Elena Conti<sup>4</sup>

<sup>1</sup> Dipartimento di scienze della Terra, Ambiente e Vita, Università degli Studi di Genova, Corso Europa, 26, 16132 Genova, Italy

<sup>2</sup> Department of Botany and Zoology, University of Stellenbosch, Private Bag X1, Matieland 7602, South Africa

<sup>3</sup> Department of Ecology & Evolution, University of Lausanne, Biophore, 1015 Lausanne, Switzerland

<sup>4</sup> Department of Systematic and Evolutionary Botany and Botanic Garden, University of Zurich, Zollikerstrasse 107, 8008 Zurich, Switzerland

**Background and Aims** - Polyploid speciation has played a key role in the evolution of many species. However, the majority of newly formed polyploids is expected to go extinct, because they are rare, have fewer potential mates or may have lower competitive abilities than their co-occurring parental species. Changes in floral traits, breeding system and ecological niches have been proposed as important mechanisms to overcome this initial frequency-dependent disadvantage. Yet, recently, it was hypothesized that other mechanisms such as dispersal capacity or biogeographical history may enable polyploids to establish and persist. Our aim was to understand the drivers behind origin, establishment and persistence of *Primula marginata* polyploids co-occurring and hybridizing with *P. allionii*, *P. latifolia* and *P. hirsuta*.

**Methods** - We used flow cytometry to determine the geographic distribution of cytotypes and nuclear sequences (ITS) to infer the auto- vs. allopolyploid origin of dodecaploids. Floral morphological traits and ecological niche characteristics among dodecaploids and hexaploids were quantified and compared.

**Results** - We did not detect any intermediate cytotypes or variation of ploidy levels within populations. Nuclear sequences indicate a close and complex evolutionary history for nuclear genomes of *P. marginata* cytotypes and *P. allionii*. Differences in floral traits are unlikely to enable the coexistence of different cytotypes. Furthermore, the results suggest the preservation of full distyly and no transition to selfing in dodecaploids. Finally, dodecaploids occur almost exclusively in environments that are predicted to be suitable also for their closest hexaploid relatives

**Conclusions** - Our results suggest that the dodecaploids of *P. marginata* are most likely of allopolyploid origin and that they have probably been able to establish and persist by occupying geographical areas not yet colonized by their closest relatives during post-glacial recolonization. Dispersal limitation and minority-cytotype exclusion probably maintain their current range disjunct from those of its parents.

## **Elaborazione di una guida pratica per la gestione della vegetazione ripariale lungo i corsi d'acqua nel Canton Ticino**

Mark Bertogliati<sup>1</sup>, Patrick Della Croce<sup>2</sup>, Brack W. Hale<sup>2</sup> e Giorgio Moretti<sup>3</sup>

<sup>1</sup> EcoEng SA, Arbedo, Svizzera

<sup>2</sup> Franklin University Switzerland, Sorengo (Lugano), Svizzera

<sup>3</sup> Ufficio della selvicoltura e del demanio, Bellinzona, Svizzera

**Introduzione e obiettivi** - Attualmente in Ticino (come in gran parte della Svizzera) mancano delle linee guida chiare ed esaustive all'indirizzo degli attori sul terreno (p. es. forestali) per la gestione della vegetazione ripariale lungo i corsi d'acqua. Con questo progetto vogliamo colmare questa lacuna e sviluppare una guida pratica che, tenendo conto del contesto ecologico, economico ed organizzativo del Cantone Ticino, permetta una gestione della vegetazione ripariale che, garantendo la sicurezza idraulica del corso d'acqua, ne mantenga – o ne migliori – gli aspetti ecologici.

**Metodi** - Il progetto, che verrà condotto fra il 2017 ed il 2018, prevede una prima fase di sintesi delle esperienze sull'importanza e la gestione della vegetazione ripariale (analisi bibliografiche e colloqui con esperti del settore). In un secondo momento, ci proponiamo di analizzare e valutare 20 casi rappresentativi di interventi selvicolturali (divisi fra torrenti di versante e di pianura) effettuati in Ticino nell'ambito del programma Riali Puliti dal 2008 in poi. Il progetto si concluderà, nell'autunno 2018, con lo sviluppo e la divulgazione delle linee guida.

**Risultati** - Visto che il progetto qui presentato è nelle sue fasi iniziali, questo poster presenterà solo parte di quanto menzionato sopra.

**Conclusioni** - Gli autori sperano però di stimolare una discussione a riguardo del progetto con esperti del settore e raccogliere suggerimenti da incorporare nel progetto. Il poster sarà in italiano con un riassunto in inglese.

## European *Primula* species recognition by chemotaxonomic traits

Paola S. Colombo<sup>1,2</sup>, Guido Flamini<sup>3</sup>, Graziella Rodondi<sup>4</sup>, Claudia Giuliani<sup>1,2</sup>, Laura Santagostini<sup>5</sup> and Gelsomina Fico<sup>1,2</sup>

<sup>1</sup> Dipartimento di Scienze Farmaceutiche, Università degli Studi di Milano, via Mangiagalli 25, 20133 Milano, Italy

<sup>2</sup> Orto Botanico G.E. Ghirardi, Dipartimento di Scienze Farmaceutiche, Via Religione 25, 25088 Toscolano Maderno, Brescia, Italy

<sup>3</sup> Dipartimento di Farmacia, Università di Pisa, via Bonanno 6, 56126 Pisa, Italy,

<sup>4</sup> Dipartimento di Bioscienze, Università degli Studi di Milano, Via Celoria 26, 20133 Milano, Italy

<sup>5</sup> Dipartimento di Chimica, Università degli Studi di Milano, via Golgi 19, 20133 Milano, Italy

**Background and Aims** - Since the beginning of the past century, a number of phylogenetic and chemotaxonomic works investigated the possibility of discriminating different *Primula* species. First of all, authors considered vacuolar and epicuticular flavonoids and saponins as marker compounds for a tentative recognition, whereas studies on volatile compounds emitted by leaves and flowers were carried out on a limited number of species.

Our primary goals in this work are: (i) to categorize the secondary metabolites isolated and identified in the genus *Primula* and (ii) to evaluate if they are suitable as markers for a taxonomic recognition at species level.

**Methods** - We specifically investigated the secondary metabolites composition related to primrose species through an in-depth analysis of the literature to find out molecules of different classes. These compounds were organized in various groups by their chemical classification and each group was evaluated for its potential chemotaxonomic value.

**Results** - The analysis of literature points out that some sugar alcohols are volemitol and hamamelitol, and their deriving sugars hamamelose and clusianose are peculiar to the genus *Primula*; therefore, they should be used for the recognition at genus level. Epicuticular flavonoids show a heterogeneous composition among primrose subgenera and some peculiar compounds can be used to distinguish different species. However, the lack of phytochemical data related to some of these species prevent any taxonomic hypothesis. The same consideration can be extended to tissue flavonoids, since they seem to be generally characterizing at species level, but the lack of data prevent to consider these compounds as markers. Volatiles are less studied than tissue compounds; among them, the main recognized constituents are terpenoids and phenylpropanoids. These substances present a greater level of variability because highly dependent from environmental pressure, so that they are less useful for chemotaxonomic purposes.

**Conclusions** - The data presented indicate a general lack of information to propose chemotaxonomic hypotheses in *Primula*, and the need for a better understanding of the role of the different metabolites production in plant/environment interaction. This implies that there are several areas of application for the study of *Primula* species, which deserve attention from the scientific community.

## Historical museum specimens reveal the loss of genetic and morphological diversity due to local extinctions in the endangered water chestnut *Trapa natans* L. (Lythraceae) from the southern Alpine lake area

David Frey<sup>1,2</sup>, Christoph Reisch<sup>3</sup>, Barbara Narduzzi-Wicht<sup>4</sup>, Eva-Maria Baur<sup>3</sup>, Carolina Cornejo<sup>2</sup>, Massimo Alessi<sup>1,5</sup> and Nicola Schoenenberger<sup>6</sup>

<sup>1</sup> Natural History Museum of the Canton Ticino, Viale C. Cattaneo 4, 6900 Lugano, Switzerland

<sup>2</sup> Swiss Federal Research Institute WSL, Biodiversity and Conservation Biology, Zürcherstrasse 111, 8903 Birmensdorf, Switzerland

<sup>3</sup> Institute of Plant Sciences, University of Regensburg, Universitätsstrasse 31, 93053 Regensburg, Germany

<sup>4</sup> Laboratory of Applied Microbiology, SUPSI, Via Mirasole 22a, 6500 Bellinzona, Switzerland

<sup>5</sup> Department of Biotechnology and Biosciences, University of Milano, Italy

<sup>6</sup> Innovabridge Foundation, Contrada al Lago 19, 6987 Caslano, Switzerland

**Background and Aims** - Freshwater aquatic plants are at increased risk for extinction due to strong human pressure and the patchy nature of their habitats. Yet the unclear structure of the plants' populations frequently hinders conservation planning.

**Methods** - To investigate population subdivision and risks to long-term survival of such species, we combined genetic, morphometric and biogeographical approaches to the example of the endangered water chestnut *Trapa natans* L. (Lythraceae) from the Southern Alpine lake region (Insubria).

**Results** - Amplified fragment length polymorphism (AFLP) revealed similar and intermediate levels of genetic diversity, of which 97% was partitioned within lakes. Thus, we found no signs of strong genetic drift and associated loss of genetic diversity, despite a reduction of approximately 52% of local populations since the early 19th century. Nuclear ribosomal sequences (ITS1-5.8S-rRNA-ITS2) combined with a morphometric study of nuts (based on fresh and historic museum material) revealed the presence of two genetically and morphologically slightly distinct lineages, of which one went extinct during the 20th century after a prolonged period of hyper-eutrophication.

**Conclusions** - Our results indicate the current presence of one large Insubric *Trapa* population. To prevent genetic risks to survival associated with small population size and increasing fragmentation due to past extinctions, freshwater managers should preserve the large census sizes still present in many Insubric lakes while reducing eutrophication.

## Reproductive biology of *Saxifraga florulenta* Moretti, a semelparous paleo-endemic of the Alps

Maria Guerrina<sup>1</sup>, Carmelo Nicodemo Macri<sup>2</sup>, Gabriele Casazza<sup>2</sup>,  
Enrica Roccotiello<sup>2</sup> and Luigi Minuto<sup>2</sup>

<sup>1</sup> Department of Plant Ecology and Evolution, Evolutionary Biology Centre (EBC)  
Norbyvägen 18D, 752 36 Uppsala Sweden

<sup>2</sup> DISTAV, University of Genoa, Corso Europa 26, 16132, Genoa, Italy

**Background and Aims** - The Maritime Alps are one of the ten biodiversity hotspots in the Mediterranean and a relevant biogeographical area in Europe because of the concentration of endemism and their possible role as long-persistence area of species. One of the most famous species of the Maritime Alps is *Saxifraga florulenta* Moretti, a monocratic paleoendemic species. According to the IUCN categories, *S. florulenta* is Vulnerable in Italy, though of Least Concern at global scale. Information about its reproductive biology is still lacking and understanding it may supply useful information on how the species may face the global warming. In this study we investigated the plant-pollinator interactions and the reproduction mode.

**Methods** - We evaluated the type of pollinators, described the phenology of inflorescence, quantified the reproductive success of the plants, and verified self and cross-fertilization.

**Results** - In *S. florulenta*, 70% of the observed floral visitors are common pollinators of other plants, mainly Diptera and Hymenoptera, suggesting a generalist pollination system. The inflorescence is a panicle, the blooming is sequential: starting with the larger terminal flower and continuing vertically from the bottom to the top along the main axis. Average fruit set and seed set were 94% and 76%, respectively. Flowers are protandrous allowing self- and cross-fertilization with an average seed set of 71% and 54% respectively.

**Conclusions** - *Saxifraga florulenta* takes advantage of its self-fertilization, which assures reproduction also in case of low pollinator service and harsh conditions. *Saxifraga florulenta* seems to be less exposed to pollinator decline due to global warming. An increase in self-fertilization might allow *S. florulenta* to cope with less pollinator visits potentially leading to a further decrease in its (already low) genetic diversity, reducing the adaptive potential of the species.

## Censimenti floristici alle Isole di Brissago (Cantone Ticino, Svizzera)

Sofia Mangili<sup>1</sup> e Brigitte Marazzi<sup>1,2</sup>

<sup>1</sup> Museo cantonale di storia naturale, Viale Carlo Cattaneo 4, 6900 Lugano, Svizzera

<sup>2</sup> Info Flora, c/o Museo cantonale di storia naturale, Viale Carlo Cattaneo 4, 6900 Lugano, Svizzera

**Introduzione e obiettivi** - Le Isole di Brissago sono note soprattutto per le specie esotiche dell'omonimo Giardino botanico, sull'Isola di San Pancrazio, ma ospitano una flora indigena spontanea altrettanto interessante, in particolare nella fascia ripuale e sull'Isola di Sant'Apollinare. Questo studio ha come scopo il censimento delle specie erbacee spontanee presenti alle Isole di Brissago, con particolare attenzione alle specie rare e minacciate delle rive.

**Metodi** - Nel corso del mese di ottobre del 2016, grazie al livello del lago eccezionalmente basso (192.36 metri s.l.m., media giornaliera), è stato eseguito un rilievo floristico lungo i tratti di riva emersi delle due isole, per verificare la distribuzione, l'abbondanza e lo stato di specie rare tipiche di questo ambiente. Nel 2017 sono state eseguite altre tre visite (a maggio, giugno e agosto) per censire la flora erbacea dell'Isola di Sant'Apollinare.

**Risultati** - In totale sono state rilevate 105 specie spontanee, indigene ed esotiche. Cinque specie caratteristiche delle rive sono iscritte nella Lista rossa svizzera: *Littorella uniflora* (EN) e *Gratiola officinalis* (VU) risultano relativamente abbondanti lungo le rive di entrambe le isole; *Ranunculus reptans* (EN), *Eleocharis acicularis* (VU) e *Cyperus fuscus* (VU) sono invece presenti con pochi individui in una sola stazione sull'Isola di San Pancrazio. Ai margini del prato dell'Isola di Sant'Apollinare, habitat di alcune specie indigene interessanti (*Narcissus poeticus* e *Serratula tinctoria* s.str.; VU), è stata trovata una specie esotica nuova per il Ticino: *Gnaphalium pennsylvanicum*.

**Conclusioni** - Questo studio ha permesso di verificare lo stato di specie spontanee rare e minacciate alle Isole di Brissago e di scoprirne di nuove. I dati raccolti saranno utilizzati per migliorare la gestione della vegetazione erbacea sull'Isola di Sant'Apollinare e per sensibilizzare i visitatori del Giardino botanico: per le rive con vegetazione ripuale a rischio di calpestio sono infatti stati allestiti dei pannelli informativi.

## **Traslocazione di una popolazione di *Aristolochia clematitis* L. (Aristolochiaceae), specie fortemente minacciata, a Melano, Cantone Ticino, Svizzera**

Sofia Mangili<sup>1</sup>, Brigitte Marazzi<sup>1,2</sup>, Guido Maspoli<sup>3</sup>, Daniela Scheggia<sup>4</sup> e David Frey<sup>5,6</sup>

<sup>1</sup> Museo cantonale di storia naturale, Viale C. Cattaneo 4, 6900 Lugano, Svizzera

<sup>2</sup> Info Flora, c/o Museo cantonale di storia naturale, Viale C. Cattaneo 4, 6900 Lugano, Svizzera

<sup>3</sup> Ufficio della natura e del paesaggio, Dipartimento del territorio, Via Franco Zorzi 13, 6501 Bellinzona, Svizzera

<sup>4</sup> Giardino botanico delle Isole di Brissago, 6614 Isole di Brissago, Svizzera

<sup>5</sup> Istituto Federale WSL, Zürcherstr. 111, 8903 Birmensdorf, Svizzera

<sup>6</sup> Dipartimento di Scienze dei Sistemi Ambientali, ETH Zurigo, Universitätstrasse 16, 8092 Zurigo, Svizzera

**Introduzione e obiettivi** - La distribuzione di *Aristolochia clematitis* sul territorio ticinese è frammentaria e il numero di popolazioni locali è in diminuzione. Per questo la specie è iscritta nella Lista rossa svizzera delle piante vascolari con categoria di minaccia 'fortemente minacciato' (EN). Per preservare l'unica popolazione di *A. clematitis* presente nel comune di Melano, che sarà distrutta da lavori stradali, nel mese di aprile 2017 è stata eseguita una traslocazione. In questo poster ne sono presentati il protocollo e i risultati preliminari.

**Metodi** - Per identificare dei siti idonei ad accogliere la specie, in base alla sua ecologia e con riguardo alle modalità di gestione, sono stati eseguiti dei sopralluoghi con censimenti floristici nel comune di Melano. Per la piantagione sono stati creati 6 blocchi di 2x2 metri, distanti 2-4 metri, e contenenti 25 piante ciascuno, distribuite in 5 quadrati di 50x50 centimetri. Il monitoraggio e la manutenzione primavera-estate 2017 consistevano nell'annaffiare le piante durante periodi di siccità prolungata e nell'estirpazione delle neofite presenti nei blocchi. In parallelo, presso il Giardino botanico del Cantone Ticino delle Isole di Brissago è stata avviata una coltivazione *ex-situ*. Per valutare e quantificare lo sviluppo della popolazione traslocata è previsto un monitoraggio, tramite conteggio degli individui sopravvissuti (tasso di sopravvivenza), dei fusti e della produzione di fiori e frutti, per il periodo 2018-2021.

**Risultati** - È stato scelto un sito che rispecchia il più possibile l'ambiente della specie, ossia gli orli nitro-termofili (*Alliarion*), non troppo distante dalla località di origine e su suolo pubblico (cantonale). In totale nel nuovo sito sono state traslocate 150 piante. Quarantaquattro individui sono invece stati piantati in vasi per la coltivazione *ex-situ* alle Isole di Brissago.

**Conclusioni** - Un primo esito della traslocazione potrà essere valutato solo nella primavera 2018. Una traslocazione rappresenta un grande carico di lavoro, realizzato solo grazie alla collaborazione di numerose istituzioni e volontari.

## The last of Swiss *Adenophora* (Campanulaceae)

Brigitte Marazzi<sup>1,2</sup>, Guido Maspoli<sup>3</sup> and Giuliano Greco<sup>4</sup>

<sup>1</sup> Info Flora, Lugano, Switzerland

<sup>2</sup> Museo cantonale di storia naturale, Dipartimento del territorio, Lugano, Switzerland

<sup>3</sup> Ufficio cantonale della natura e del paesaggio, Dipartimento del territorio, Bellinzona, Switzerland

<sup>4</sup> OIKOS 2000, Monte Carasso, Switzerland

**Background and Aims** - Conservation of highly endangered species can be challenging, especially when populations are geographically isolated, population size is small, and the natural history is unknown. This is the case of *Adenophora liliifolia* (L.) A. DC. (ladybell), an herbaceous perennial highly threatened in Europe and listed as critically endangered in the recent Red List of Switzerland (2016). The only known Swiss population occurs on Monte San Giorgio, meaning that Canton Ticino bears high responsibility for its conservation. In this bilingual poster, we present results from a pilot-project aimed at documenting the population's current situation (demography and ecology).

**Methods** - Field observations on Monte San Giorgio occurred on three non-consecutive days in the mesic grassland vegetation (*Tanacetum corymbosae-Molinietum arundinaceae*) hosting the ladybell. We recorded: number of individuals, plant size, phenological state, number of vegetative (leaves) and reproductive organs (buds, flowers, fruits), visits by potential pollinators, damages by different herbivores, and competition with other plants.

**Results** - We found more than 100 individuals, ranging from small sterile to taller reproducing plants up to c. 75 cm. Inflorescences rarely bear more than 20 floral organs; most produced no fruits or fruits aborted early. Herbivory damages were notable: consumption of the inflorescence by mammalian herbivores, consumption of leaves and floral parts by grasshoppers and beetles respectively, and wounds from sap-sucking insects. We observed one solitary bee and one fly that could act as pollinators. Generally, ladybells appeared suffocated by the dominant grass, *Molinia arundinacea* Schrank.

**Conclusions** - Although *A. liliifolia* population on Monte San Giorgio is small, it is slightly larger than expected. However, most of the young individuals likely derive from vegetative rather than sexual reproduction. Herbivory damages appear to contribute to the low observed fruit set. This pilot-project raises questions to be addressed in the near future, and that we hope to discuss with congress participants.

## LIST OF ALL PARTICIPANTS

---

<b>Name</b>	<b>Affiliation</b>
Fedele Airoldi	Società Botanica Ticinese
Franziska Andres	Trifolium
Erick Andrews	Franklin University Switzerland
Richard Arnoldi	
Matteo Arrighi	Università degli Studi di Milano
Daniel Bermudez	Franklin University Switzerland
Mark Bertogliati	EcoEng SA
Lorenzo Besomi	Cantone Ticino, Ufficio natura e paesaggio
Denise Binggeli	University of Basel
Sara Borella-Steinert	Franklin University Switzerland
Jessica Borgert	Franklin University Switzerland
Antonella Borsari	Società Botanica Ticinese
Micaela Campagnoli	Museo cantonale di storia naturale
Ivan Candolfi	Università di Berna
Gabriele Carraro	Dionea SA
Gabriele Casazza	Università di Genova
Anna Caspani	
Walter Cauzzo	
Bruno Enrico Leone Cerabolini	University of Insubria, DiSTA
Roberta Ceriani	Centro Flora Autoctona della Regione Lombardia
Paola Sira Colombo	Università di Milano, Dipartimento Scienze Farmaceutiche
Marco Conedera	Insubric Ecosystem Research Group WSL
Elena Conti	University of Zürich
Simona Crivelli	Swiss Federal Research Institute WSL
Michele Dalle Fratte	Università degli studi dell'Insubria
Rosella De Andreis	
Jurriaan de Vos	University of Basel
Patrick Della Croce	Franklin University Switzerland

Roberto Dellavedova	Università di Pavia
Stefan Eggenberg	Info Flora
Peter Englmaier	University of Vienna, Faculty of Life Sciences
Elizabet Faisman	Franklin University Switzerland
Gelsomina Fico	Università di Milano, Dipartimento Scienze Farmaceutiche
David Frey	Swiss Federal Research Institute WSL
Luca Gaggini	University of Basel, Section of Conservation Biology
Katherine Gannon	Franklin University Switzerland
Rodolfo Gentili	Università di Milano-Bicocca
Carlotta Giacometti	
Pia Giorgetti Franscini	Museo cantonale di storia naturale
Giuliano Greco	Oikos 2000 Sagl
Maria Guerrina	Evolutionary Biology Centre (EBC), Department of Plant Ecology and Evolution
Brack Hale	Franklin University Switzerland
Candida Haritz	
Oriane Hidalgo	Royal Botanic Gardens Kew
Rolf Holderegger	Swiss Federal Research Institute WSL
Alex Indermaur	
Mauro Jermini	Agroscope
Philippe Juillerat	
Michael Jutzi	Info Flora
Michael Kleih	Società Botanica Ital., Schweiz. Bot. Gesellschaft
Bärbel Koch	
Emma Lamy	Franklin University Switzerland
Andrea Brian Leo	Università degli studi dell'Insubria
Hans-Peter Linder	Universität Zürich, Institut für Systematische und Evolutionäre Botanik
Vera Lorenzetti	Università di Basilea
Lara Lucini	Museo cantonale di storia naturale
Alessio Maccagni	University of Basel
Tiziano Maddalena	Maddalena & associati Sagl
Yuri Malagutti	

Sofia Mangili	Museo cantonale di storia naturale
Brigitte Marazzi	Museo cantonale di storia naturale & Info Flora
Guido Maspoli	Cantone Ticino, Ufficio della natura e del paesaggio
Emiliano Medici	
Alexandra Meier	
Michela Meier	
Adrian Möhl	Info Flora
Giorgio Moretti	Canton Ticino, Ufficio della selvicoltura e del Demanio
Marco Moretti	Swiss Federal Research Institute WSL
Anton Moskvitin	Franklin University Switzerland
Vinciane Mossion	University of Neuchâtel
Gabriella Muñoz	Franklin University Switzerland
Varaidzo Ndebele	Franklin University Switzerland
Marco Nembrini	Oikos2000 Sagl
Gisella Novi	
Leandro Paganetti	
Nicola Patocchi	Fondazione Bolle di Magadino
Caitlin Payne	Franklin University Switzerland
Luca Pegoraro	Royal Botanic Gardens of Kew
Andrea Persico	Pro Natura Ticino
Gianni Boris Pezzatti	Swiss Federal Research Institute WSL
Lily Pifferini-Carter	
Lucia Pollini Paltrinieri	Museo cantonale di storia naturale
Constantin E Pöll	University of Innsbruck, Institute of Botany
Anita Python	
Filippo Rampazzi	Museo cantonale di storia naturale
McKenzie Reilly	Franklin University Switzerland
Giotto Roberti	
Neria Roemer	Museo cantonale di storia naturale
Sibyl Rometsch	Info Flora
Hans-Peter Rusterholz	University of Basel

Lia Sacchi	Oikos 2000 Sagl
Helder Santiago	Info Flora
Ivan Sasu	Consultati SA
Daniela Scheggia	Giardino Botanico, Isole di Brissago
Hansjörg Schlaepfer	Società Botanica Ticinese
Anna-Katherina Schoenenberger	
Nicola Schoenenberger	Innovabridge Foundation
Silvana Soldini	
Nitish Soundalgekar	Franklin University Switzerland
Jürg Stöcklin	University of Basel
Daniel Ston	Swiss Federal Research Institute WSL
Erika Taini	Università degli studi dell'Insubria
Pauline Thompson	Franklin University Switzerland
Rita Tognini	
Genevieve Totten	Franklin University Switzerland
Amanda Tuozzo	
Prisca Valenti	Museo cantonale di storia naturale
Manuela Varini	Società ticinese di scienze naturali
Alessia Vitalini	Museo cantonale di storia naturale
Wadi Luca Watfa	Franklin University Switzerland
William Wallace	Franklin University Switzerland
Miguel Weedn	Franklin University Switzerland
Nicola Widmer	Hochschule für Agrar-, Forst- und Lebensmittelwissenschaften HAFL
Thomas Wilhalm	Naturmuseum Südtirol
Mirko Zanini	Maddalena & associati Sagl











18 November 2017  
Museo cantonale di storia naturale  
Lugano, Switzerland  
[botanicasudalpina.ch](http://botanicasudalpina.ch)