



# Piano di gestione 2025-2031

Sito Patrimonio Mondiale  
ORTO BOTANICO  
UNIVERSITÀ DI PADOVA

## Orto Research Program Strategic Plan 2025-2028

*Advancing Plants Biodiversity,  
Resilience and Conservation  
Research*

# Table of contents

<b>Introduction</b>	<b>3</b>
<b>Mission and Vision</b>	<b>3</b>
<b>Goals</b>	<b>4</b>
<b>Implementation Plan</b>	<b>6</b>
Priority 1. Biodiversity	6
Priority 2. Resilience	8
Priority 3. Conservation	9
<b>Dissemination</b>	<b>12</b>
<b>Appendix A. Current Key Collaborations</b>	<b>14</b>

## Introduction

The research program at the University of Padova's Orto Botanico (the **Orto**) has been integral to its operations since it was founded in 1545. Originally dedicated to the medicinal properties of plants, the studies pursued by researchers have changed along with new research priorities, technology and scientific progress, and investigations today include genetics, cell biology, functional traits, evolution as well as the interactions between plants and microorganisms.

This document, the **Orto Research Program's Strategic Plan, 2025-2028**, describes Orto researchers' most important scientific endeavors and articulates the Program's mission and the visions, establishing its priorities and implementation plans for the next four years (2025-2028) to set a strong foundation for the future.

## Mission and Vision

The *mission* of the Orto is to **study, document and promote the knowledge and sustainable use of plant diversity**, as well as to better understand the importance of plants for the well-being of all ecosystems and for supporting human society.

The **Orto Research Program vision** is to implement this mission by focusing on three main themes: **Biodiversity, Resilience, and Conservation**. Together, these three interconnected themes create a framework for the research program at the Orto and provide a way to clearly convey research findings to colleagues and the public around the world.

### 1. Biodiversity.

Biodiversity, the rich variety of life on Earth, is essential for the stability and resilience of ecosystems. It supports everything from nutrient cycling and water purification to pollination and climate regulation. This diversity also underpins agricultural systems and pharmaceutical industries by providing a vast array of resources. However, with an estimated two-thirds of the world's biodiversity currently under threat, the potential loss could jeopardize not just the natural world but human health and economies as well. Building on this understanding, the Orto Research Program is dedicated to **developing innovative scientific methodologies and insights** to better understand plant biodiversity across various ecosystems, assessing the impacts of climate change and human activities to forge solutions that protect our planet's biological wealth.

### 2. Resilience.

Plants' survival hinges on their ability to respond and/or adapt to environmental conditions, a capability that becomes increasingly crucial in the face of climate change and habitat degradation. Investigating and documenting how different species acclimate and adapt to varying environments is essential for understanding their resilience. This research not only helps identify the strategies plants use to cope with stress but also aids in predicting which species are most likely to thrive or decline under changing conditions. **Such insights are vital for developing conservation strategies that enhance the adaptability and survival of plant species in their natural habitats.**

### 3. Conservation.

**The knowledge built in the first two themes is the basis supporting activities to conserve and increase biodiversity** working within parks and protected areas (conservation *in situ*), explore the genetic potential of species (germplasm) through the creation of seed banks, and look to reintroduce plants (conservation *ex situ*) in areas impacted by climate change and detrimental

anthropogenic activities. These activities align with the targets set in the [EU Biodiversity Strategy for 2030](#) and the [Biodiversity Research Policy](#) (that is part of the EU Research and Innovation Program) to better *conserve* ecosystems.

## Goals

Over the next four years, the **Orto Research Program** will focus its activities on the three themes of **Biodiversity**, **Resilience**, and **Conservation**, to achieve the goals outlined below.

### **Priority Area 1 [P1]: Biodiversity**

#### **Goal: Significantly contribute to global biodiversity initiatives**

Through population and herbarium genomics, the Orto has been able to successfully reconstruct the variation of genetic diversity in space and time for some key species, including several endemic alpine chasmophytes. Given these achievements, the Orto Research Program will help reconstruct the historical distribution of plants, their ecosystems, and our scientific methods for understanding these plants at the genomic level. Also, with the support of international collaborations, projects within this framework can contribute to global efforts to document and monitor biodiversity before it is irretrievably lost. Such collaborations will enhance our understanding of the most effective conservation strategies, helping to preserve the biodiversity that remains.

### **Priority Area 2 [P2]: Resilience**

#### **Goal: Innovate research around plant resilience**

As climate change compels species to adapt to new environmental conditions, understanding their functional traits and reproductive structures is increasingly crucial for conservation efforts. The Orto Research Program will study recent plant adaptations, offering valuable insights into plant survival strategies. This approach not only enhances our understanding of how plants respond to environmental stressors but also drives innovation in conservation strategies. In parallel, by focusing on the functional traits that determine a plant's adaptability and resilience, the program is on track to develop pioneering methods to safeguard biodiversity against the ongoing threats of climate change.

### **Priority Area 3 [P3]: Conservation**

#### **Goal: Become a recognized leader in conservation initiatives**

Conservation of biodiversity and the maintenance of healthy ecosystems are vital for the future well-being of all living organisms. Given the accelerated pressures of climate change, there is a pressing urgency to enhance these efforts. The Orto Research Program is poised to become a significant contributor in this field, leveraging its capabilities to culture samples from diverse environments—such as deserts, tropics, and Antarctica—and to implement advanced seed banking techniques. This initiative will establish conservation plots and conduct *ex situ* studies, utilizing a comprehensive approach that integrates genomic data (both spatial and temporal), functional traits (morphological and physiological), and distribution insights gleaned from herbarium records. By modeling and implementing best practices in integrative conservation genomics, the program seeks to define effective conservation units that incorporate these diverse data streams, providing a robust framework for preserving biodiversity in the face of environmental change.

## Implementation Plan

The research on the three priority areas will be implemented pursuing specific research objectives, as detailed below.

### Priority 1. Biodiversity

#### **P1. Objective a. Comprehensive biodiversity mapping across spatial and temporal scales**

The Orto Research Program will lead a focused research effort to explore the adaptive strategies of plant species with small or declining populations, as well as endangered species from the European Alpine arc. This research will encompass both genetic and epigenetic dimensions, assessing the extent of genetic erosion over time. By integrating herbarium genomics to analyze historical and current genetic diversity, the program will reveal the mechanisms behind these adaptations and their spatial and temporal patterns, ultimately building robust models to predict future responses to environmental change.

- **Timaeus project**, which focuses on herbarium genomics of endemic alpine plants, along with other initiatives to enhance the assessment of genetic erosion. This can be achieved by leveraging advanced herbarium and population genomics techniques, providing deeper insights into the genetic health and evolutionary trajectories of these vulnerable species.
- **Goethe's Palm Genome Project** to illuminate the history of Goethe's Palm, with a particular focus on the provenance of the individual specimen and how its genetic diversity compares to current wild populations.
- Develop effective **DNA barcoding methods** for plants at the Botanical Garden, focusing on Cycadales species from the Padova and Palermo collections. This project will re-evaluate and correctly classify specimens, addressing misidentifications and unidentified individuals. By targeting plastid loci with high universality and discriminatory power, the study enhances phylogenetic analysis and biodiversity characterization, providing critical insights into conservation challenges for this ancient and threatened group of gymnosperms.

*Orto research team:* Francesco Dal Grande (lead), Barbara Baldan (lead), Livio Trainotti (lead), Marco Canella, Tomas Morosinotto, Sebastiano Nigris, Francesco Petruzzellis, Garima Singh.

*Collaborators:* Emidio Albertini, Gianpiero Marconi (Uni Perugia), Patrick Griffith (Montgomery Botanical Centre, FL), Stefan Prost (University of Oulu, Finland), Andrea Scapin, Niccolò Forin (UniPd), Simone Marcolini, Elena Palmieri, Rosario Schicchi, Manlio Speciale (University of Palermo)

#### **P1. Objective b. Uncovering biodiversity patterns and dynamics in vulnerable ecosystems**

The Orto Research Program will drive efforts to uncover biodiversity patterns and dynamics within vulnerable ecosystems. Integrating cutting-edge genomic and ecological techniques, it will analyze biodiversity across a range of taxa and assess how environmental pressures have shaped species distributions and community structures over time. We will investigate how microorganisms contribute to plant health, soil fertility, and ecosystem resilience. By identifying genetic mechanisms regulating plant-microorganism relationships and focusing on interactions

among bacteria, algae, fungi, and plants, the program will enhance microbial biodiversity and develop strategies for conservation, promoting ecosystem resilience and stability.

- The Orto Research Program plans to spearhead a large-scale screening initiative to uncover "hidden" biodiversity within **desert ecosystems**. This effort will focus on applying comparative genomics to elucidate functional and adaptive pathways, such as secondary metabolites, symbiotic genome architecture, and stress response mechanisms. By expanding our living collection of microalgae from these extreme environments, we seek to deepen our understanding of how these organisms adapt to conditions like water scarcity, high temperatures, and intense sunlight.
- Orto researchers will participate in the collaborative effort to understand and protect Brazil's Atlantic Rainforest, one of the most biodiverse regions on Earth, alongside the Royal Botanic Gardens, Kew in the United Kingdom and the **Atlantic Forest Research and Conservation Alliance in Brazil (ARAÇÁ)**. Specifically, the program will sequence the genome of two Brazilian tropical forest fig trees to assess their health and risks in a changing climate. Through this **Fig Tree Biodiversity Project**, Orto researchers will establish the Orto as a center for genomic analysis, helping partners to better understand the mechanisms controlling species distribution, growth traits, and other vital processes like aging.
- Orto researchers will participate in the **Red Verde project**, which explores the disturbance ecology of epiphyte communities in the mesic tropical forests of the Sierra y Huasteca region in eastern Mexico. This project, spearheaded by an international consortium of experts from the University of Padova, Mexican partners, and the **field station CICHAZ (Centro de Investigaciones Científicas de las Huastecas "Aguazarca")**, focuses on assessing the impact of disturbances on forest ecosystems, particularly tree size distributions and epiphyte diversity. Using ecological modeling, the project will predict disturbance effects on epiphyte diversity by integrating environmental, functional, and phylogenomic data. Additionally, the initiative seeks to advocate for legal protection of endangered epiphytic species and establish robust management strategies.

*Orto research team:* Francesco Dal Grande (lead), Barbara Baldan, Tomas Morosinotto, Sebastiano Nigris, Garima Singh, Rhonda Struminger.

*Collaborators:* Alexander Antonelli (KEW Royal Botanic Gardens), Lisa Dalla Via (UniPd), Thomas Hasper, Samantha Koehler (Universidade Estadual de Campinas, Brazil), Fernando Maestre (King Abdullah University of Science and Technology, Kingdom of Saudi Arabia), Hortensia Parra (Universidad de Colima, Mexico), Gil Rosenthal, Lorella Navazio (UniPd), Nicoletta La Rocca, Alessandro Alboresi, Tommaso Anfodillo (UniPd)

## **P1. Objective c. Historical analyses of Orto Botanico collections**

In herbaria, history meets natural sciences, the past dialogues with the present. The amount of information and stories that are 'hidden' in botanical museums is incredible. It is essential to reconstruct the genesis, formation, and evolution of these collections, deepening their contents also through digitization projects. These lines of research explore the historical collections of the Botanical Museum of Padua, the personalities who worked there in the past, as well as the history of the Botanical Garden and its collections, stimulating interdisciplinary research between history and science.



- **History and botany:** Pier Andrea Saccardo and his school. This project reconstructs the life, work and activity of Pier Andrea Saccardo (1845-1920), prefect of Padua's Botanical Garden in the late 19th/early 20th centuries. One of the world's most renowned mycologists, his most ambitious scientific project was the *Sylloge fungorum omnium*, a work he began in 1882 by classifying all species of fungi known at the time. The focus of the research is to examine the contribution made by Saccardo to the history of botany and to mycology, through the study of his works and his collections, but also the school of botanists that developed with him.
- **Achille Forti and his collections:** The study of biodiversity in history and science. The purpose of the project is to study the figure, the work and the collections of the Veronese botanist Achille Forti (1878-1937). He made significant contributions to the science of algology, becoming a point of reference for many algologists of the time. His botanical collections, the Algarium and the Diatom Gallery, are preserved in the Padua Botanical Museum, and the digitization of the algological herbarium is now ongoing. The research reconstructs Forti's scientific activity and the history of the Algarium and the Diatom Gallery, as archives of biodiversity.
- **The micro-worlds of galls:** The purpose of the project is to study and valorize the collection of galls (abnormal outgrowths of plant tissues, presenting a typical structure, caused by interaction with any one of various external organisms, such as insects, mites, bacteria or fungi), put together by Alessandro Trotter (1874-1967), pupil of Pier Andrea Saccardo (1845-1920), and housed today in the Botanical Museum of the University of Padua. This project will enumerate the samples of Trotter's cecidological herbarium; reconstruct the history of how cecidology was founded; raise public awareness on matters of biodiversity, by reflecting on the interspecific relationships that characterize the formation of galls.
- In collaboration with the Royal Botanic Gardens, Kew in the United Kingdom, through the Plant and Fungi Tree of Life (PAFTOL) project, the Orto Research Program is developing a method that utilizes **machine learning algorithms** to enable the **prediction of the sequencability of herbarium specimens**. This will facilitate a rapid and efficient prioritization of herbarium specimens for genetic analysis, ultimately saving both time and resources. Additionally, the program will develop innovative AI approaches to analyze digitized herbarium specimens and extract key ecological traits, enhancing our understanding of biodiversity and ecosystem dynamics through historical data.
- **The Herbarium of Silvia Zenari:** History of Botany and Women. This project studies, catalogues, and interprets the specimens of Silvia Zenari held at the Botanical Museum of Padova, and retraces her herbaria in other Italian and European museums. Moreover, the life and work of Silvia Zenari, one of the few Italian botanists of the time, will be addressed.

*Orto research team:* Elena Canadelli (lead), Francesco Dal Grande (lead), Claudia Addabbo, Barbara Baldan, Tiziana Beltrame, Marco Canella, Yasaman Ranjbaran, Luca Tonetti, Valentina Boscariol, Rossella Marcucci, Dalila Giacobbe, Giorgia Volpe

*Collaborators:* Mauro Mandrioli (University of Modena and Reggio Emilia), Gabriele Sales (UniPd), William Baker, Alexander Antonelli (KEW Royal Botanic Gardens), Nevio Dubbini (University of Pisa), Niccolò Forin (UniPd), Federica Bonacini (University of Roma Tre)

## Priority 2. Resilience

### P2. Objective a. Plants' functional traits and how they are adapting to climate change

The Orto Research program will deepen our understanding of plant functional traits and their adaptations to climate change by exploring photosynthetic biodiversity and the genetic, molecular, and hormonal mechanisms underlying key developmental processes across diverse plant species.

- **Photosynthesis**, the process by which plants, algae, and certain bacteria convert sunlight into chemical energy and biomass, is vital for understanding plant adaptation and acclimation to diverse environments. At the Padua Botanical Garden, we investigate photosynthetic activity in over 80 plant species spanning the phylogenetic diversity of Viridiplantae (Embryophyta). By continuously monitoring key environmental factors (e.g., light, temperature, and humidity) and evaluating traits such as leaf morphology and chlorophyll fluorescence, we uncover the complexity of photosynthetic adaptations and their role in enabling plants to thrive in varying conditions.
- Orto Researchers are coordinating an **EU project (MSCA-RISE EVOFRULAND)** involving 13 international research groups. This is an interdisciplinary network designed to elucidate the evolution of molecular signaling and capture the crosstalk among different players that underpin the **development of the fruit/ fruit-like structures**. The focus will be on: the functional evolution of transcription factors (TFs) known to be of fundamental importance in fruit/ fruit-like structures reconstructing and comparing which genes are involved in eudicots both in dry and fleshy fruit development, the hormonal signaling (mainly auxin, but also gibberellic acid and cytokinin) involved in the coordination and synchronization of the developmental steps of fruit/fruit-like development.

*Orto research team:* Alessandro Alboresi (lead), Barbara Baldan (lead), Tomas Morosinotto, Silvia Moschin, Sara Natale, Sebastiano Nigris, Elisabetta Offer, Cecilia Zumajo-Cardona,

*Collaborators:* Lucia Colombo, Martin Kater (University of Milan), Leonardo Bruno, Antonella Muto, Barbara Ambrose (NYBG), Cristina Ferrandiz, Soraya Pelaz, Gerco Angenent, Stefan De Folter, Marcelo Dornelas.

### P2. Objective b. Water use and acquisition in the spectrum of plant functional strategies: a root-to-leaf perspective

Understanding the fundamental trade-offs among functional traits that shape plant ecological strategies is a central goal in studying plant functional diversity. The "Leaf Economic Spectrum" (LES) has identified key trade-offs, distinguishing species along an "acquisitive-conservative" gradient. Accordingly, it is possible to distinguish between species with a conservative strategy (i.e., investing more resources in the construction of leaves, which have a longer lifespan at the expense of slower growth) from species with an acquisitive strategy (i.e., growing faster due to reduced leaf construction costs, but more vulnerable when growth conditions are not optimal). However, only functional traits related to carbon and nutrient use and acquisition have generally been considered in this type of analyses, often overlooking functional traits related to water use and acquisition, such as drought resistance and efficiency of water transport. Furthermore, previous research has predominantly examined trade-offs at the leaf or stem level, while trade-



offs at the root level, which are increasingly recognized as critical to plant growth and environmental responses, remain underexplored.

The UniPD Orto Research Program will expand our understanding of plant ecological strategies by investigating traits related to water use and acquisition at the leaf, stem, and root levels.

Specifically, Orto researchers will:

- Refine and develop new experimental procedures to measure water relations and hydraulic traits across plant organs;
- Improve our understanding of how water use and acquisition traits at multiple levels (leaf, stem and root) contributes to the spectrum of plant functional strategies;
- Assess potential shifts of plant functional strategies at the community level in response to environmental changes.

*Orto research team:* Francesco Petruzzellis (lead), Francesco Dal Grande, Tomas Morosinotto

### *Priority 3. Conservation*

#### **P3. Objective a. Strengthening the Germplasm Bank for the Conservation of Plant Genetic Resources**

The Orto Research Program is dedicated to strengthening its germplasm bank and fostering partnerships to enhance the conservation of plant genetic diversity, with a particular focus on Alpine flora. Through expanding collections, improving storage methods, facilitating research, and collaborating with local, national, and international organizations, the program will help protect endangered species, preserve biodiversity, and promote ecosystem resilience in the face of environmental change. Specifically, Orto researchers will:

- Focus on targeted seed collections from the northeastern Alps, specifically alpine endemic plants, to represent their natural genetic diversity within the germplasm bank. Alongside this, we will conduct experiments using growth chambers, incubators, and other controlled environments to develop optimized germination protocols, enhancing our ability to conserve and restore these critical species.
- Continue and possibly expand collaboration with the 14 Alpine Botanical Gardens (see Appendix A) and the SEEDFORCE and RIBES networks. We intend to enhance and strengthen these partnerships to implement effective **quasi in situ conservation** projects. Our focus will be on conserving alpine flora through prioritization activities and population reinforcements of selected taxa.

*Orto research team:* Francesco Dal Grande (lead), Marco Canella, Tomas Morosinotto, Francesco Petruzzellis, Garima Singh, Maria Cristina Villani

*Collaborators:* Carla Lambertini (University of Milan), Costantino Bonomi (MUSE Trento), Andreas Gröger, Gudrun Kadereit, Joseph Kadereit (Munich Botanical Garden), Fabio Marroni (University of Udine), Špela Pungaršek (Slovenian Museum of Natural History)

### **P3. Objective b. Ex-Situ Conservation of Microalgae and Fungi**

We plan to become a leading center for the culturing and ex situ conservation of microalgae and fungi from diverse environments, such as deserts, tropical regions, and the Atlantic Amazon Forest.

This initiative will involve developing advanced cultivation techniques specifically designed for the survival and growth of these organisms outside their natural habitats. Additionally, we will establish a comprehensive repository that preserves these species while supporting research into their biological functions, resilience strategies, and potential applications in fields like biotechnology and ecosystem restoration, particularly in the face of climate change.

*Orto research team:* Francesco Dal Grande (lead), Alessandro Alboresi, Nicoletta La Rocca, Tomas Morosinotto, Garima Singh.

*Collaborators:* Alexander Antonelli (KEW Royal Botanic Gardens), Tommaso Anfodillo (UniPd), Fernando Maestre (King Abdullah University of Science and Technology, Kingdom of Saudi Arabia)

### **P3. Objective c. Integrative Conservation Genomics Best Practices**

We will find and propose best practices for integrative conservation genomics by combining genetic analysis of natural populations, functional trait studies, seed banking, and both *in situ* and *ex situ* conservation experiments, utilizing the unique strengths of botanical gardens.

- Building on the outcomes of the 8th Global Botanic Gardens Congress, held at the Singapore Botanic Gardens, Orto researchers will collaborate with leading institutions to promote a unified approach to conservation research. This initiative will emphasize the essential role botanical gardens play in biodiversity conservation. By integrating genetic research, functional trait analysis, and advanced conservation techniques, we will propose innovative strategies that strengthen both research and practical efforts to safeguard biodiversity, ensuring botanical gardens remain central to global conservation efforts.

*Orto research team:* Francesco Dal Grande (lead), Elena Canadelli, Marco Canella, Tomas Morosinotto, Garima Singh, Livio Trainotti

*Collaborators:* Alexander Antonelli (KEW Royal Botanic Gardens), Gillian Khew (Singapore Botanical Garden)

## Dissemination

The Orto Research Program needs to attract future research collaborations, students, and funding opportunities and can do this by promoting current research endeavors among University of Padova faculty, students, and current collaborators, as well as by expanding its online and social media presence to target academic communities around the globe. In addition, the Program's main results should be visible for Orto visitors as well.

Accordingly, there will be indicators throughout the Orto Botanico highlighting which components of the herbarium and which living plants (individual, like Goethe's Palm, or clusters, like what is found in the Alpine Rock Garden) are part of ongoing research projects. A logo will be created for easy distribution throughout the Orto exhibits that highlights one or all of **three themes** the research may align with: **Biodiversity**, **Resilience**, and/or **Conservation**.

Working with graphic designers, we will be developing a multipurpose logo so visitors to the Orto Botanico can see the research focus of the item on display.



### *Logo draft:*

The logo will integrate all three themes and will have an embedded QR code linking to the research section of the Orto Botanico's website.

The **research section of the Orto Botanico website** will be updated regularly and social media posts will be created in coordination with events, academic conferences, and public presentations.

**Goethe's Palm** will be the first focus area and model for how key aspects of the research program will be profiled and presented. New placards that incorporate research findings, and links to ongoing research, will be made available within the Orto Botanico so visitors will be able to understand the research and stay current with scientists' progress.

### **Events**

*Throughout the year* special exhibits and/or symposia will be scheduled to present findings or projects that involve Orto researchers.

*Spring.* A Spring Research Day, beginning in May 2025, will be organized to raise the visibility of the research program within the University of Padova community and among invited guests.

*Fall.* Orto researchers will continue to participate in Science4All activities.

## Appendix A. Current Key Collaborations

1. [Royal Botanic Gardens, Kew](#)
2. [Botanical Garden of Palermo](#) (DNA Barcoding)
3. [Charles University](#) (Prague, Czech Republic - Dryland Biobanking)
4. [MUSE](#) (Trento, Italy – SEEDFORCE and Timaeus)
5. [LOEWE Centre for Translational Biodiversity Genomics](#) (Frankfurt Am Main, Germany - Goetheome)
6. [Montgomery Botanical Center](#) (Miami, USA - Goetheome )
7. [New York Botanical Garden](#) (New York, USA)
8. [S.E.S.A. Spa](#) (Società Estense Servizi Ambientali) International Information Technology Group, based in Empoli Florence, Italy – Plant and microorganism interaction)
9. [University of Milan](#) (Milan, Italy - Plant Reproduction and Adaptation)
10. [University of Modena and Reggio Emilia](#) (Modena, Italy – Herbarium study of galls)
11. [University of Oulu](#) (Oulu, Finland – Timaeus)
12. Università degli Studi di [Udine](#) (Udine, Italy - SEEDFORCE)
13. Alpine Botanical Gardens: Jardin du Lautaret (France), Botanischer Garten München-Nymphenburg (Germany), Giardino Botanico Montano di Oropa (Italy), Giardino Botanico Lorenzoni (Italy), Giardino Botanico delle Alpi Orientali (Italy), Giardino Alpino Dario Broglio (Italy), Giardino Botanico Alpino Viote (Italy), Giardino Botanico Carsiana (Italy), Giardino Botanico Alpino San Marco (Italy), Giardino Botanico Alpino Valcava (Italy), Giardino Botanico Alpino Bruno Peyronel (Italy), Juliana Alpine Botanical Garden (Slovenia), Schynige Platte Alpine Garden (Switzerland), La Rambertia Alpine Garden (Switzerland)