

## **SCIENTIFIC EXPERIENCES FROM PEST ADVISORY IN VORARLBERG, AUSTRIA**

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**Abstract** The biological advisory service (BAS) of the “inatura-Erlebnis Naturschau Dornbirn” is a free service for the general public, authorities and professionals in the state of Vorarlberg (Austria). Pests and annoying intruders in houses and gardens appear as a main topic for the advisors. They are regularly confronted with new pests, mass occurrences and invasive alien species. The preferred migration corridors of selected species are explained. Some of the invaders enlarge their range naturally are forced by climate changes. Others have been introduced by worldwide trading activities.

**Key Words** *Argiope bruennichi*, *Cheiracanthium mildei*, *Cylindroiulus caeruleocinctus*, *Ectobius vittiventris*, *Harmonia axyridis*, invasive species, *Leptoglossus occidentalis*, mass occurrence, *Sceliphron curvatum*, *Scutigera coleoptrata*

### **INTRODUCTION**

The “inatura – Erlebnis Naturschau Dornbirn” is a museum for natural history in Vorarlberg (Austria). It was founded in 1960 by the state government and by the city of Dornbirn. In 2003 it was transformed into a limited liability company. Besides the classical challenges of a museum like exhibition, conservation and research, inatura also offers a biological advisory service (BAS). This service works on enquiries of the general public, mass media, authorities and professionals (e.g. pest controllers or physicians). A wide range of questions concerning animals, plants and fungi have to be handled. An increasing part of the consultants’ work is pest advisory in a broad sense, including troublemakers and intruders. The contract to fulfill the BAS is written down in the nature conservation law of Vorarlberg. This also includes the enforcement of public relations. The advisors constantly publish explanatory leaflets, articles and press releases. At present the advising team consists of three part-time biologists.

Vorarlberg is the most western state of Austria. It has an extension of 2.601 square kilometers and more than 374.000 inhabitants. The Alpine Rhine Valley and the Walgau are the zones with the highest population density. With more than 2/3 of the whole population they show a distinctive urban sprawl. The biggest city is Dornbirn with more than 46.000 inhabitants. In the east and south of Vorarlberg high mountain ranges form natural boundaries to the other states of Austria and to Switzerland. In the west the Alpine Rhine River marks the border to Switzerland and Liechtenstein, Lake Constance the region where Switzerland, Austria and Germany meet. In the north the soft foothills of the Alps form the border to Germany.

## MATERIALS AND METHODS

Enquiries to the BAS can be made personally, via telephone and e-mail. In many cases clients deliver specimen or samples for identification or they mail digital photographs. Many questions can be answered spontaneously or after consulting specialized literature or external partners. Sometimes outdoor activities are necessary, especially to survey mass occurrences or extraordinary phenomena.

Since 2003 all enquiries have been registered in annual advisory tables (MS Excel). Ideally these records contain the species or genus of the specimen, the purpose of the question, the location and circumstances of discovery and contact information of the client. In cases of particular incidents the complete e-mail correspondence is stored in digital files. Digital pictures, videos or sound samples complete the documentation. Selected specimen are preserved in alcohol or dried as further references.

## RESULTS AND DISCUSSION

### Annual Statistics

In the past ten years the amount of enquiries has increased to approximately 2.500 a year, especially the ones made by authorities and mass media. More than 100 interviews are given each year. The annual statistics show the number of enquiries classified according to systematic units, client cohorts and other characteristic values. They form an important reference for the authorities and a basis for the publication in *inatura's* quarterly magazine *inatura aktuell*. Many of the advisory records are directly forwarded to external scientists to support all-Austrian projects about single species (raccoons) or animal groups (exotic marsh turtles).

### Pests and Annoying Intruders

More than one third of the questions concern unwanted animals or pests in houses and gardens. Some of these enquiries regard vertebrates, particularly mammals like mice, martens, foxes or raccoons but also crows, snakes and others. However, there are many more bothersome intruders and pests among the arthropods. There are occurrences that do not need any measures, others can be treated easily by the clients themselves with the guidance of the BAS. Only some dangerous pests need to be combated by professional pest controllers. In Vorarlberg pests like cockroaches, bedbugs or pharaoh ants are not notifiable, therefore no universal statistics about their occurrences exist.

### Mass Occurrences

Since 2004 a mass occurrence of the millipede *Cylindroiulus caeruleocinctus* (Wood) in the small village of Röns (Vorarlberg) has been observed by Zimmermann (2013). During almost ten years the residents of three houses have been confronted with periodical appearances of thousands of individuals. The cause of this phenomenon is unknown (Passig and Scholz, 2007). Various methods were tested to protect the affected persons and to force back this pest. Strangely enough, this mass occurrence signifies the first recorded appearance of this species in Vorarlberg. *C. caeruleocinctus* is indigenous in Central Europe, but there are several gaps in the stocks. This species might have been accidentally imported with soil or agricultural products. Meanwhile ten further mass occurrences of *C. caeruleocinctus* in Vorarlberg have been documented by the BAS.

### Examples of Introduced Alien Species

The thermophilic Mud Dauber *Sceliphron curvatum* (F. Smith) is indigenous in Central Asia, its first European occurrence was in 1979 in southeastern Austria (Gepp 1995). From there it extended to all directions. Appearances were documented in 1994 by Aistleitner (2000) in Bregenz (Vorarlberg) and in 1998 by Schmid-Egger (2005) in Basel (Switzerland). This species has been regularly registered in Vorarlberg by the BAS from 2003 onwards (Table 1). The Harlequin Ladybird, *Harmonia axyridis*

(Pallas), was imported from Asia to control aphids in the glasshouses of the Netherlands and Belgium. The first European outdoor occurrence was observed in 1999 in Germany. In Vorarlberg *H. axyridis* was documented for the first time in 2006 by Rabitsch and Schuh (2006) in Götzis. In the same year the BAS registered three mass occurrences in Dornbirn, Feldkirch and Hittisau (Table 1).

The Western Conifer Seed Bug, *Leptoglossus occidentalis* Heidemann, originates from Northern America. Most probably it was accidentally imported to Europe with timber. In 1999 it was reported in northern Italy, six years later it reached Austria (Rabitsch and Heiss, 2005). In Vorarlberg *L. occidentalis* has been recorded by the BAS from 2009 onwards (Table 1). This bug is believed to have spread over Central Europe by its own efforts. But accidental transportations with garden products are possible as well.

**Table 1.** Numbers of individuals (*S. curvatum*, *L. occidentalis*) or mass occurrences (*H. axyridis*) of introduced alien species registered by the BAS since 2003.

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
<i>S. curvatum</i>	2	5	5	12	14	13	5	16	17	7	9
<i>H. axyridis</i>				3	8	85	17	7	41	23	7
<i>L. occidentalis</i>							4	4	6	6	17

**Table 2.** Number of individuals of invasive Mediterranean species registered by the BAS since 2003.

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
<i>A. bruennichi</i>	7	4	5	36	8	30	11	12	9	13	4
<i>E. vittiventris</i>							8	7	11	11	20
<i>Ch. mildei</i>											1
<i>S. coleoprata</i>											1

### Examples of Invasive Mediterranean Species

The Wasp Spider *Argiope bruennichi* (Scopoli) appeared in western and central Europe already 80 years ago (Auer, et al., 1989). According to the records of the BAS (Table 2) stocks in Vorarlberg have been increasing for more than 20 years. The field-dwelling cockroach *E. vittiventris* (Costa) has been registered in northern Switzerland from 1985 (Baur, et al., 2004). The first occurrence in Vorarlberg was in 2009 (Table 2). Three years earlier local pest controllers had probably been confronted with *E. vittiventris*.

The Northern Yellow Sac Spider, *Cheiracanthium mildei* L. Koch, appeared in southern Germany already 30 years ago (Muster, et al., 2008). First indications for its presence in Vorarlberg come from 2006. In 2013 the first proven specimen was registered by the BAS in Dornbirn (Table 2). The first appearance of the House Centipede, *Scutigera coleoprata* (Linnaeus), in Vorarlberg was documented by the BAS in Gaissau (A) in 2013 (Table 2). Observations from Switzerland and Germany show that this species occurs in many places along the High Rhine Valley and around Lake Constance.

## CONCLUSIONS

Being the first information facility for enquiries about all kinds of pests, mass occurrences and invasive species in Vorarlberg, the BAS offers the possibility to create awareness for new critical occurrences in the general public. Various thermophilic species spread their range from the Upper Rhine Valley eastwards along the High Rhine Valley and Lake Constance to Vorarlberg and neighbouring regions. These migration trends might be a reaction to local climate changes and have to be observed accurately.

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