

Simo hirticornis (Herbst, 1795) and S. variegatus (Boheman, 1943) in Switzerland : on their distribution and a reliable identification (Coleoptera, Curculionidae)

Autor(en): **Germann, Christoph / Moretti, Marco**

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Simo hirticornis (Herbst, 1795) and *S. variegatus* (Boheman, 1843)
in Switzerland — on their distribution and a reliable identification
(Coleoptera, Curculionidae)

CHRISTOPH GERMANN¹ & MARCO MORETTI²

¹ Natur-Museum Luzern, Kasernenplatz 6, CH-6003 Luzern and Naturhistorisches Museum der Burgemeinde Bern, Bernastrasse 15, CH-3005 Bern, Email: christoph.germann@lu.ch

² Swiss Federal Research Institute WSL, Insubric Ecosystems Research Group, Via Belsoggiorno 22, CH-6500 Bellinzona

Distribution patterns of *Simo hirticornis* and *S. variegatus* are presented for the first time for Switzerland based on an extensive data set of 1393 specimens, since the species state of *S. variegatus* was revised in 1995. New insights into their ecological requirements are presented. An additional morphological character to distinguish the two sibling species in Switzerland is further provided.

Keywords: Curculionoidea, Entiminae, morphology, ecology, sibling species, determination

INTRODUCTION

The genus *Simo* Dejean, 1821 was recently revised by Pierotti & Bellò (2006). Presently, *Simo* comprises four Mediterranean species, two of them — *Simo hirticornis* (Herbst, 1795) and *S. variegatus* (Boheman, 1843) — also occur in Central Europe. Although already described in 1843, *S. variegatus* was considered as a valid species only after Palm (1995), who showed for the first time relevant characters that allowed a reliable differentiation from the closely related *S. hirticornis*. Knu-telski *et al.* (1997) provided an overview of the distribution of the two species in Europe. Behne (1998) added *S. variegatus* in a supplement to the most often used identification key «Die Käfer Mitteleuropas». Just recently Heijerman (2002) deleted *S. hirticornis* from the species list of Denmark, Stejskal (2005) recorded *S. variegatus* for the Czech Republic and Braunert (2009) listed both species for Luxembourg. In synthesis, the overall distribution of the two species is as follows (after literature cited): *Simo hirticornis* (Locus typicus: Germany): France including Corse, Switzerland, north-western Greece, Netherlands, Germany, South of Sweden, Luxembourg, Poland, Czech Republic, Slovakia, Spain, Austria, Serbia, Croatia, and Italy. *Simo variegatus* (Locus typicus: Switzerland, Geneva): France (Corse doubtful), Switzerland, Denmark, Germany, Poland, Slovakia, Czech Republic, Hungary, Luxembourg, Austria, Serbia, and Italy.

The distribution of *S. variegatus* was little known in Switzerland so far, because of the late recognition of its species state. This lack of data was subsequently made up through an extensive data survey based on specimens from Museum collections, private collections, and material from scientific investigations of the Swiss Federal Research Institute (WSL hereafter) in the run up of a checklist of the Swiss weevils (Germann 2010). Furthermore, a new character for the reliable differentiation of the two species was found based on the specimens examined, which is presented and illustrated in the following.

MATERIAL AND METHODS

From the following collections specimens were examined (in alphabetical order):

BNM	Bündner Naturmuseum, Chur
cCG	collection Christoph Germain, Thun
cMG	collection Michael Geiser, Basel
cRG	collection Roman Graf, Luzern
cYC	collection Yannick Chittaro, Conthey
ETHZ	Eidgenössische Technische Hochschule, Zürich
IBUN	Institut de Biologie de l'Université de Neuchâtel
MHNF	Muséum d'Histoire Naturelle de Fribourg
MHNG	Muséum d'Histoire Naturelle de Genève
NMBA	Naturhistorisches Museum, Basel
NMBE	Naturhistorisches Museum der Burgergemeinde, Bern
NMLU	Natur-Museum, Luzern

Additional specimens were sampled by the WSL Bellinzona and Birmensdorf during several biodiversity surveys and specific studies in various regions of the canton Ticino (Brissago 696.850 / 107.600, Ronco s. Ascona 698.350 / 110.600, Locarno 703.300 / 114.700, Minusio 705.350 / 115.600, Gordola 709.900 / 116.600, Tenero-Contra 708.500 / 117.000, Pura 710.900 / 093.600, S. Antonino 720.100 / 112.100, Bolle di Magadino 709.050 / 112.850), Graubünden (Soazza 736.800 / 135.400), and Valais (Leuk 616.300 / 131.200).

All specimens were sampled with standard methods (Duelli *et al.* 1999). Litter dwelling species were sampled using pitfall traps, which consisted of 1 funnel recessed into the soil (opening diameter 13 cm) filled with a 2 % formalin solution, and protected from the rain by transparent roofs. Traps were emptied every week, mostly from April to September. Details about the projects by the WSL are available by the second author.

The first author identified 1393 *Simo* specimens in total. The identification was based on ectoskeletal characters, and the spermathecae that were obligatorily examined. The identification keys of Palm (1995), Knutelski *et al.* (1997), Behne (1998), and Pierotti & Bellò (2006) were used. The pictures of the setae on the elytral disc were taken with a digital camera (3 mega pixel, JVC) through a binocular (Leica MZ16). The images were modified with the program Auto-Montage (Synoptics) for best results in depth of sharpness, and then reworked using Adobe Photoshop version 10.0.1 (Adobe Systems Incorporated).

RESULTS

Geographical distribution

We examined 156 specimens of *Simo variegatus*, and 271 specimens of *S. hirticornis* from different collections in Switzerland (Appendix 1), as well as 738 specimens of *S. hirticornis* from central to southern canton Ticino, and 228 specimens of *S. variegatus* from the Valais, caught during biodiversity surveys of the WSL. All finding sites of the two species are presented (Figs 1 and 2). *Simo variegatus* was recorded in 12 cantons (Aargau, Basel, Bern, Freiburg, Genève, Graubün-



Fig. 1. Finding sites of *Simo hirticornis* (Herbst, 1795) in Switzerland (copyright CSCF).

den, Neuchâtel, Schaffhausen, Solothurn, Ticino, Vaud, Valais), *S. hirticornis* in 8 cantons (Bern, Freiburg, Graubünden, Neuchâtel, St. Gallen, Ticino, Vaud, Valais).

Vertical distribution

Based on the collection data, 99 sites of the 156 specimens of *Simo variegatus* were located at a mean altitude of 709 ± 397 m a.s.l. (min. 270 – max. 2006 m), while 147 sites of the 271 specimens of *S. hirticornis* were located at a mean altitude of 963 ± 439 m a.s.l. (min. 200 – max. 2200 m).

Morphology and discrimination characters

The morphological characters commonly used to identify the two species (see point 1 to 5 below) show some variability, as illustrated in the identification keys of Palm (1995), Knutelski *et al.* (1997), Behne (1998), and Pierotti & Bellò (2006), the latter with extensive illustrations.

In our study we identified a new character of the elytral setae (see point 6 below), that hardly shows any variability among the 1393 *Simo* specimens considered, especially when the antennal groove is polluted (see point 2 below), as it was often observed.

1. Width of rostrum (in *variegatus* wider compared with the most narrow point of the rostrum of *hirticornis*).

2. Scales between the eye and the antennal groove (in *variegatus* with isolated scales, in *hirticornis* with dense, overlapping scales).

3. Spermatheca (in *variegatus* with a large and thin cornus; the basis broader than in *hirticornis*).



Fig. 2. Finding sites of *Simo variegatus* (Boheman, 1843) in Switzerland (copyright CSCF).

4. Antennal articles (*variegatus* last articles before club transverse, stronger than in *hirticornis*).
5. Propygidium (in *variegatus* apically rounded or spatuliform, in *hirticornis* pointed).
6. New character: Setae on elytral disc (Fig. 3A: in *variegatus* dark, weakly bowed, raised setae on the intervals; Fig. 3B: in *hirticornis* with bright, strongly bowed, adherent setae).

DISCUSSION

Distributional Patterns

The geographical distribution of the two *Simo* species in Switzerland based on the museum specimens shows an apparent lack of records from the Northern side of the Alps and from Central Switzerland, as well as an almost complete lack of *variegatus* from Graubünden (*variegatus*: 4; *hirticornis*: 47 specimens) and the canton of Ticino (*variegatus*: 1; *hirticornis*: 52 specimens). The first lack of records is strongly suspected to be due to undersampling, whereas in the second case, other explanations are needed and provided. In the canton of Ticino, *hirticornis* clearly dominates, which was confirmed by intensive sampling at nine localities (see Material and Methods) and 738 specimens in chestnut forests. If the silicate ground is an explanatory factor, this could not be shown unambiguously, as *Simo variegatus* was also recorded on silicate grounds. Of particular interest thereby are records from Valais, where the underlying ground (silicate or limestone) apparently does not seem to have an influence. However, a decisive factor might be the exposition towards South and/or the degree of xerothermal biotopes, where *variegatus* can be found

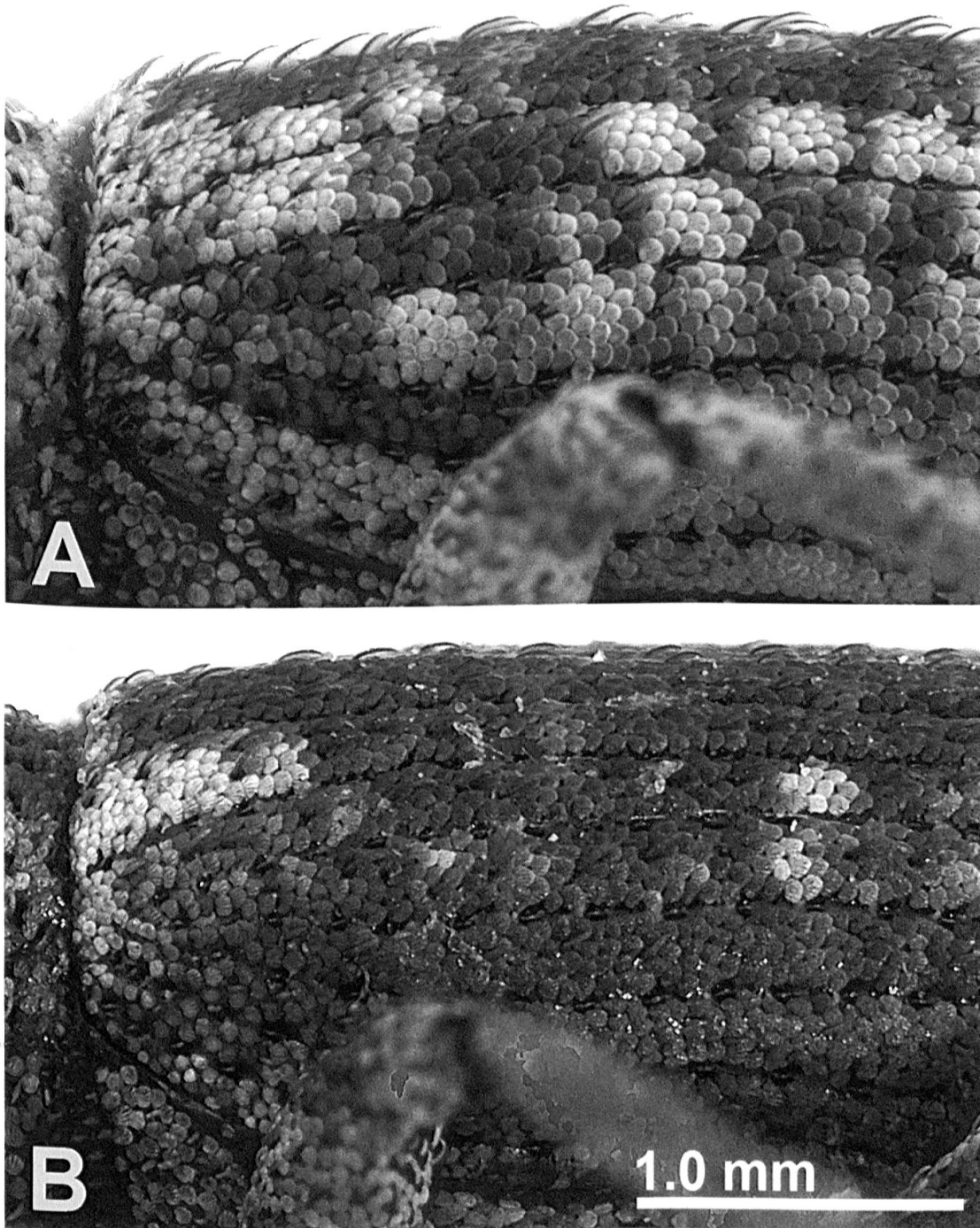


Fig. 3. A: *Simo variegatus* (Boheman, 1843): Switzerland, Valais: Chelin. — B: *Simo hirticornis* (Herbst, 1795): Italy, Piemonte: Gran Paradiso.

exclusively. This was shown impressively in a burnt forest area above Leuk, Valais (Moretti *et al.* 2010). Additionally, interesting insights into a transition-zone near Martisberg (Valais) were gained on an excursion in June 2008 where both *Simo* species were found in sympatry. The biotope consisted of an open *Picea abies* — *Pinus sylvestris* forest at 1300 m a.s.l., where xerotherm shrubs change into montane *Picea abies* forest.

A possible dependence of *variegatus* on an underlying limestone ground was suspected by Palm (1995) and Knutelski *et al.* (1997). However, already Stejskal (2005) did not confirm this hypothesis. Nevertheless, in the Jura Mountains (limestone) *hirticornis* was solely found in few exemplars, whereas *variegatus* seems to dominate.

As a conclusion, collection data (Appendix 1) and partly included data of biotopes of these finds (Germann, unpublished) in Switzerland show that *Simo hirticornis* lives in mixed forests, montane *Picea abies* forests (Northern side of the Alps), at forest edges, in gardens (Swiss Midlands) and in (chestnut-)deciduous forests (Southern Switzerland, Ticino), whereas *Simo variegatus* lives in southern exposed open *Pinus sylvestris* forests, partly mixed with xerotherm shrubs (Valais), *Quercus pubescens/petraea* forests (southern slopes of Jura Mountains) and in (garden-)hedgcs (Swiss Midlands).

Our study clearly shows that the vertical distributions of both *Simo* species in Switzerland is very broad and overlaps almost completely. However, *Simo hirticornis* was found on average at higher altitude than *variegatus*. This might be related to microclimatic preferences of the two species with *S. variegatus* preferring xerothermal biotopes and milder climate (Knutelski *et al.* 1997) compared to *hirticornis* whose distribution extends up to southern Scandinavia, whereas *variegatus* is absent there. Although our findings are overall consistent with the data known up to now, the broad overlap of the two species in their vertical distribution has not been shown so far.

Remarks on the biology of the two Simo species

For both species we present for the first time specimen rich data collections: *Simo hirticornis* in 738 specimens in canton Ticino, and *S. variegatus* in 228 specimens in the Valais above Leuk. Such contrasting biotopes, as chestnut forests in Ticino under Insubric climate conditions — mild and dry in winter, and rainy and hot in summer — or xerothermal slope with rocky steppe and conifers (*Pinus sylvestris*), and the continental climate (dry and winter-cold) in the Valais, are indeed colonised very specifically by each of the two species.

The sympatric occurrence of the two species — presently stated as a rare event after Knutelski *et al.* (1997) — was detected at various locations, namely in Bern (city of Bern), especially in the Valais (Bramois, Euseigne, Evolène, Martigny, Martisberg, Saas, St-Léonard, St-Maurice, Simplon), Ticino (Valle Verzasca) and Graubünden (Scuol, Tarasp). The sympatric occurrence of the two species in anthropogenically formed biotopes (e.g. botanical garden, city of Bern) might point out, that both species also spread out via ornamental shrubs and eventually, an original separation of biotopes might be blurred. In their foraging behaviour, both species are polyphagous on deciduous and coniferous trees and shrubs (Knutelski *et al.* 1997). In urban areas of Switzerland, both species were recorded on ornamental garden shrubs (*Cotoneaster* sp., *Prunus* spp.) as well as on herbaceous plants (*Primula* sp.) (Germann, pers. observations).

All specimens examined from Switzerland were females; both species show an exclusively parthenogenetic reproduction in a large part of the distribution area. Males of both species were only reported from Northern Italy (Piemonte) by Pirotti & Bellò (2006). Suomalainen (1954) found triploid and tetraploid specimens of *S. hirticornis* from Switzerland, however, without considering both taxa. A

re-examination of the specimens was unfortunately not possible, despite intensive investigations in the Finnish Museum of Natural History in Helsinki. The larvae of neither of the species has ever been described, nor is their larval development known. Nevertheless, as in other Entiminae, a predominantly ectophagous larval development on roots in the soil can be hypothesized.

Morphology

The determination of the two very similar species *Simo variegatus* and *S. hirticornis* is simplified with an additional reliable and conspicuous character; the setae on the elytra, especially on the elytral disc. This character is best visible if specimens are held in a lateral position (see Fig. 3). However, as this trait was only tested on the Swiss specimens available, we advocate for a further study the inclusion of more samples from various regions to verify its broader reliability. A combination of all characters is still the best guarantee for a confident discrimination of the two species.

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Appendix 1

Data basis for the maps of the finding sites of the two *Simo* species from various collections. Acronyms used: alt. = altitude in m a.s.l., coord. = Swiss coordinates, N = number of specimens.

canton/location	coord.	alt.	date	leg.	coll.	N
<i>Simo variegatus</i>						
AG/Reinach	656234	530	24.6.1923	P. Seiler	NMBA	1
AG/Schartenfels	666258	470	6.6.1892	P. Seiler	NMBA	1
AG/Schinznach	653255	360	-	-	MHNG	1
BA/Basel	611267	270	22.04.2000	Ch. Germann	NMBE	1
BA/Basel	611267	270	5.1936	G. Toumayeff	MHNG	1
BA/Basel	611267	270	21.5.1888	P. Seiler	NMBA	2
BA/Basel, Basler-Zoo	610266	270	22.7.2005	E. Sprecher	NMBE	1
BA/Basel, Basler-Zoo	610266	270	19.8.2005	E. Sprecher	NMBE	1
BA/Bruderholz	611262	360	6.1959	G. Toumayeff	MHNG	1
BE/Bern	600200	550	Juli 1896	C. Benteli	NMBE	1
BE/Bern	600200	550	15.06.1927	W. Burghold	NMBE	1
BE/Biel	585220	430	6.7.1898	A. Rätzer	NMBE	2
BE/Biel	585220	430	17.6.1958	-	NMLU	1
BE/Botanischer Garten	600200	500	09.04.1999	Ch. Germann	NMBE	1
BE/Pieterlen	592224	436	11.06.1906	A. Rätzer	NMBE	4
BE/Pieterlen	592224	436	23.5.1887	A. Rätzer	NMBE	4
BE/Pieterlen	592224	436	04.06.1906	A. Rätzer	NMBE	2
BE/Pieterlen	592224	436	11.06.1906	A. Rätzer	NMBE	1
BE/Spiez, Bürg	619170	600	03.06.1990	Ch. Germann	NMBE	1
BE/Uttigen	610182	544	5.1932	H. Pochon	MHNF	1
FR/Fribourg	578184	600	08.09.2002	Ch. Germann	NMBE	1
FR/Gibloux	570170	1200	1934	H. Pochon	MHNF	1
FR/Marly	577180	591	13.5.1934	H. Pochon	MHNF	1
FR/Pérolles	577182	650	-	-	NMLU	1
GE/Bavois, Mormont	532170	430	5.1979	G. Toumayeff	MHNG	1
GE/Genève	500118	375	01.05.1958	J. Rappo	MHNG	1
GE/Genève	500118	400	18.5.1939	A. Comellini	MHNG	1
GE/Genève	500118	375	5.1947	G. Toumayeff	MHNG	1
GE/Peñey	492117	372	-	H. Tournier	MHNG	1
GE/Sierne, Arve	503115	410	25.6.1987	J. Steffen	MHNG	1
GR/Mesocco	737139	777	2.8.1946	A. Comellini	MHNG	1
GR/Scuol	818187	1244	7.1938	G. Toumayeff	MHNG	2
GR/Tarasp, Kurhaus	816185	1150	5.5.2008	Ch. Germann	cCG	1
NE/Bois de l'Hôpital	567209	620	27.7.1977	F. Affolter	IBUN	2
NE/Enges	567212	850	26.5.1963	H. Pochon	MHNF	3
NE/Hauterive	564207	580	16.6.1977	F. Affolter	IBUN	1
NE/La Neuveville	573212	434	14.04.2001	Ch. Germann	NMBE	1
NE/Neuchâtel	561205	430	21.9.2006	Ch. Germann	cCG	1
NE/St-Blaise	565207	500	16.6.1977	F. Affolter	IBUN	1
NE/St-Blaise	565207	500	7.6.1977	F. Affolter	IBUN	1
SH/ Rüdlingen, Ischleg	685271	350	20.06.1990	S. Naglis	ETHZ	1
SO/Olten	635243	390	5.5.2006	M. Geiser	cMG	1
TI/Val Verzasca, Frasco	704133	885	22.7.1938	H. Pochon	NMLU	1
VD/Antagnes	567125	550	21.06.1912	A. Mathey	NMBE	1
VD/Chessel	558133	390	22.05.1991	L. Feller	NMBE	1
VD/Lavey	567118	490	6.1961	G. Toumayeff	MHNG	1
VD/Orny	530169	450	7.1988	G. Toumayeff	MHNG	1

VD/Roche	566199	430	28.5.1944	H. Pochon	MHNF	1
VD/Roche	566199	430	19.07.1955	P. Scherler	NMBE	2
VD/Roche	566199	430	21.05.1955	P. Scherler	NMBE	2
VD/Roche	566199	830	6.1978	G. Toumayeff	MHNG	1
VS/Ardon	586118	650	5.1980	G. Toumayeff	MHNG	3
VS/Bex	567122	428	07.05.1969	P. Scherler	NMBE	1
VS/Bramois	597120	500	26.6.1980	C. Besuchet	MHNG	1
VS/Branson	573108	400	6.5.1989	L. Feller	NMBE	1
VS/Branson	573108	460	2.5.1995	L. Feller	NMBE	1
VS/Bratsch	620130	1000	22.4.2007	W. Marggi	cCG	1
VS/Chelin	600123	780	31.05.1970	P. Scherler	NMBE	1
VS/Conthey, Mayens	590125	660	30.5.2004	Y. Chittaro	cYC	1
VS/Dorénaz	569110	460	3.5.1986	L. Feller	NMBE	1
VS/Euseigne	598113	970	7.1938	V. Allenspach	NMBA	2
VS/Euseigne	598113	970	08.06.1969	P. Scherler	NMBE	2
VS/Euseigne	598113	970	17.06.1909	T. Steck	NMBE	2
VS/Euseigne	598113	975	11.7.1954	P. Scherler	MHNG	1
VS/Evolène	604106	1371	24.4.1960	J. Rappo	MHNG	1
VS/Evolène	604106	1350	07.07.1987	C. Besuchet	MHNG	1
VS/Feschel	618131	1950	8.1979	G. Toumayeff	MHNG	2
VS/Gampel	623129	634	-	H. Pochon	NMLU	2
VS/Gantertal	646127	1200	11.08.1990	L. Feller	NMBE	1
VS/Laggintal	649114	1287	10.6.1939	H. Pochon	MHNF	2
VS/Leuk	615129	730	5.6.1938	H. Pochon	MHNF	1
VS/Leuk	615129	1450	17.5.2005	A. Pasche	cCG	9
VS/Leuk	615129	730	05.06.1936	A. Mathey	NMBE	3
VS/Martigny	571106	450	20.5.2006	Ch. Germann	cCG	2
VS/Martigny	571105	470	24.6.1939	V. Allenspach	NMBA	4
VS/Martigny	571105	470	24.6.1892	A. Rätzer	NMBE	1
VS/Martisberg	651137	1300	28.6.2008	Ch. Germann	cCG	2
VS/Mollens	606129	1100	A.7.1997	Ch. Germann	NMBE	1
VS/Pfynwald	614128	660	16.5.1937	H. Pochon	MHNF	1
VS/Pfynwald	614128	1400	23.4.2004	Y. Chittaro	cYC	1
VS/Pfynwald	614128	660	22.7.2007	Ch. Germann	cCG	2
VS/Pfynwald	610127	540	9.10.1888	A. Rätzer	NMBE	2
VS/Pfynwald	614128	660	16.5.1937	-	NMLU	1
VS/Praz-de-Fort	575093	1150	21.6.2007	Ch. Germann & M. Borer	NMBE	3
VS/Réchy	604123	-	6.1967	G. Toumayeff	MHNG	1
VS/Saas	640105	1679	Juli 1886	E. Bugnion	NMBE	2
VS/Sarvaz	579113	467	4.1969	G. Toumayeff	MHNG	1
VS/Sembrancher	578103	700	24.06.2001	Ch. Germann	NMBE	3
VS/Sembrancher	578103	700	3.7.1941	J. Simonet	MHNG	1
VS/Sembrancher	578103	700	1.7.1941	J. Simonet	MHNG	1
VS/Simplon	645122	2006	Juli 1877	A. Rätzer	NMBE	2
VS/St-Léonard	599122	505	5.1965	G. Toumayeff	MHNG	2
VS/St-Léonard	599122	1050	12.7.1986	D. Burckhardt	MHNG	2
VS/St-Maurice	568115	420	M.7.98	Ch. Germann	NMBE	4
VS/Sur Ardon	586118	490	10.05.1969	P. Scherler	NMBE	2
VS/Sur Saxon	580110	538	02.06.1971	P. Scherler	NMBE	1
VS/Val d'Hérens	602111	1650	11.7.1986	C. Lienhard	MHNG	1
VS/Val Ferret	576091	1900	-	A. Rätzer	NMBE	4
VS/Varen	613130	850	7.1973	G. Toumayeff	MHNG	1
VS/Vissoie	611118	1200	10.7.1962	A. Spälti	MHNG	2
total:						156

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<i>Simo hirticornis</i>						
BE/Bantiger	607202	920	27.05.1999	Ch. Germann	NMBE	4
BE/Bäriswil	606207	550	16.5.1971	-	MHNG	2
BE/Bern	600200	550	Juni 1896	C. Benteli	NMBE	7
BE/Bern	600200	550	Juni 1895	C. Benteli	NMBE	1
BE/Bern	600200	550	16.6.1891	A. Rätzer	NMBE	1
BE/Bern	600200	550	12.06.1926	W. Burghold	NMBE	1
BE/Bern	600200	550	22.05.1926	W. Burghold	NMBE	1
BE/Botanischer Garten	600200	500	09.04.1999	Ch. Germann	NMBE	1
BE/Gadmental, Wyler	670177	800	15.09.2001	Ch. Germann	NMBE	3
BE/Grimselpass	666163	1300	A.7.1998	Ch. Germann	NMBE	1
BE/Heimiswil	619212	822	27.6.2006	E. Kobel	cCG	2
BE/Huttwil	631218	640	6.1973	S. Kiener	MHNG	1
BE/Lyssach	610212	516	22.5.1978	S. Kiener	MHNG	1
BE/Meinisberg	593223	447	2.4.1939	H. Pochon	MHNF	1
BE/Ortschwaben	597204	585	-	-	ETHZ	1
BE/Rossgرابen	596186	682	5.1958	G. Toumayeff	MHNG	1
BE/Schwarzwasser	597184	700	26.06.1921	W. Burghold	NMBE	1
BE/Selhofen	602196	540	14.06.1928	W. Burghold	NMBE	1
FR/Salvenach	578196	560	Juni 1879	M. Leuenberger	NMBE	1
GR/Baselgia	768154	1650	17.06.1953	E. Handschin	BNM	1
GR/Bondo	763133	1000	7.1984	G. Toumayeff	MHNG	1
GR/Brusio	807126	780	20.07.1971	P. Scherler	NMBE	2
GR/Cabbiolo	736132	440	13.5.1968	W. Wittmer	NMBA	3
GR/Campascio	808125	635	31.07.1969	P. Scherler	NMBE	1
GR/Campocologno	808124	600	25.8.1966	C. Besuchet	MHNG	1
GR/Castaneda	731124	786	19.7.1976	C. Besuchet	MHNG	1
GR/Cavaione	806126	1200	6.10.2006	Ch. Germann	cCG	1
GR/Cavaione	806126	1100	26.8.1983	C. Besuchet	MHNG	1
GR/Chur	760191	1328	11.7.1909	J.B. Joerger	NMBA	6
GR/Chur	760191	1328	11.9.1907	J.B. Joerger	NMBA	13
GR/Coltura	765134	991	21.07.1979	P. Scherler	NMBE	1
GR/Davos, Umgebung	783187	1563	29.07.1999	Ch. Germann	NMBE	1
GR/Filisur	772171	1000	26.5.1940	J.P. Wolf	MHNG	1
GR/Ftan	813186	1700	19.6.2006	Ch. Germann	cCG	1
GR/Haldenstein	759194	560	26.06.2005	M. Geiser	cMG	1
GR/Lüsai	825166	1746	-	Handschin	BNM	1
GR/Malans	762205	539	21.5.1935	J.P. Wolf	MHNG	1
GR/Müstair	830168	1300	22.8.1966	C. Besuchet	MHNG	1
GR/Passo Bernina	799143	2200	24.08.2001	Ch. Germann	NMBE	1
GR/Poschiavo	801134	1014	7.1928	J.B. Joerger	NMBA	1
GR/Poschiavo	801134	1100	5.8.1974	C. Besuchet	MHNG	1
GR/Scuol	818187	1244	5.10.2006	Ch. Germann	cCG	1
GR/Scuol	818183	1500	16.6.2006	R. Graf	cRG	1
GR/Scuol	818187	1244	20.07.1970	P. Scherler	NMBE	2
GR/Soglio	761134	900	10.9.1985	C. Besuchet	MHNG	3
GR/Strada Inn	827193	1060	30.07.1983	P. Scherler	NMBE	1
GR/Tarasp, Kurhaus	816185	1150	5.5.2008	Ch. Germann	cCG	2
GR/Valle Mesolcina, Grono	731123	400	16.8.1989	D. Burckhardt	MHNG	1
GR/Val Poschiavo, Garbela	805128	1000	28.08.2004	Ch. Germann	NMBE	2
GR/Val Somvix	714176	1056	25.7.1891	A. Rätzer	NMBE	11
GR/Val Calanca	730135	1000	23.6.1892	N. Stöcklin	NMBA	1
GR/Val Calanca, Bosch d'Agher	730135	1800	18.8.1989	D. Burckhardt	MHNG	1
GR/Val Sinestra	821193	1500	21.07.1971	P. Scherler	NMBE	1
GR/Val Poschiavo, Cavaione	806126	1200	6.10.2006	Ch. Germann	cCG	1
GR/Vals	733164	1240	2.7.1919	J. B. Joerger	NMBA	3
GR/Versam	744184	908	Juli 1895	C. Benteli	NMBE	1

GR/Versam	744184	908	9.7.1898	A. Rätzer	NMBE	1
GR/Versam	744184	908	Juli 1896	A. Rätzer	NMBE	2
GR/Zernez	803175	1473	13.07.1973	P. Scherler	NMBE	2
GR/Zernez	803175	1473	-	E. Handschin	BNM	2
GR/Zernez, Gondas	804177	1500	19.7.1956	W. Eglin	NMBA	1
NE/Cornaux	567208	600	26.2.1977	A. Pedroli	IBUN	1
NE/Tête de Ran	555211	1422	1902	-	MHNF	1
SG/Ragaz	759206	510	6.1942	G. Toumayeff	MHNG	1
TI/Acquarossa	715146	530	9.1938	A. Linder	NMBA	1
TI/Alpe Brogaldone	725125	1900	17.7.1990	C. Besuchet	MHNG	3
TI/Auressio	696117	558	4.7.2007	Ch. Germain	NMBE	4
TI/Bogno	725105	961	8.1963	G. Toumayeff	MHNG	1
TI/Bordei	693111	726	21.7.1981	C. Besuchet	MHNG	1
TI/Boschetto	690128	400	2.5.1987	E. Della Santa	MHNG	1
TI/Brissago	698109	560	08.04.1997	Ch. Germain	NMBE	1
TI/Cavigliano	698115	511	4.7.2007	Ch. Germain	NMBE	3
TI/Chiasso	723077	238	13.07.1969	P. Scherler	NMBE	1
TI/Cimotta [Cimalmotto]	680126	1405	23.07.1965	-	MHNG	1
TI/Figino	713089	300	7.1952	F. Dillier	NMBA	1
TI/Frasco	704133	885	25.07.1969	P. Scherler	NMBE	1
TI/Frasco	704133	885	12.07.1933	W. Burghold	NMBE	1
TI/Fusio	694144	1350	17.07.1937	W. Burghold	NMBE	1
TI/Gridone	693108	1000	08.09.2001	Ch. Germain	NMBE	4
TI/Gridone	693108	400	08.09.2001	Ch. Germain	NMBE	4
TI/Indemini	707105	1000	7.1969	G. Toumayeff	MHNG	4
TI/Isone	720110	800	16.7.1976	C. Besuchet	MHNG	1
TI/Locarno	704113	200	5.1934	G. Toumayeff	MHNG	1
TI/Locarno, Ai Sassi	704113	580	17.06.1997	M. Moretti	NMBE	1
TI/Locarno, Colmaghera	704113	500	22.04.1997	Ch. Germain	NMBE	1
TI/Maggiatal, Maggia	698123	500	11.07.1999	Ch. Germain	NMBE	2
TI/Maggiatal, Maggia	697122	500	M.7.98	Ch. Germain	NMBE	1
TI/Mendrisio	720810	350	19.5.1937	A. Linder	NMBA	1
TI/Mendrisio	720081	350	02.07.1933	W. Burghold	NMBE	1
TI/Migliaglia	709098	1050	2.6.1962	C. Besuchet	MHNG	1
TI/Moneto	691111	550	9.1976	G. Toumayeff	MHNG	1
TI/Monte San Giorgio	717085	1000	20.7.1990	C. Besuchet	MHNG	1
TI/Monte Generoso	723088	1650	09.08.2001	Ch. Germain	NMBE	1
TI/Palagnedra	692112	650	6.1978	G. Toumayeff	MHNG	1
TI/Passo di Neggia	709107	1400	5.7.1975	C. Besuchet	MHNG	1
TI/Ponte Brolla	701116	250	25.06.1998	Ch. Germain	NMBE	3
TI/Rancate	718081	360	25.05.1969	P. Scherler	NMBE	2
TI/Rovio	720088	500	7.1968	G. Toumayeff	MHNG	1
TI/Salorino	720812	460	4.1940	A. Linder	NMBA	1
TI/SBoschetto	690128	400	2.5.1997	E. Della Santa	MHNG	1
TI/Serpiano	715085	645	7.9.1965	C. Besuchet	MHNG	1
TI/Sessa	705095	400	5.1977	G. Toumayeff	MHNG	1
TI/Sonogno	703134	909	17.08.1967	P. Scherler	NMBE	1
TI/V. Vergeletto, Piano delle Cascine	689120	1200	21.7.1990	C. Besuchet	MHNG	1
TI/Val Verzasca	709118	700	22.06.1967	-	NMBE	1
TI/Val d'Ossola	670960	900	05.11.1994	C. Besuchet	MHNG	1
TI/Val Bavona, San Carlo	683140	1150	4.7.2008	M. Geiser	cMG	2
TI/Vergeletto	689120	905	22.06.1983	P. Scherler	NMBE	1
UR/Bristen	695180	866	6.7.2007	Ch. Germain	NMBE	14
VD/Eau Froide	563129	500	5.1964	G. Toumayeff	MHNG	1
VS/Alesse	570110	896	07.07.1972	P. Scherler	NMBE	2
VS/Antagnes	567125	505	21.06.1912	A. Mathey	NMBE	2
VS/Bramois	597120	500	26.6.1980	C. Besuchet	MHNG	1
VS/Branche d'En Haut	574089	1400	16.7.2007	Ch. Germain	NMBE	2
VS/Bürchen	629126	1320	11.08.1926	W. Burghold	NMBE	1

SIMO HIRTICORNIS AND S. VARIEGATUS IN SWITZERLAND

VS/Champex	575098	1472	11.7.1957	J. Simonet	MHNG	1
VS/Emaney	562106	1600	7.1980	G. Toumayeff	MHNG	1
VS/Euseigne	598113	970	11.07.1954	P. Scherler	NMBE	2
VS/Euseigne	598113	970	17.06.1909	T. Steck	NMBE	1
VS/Euseigne	598113	970	3.7.1897	A. Rätzer	NMBE	2
VS/Evolène	604106	1371	1.7.1897	A. Rätzer	NMBE	1
VS/Evolène	604106	1371	22.7.1958	P. Scherler	MHNG	1
VS/Follatères	571108	620	2.4.1988	C. Besuchet	MHNG	1
VS/Gantertal	646127	1200	22.6.1991	L. Feller	NMBE	3
VS/Gantertal	646127	1200	2.8.1984	L. Feller	NMBE	1
VS/Gondo	653115	1100	12.7.2007	Ch. Germann	NMBE	2
VS/Gondo	654116	840	8.1964	G. Toumayeff	MHNG	3
VS/Grugny	582117	760	06.05.2000	Ch. Germann	NMBE	2
VS/La Forclaz	566100	1526	21.7.1951	J. Simonet	MHNG	1
VS/Le Trétien	565105	1080	7.1980	G. Toumayeff	MHNG	3
VS/Les Haudères	605103	1550	11.07.1954	P. Scherler	NMBE	1
VS/Martigny, Combe	569103	600	25.05.2001	Ch. Germann	NMBE	1
VS/Martisberg	651137	1300	28.6.2008	Ch. Germann	cCG	4
VS/Monte Moro	641094	-	-	J. Odier	MHNG	1
VS/Ravoire	570106	1060	7.1961	G. Toumayeff	MHNG	1
VS/Saas	640105	1679	Juli 1886	E. Bugnion	NMBE	1
VS/Saas Grund	638108	1400	21.6.2007	Ch. Germann & M. Borer	NMBE	11
VS/Simplon	645122	2006	Juli 1877	A. Rätzer	NMBE	2
VS/Simplon	645122	2006	01.04.1905	A. Rätzer	NMBE	1
VS/Simplon	645122	2006	Juli 1877	A. Rätzer	NMBE	1
VS/Simplon, Laggintal	649114	1400	9.6.2008	W. Marggi	cCG	1
VS/St-Léonard	599122	1050	12.7.1986	D. Burckhardt	MHNG	1
VS/St-Maurice	566117	420	2.5.1980	C. Besuchet	MHNG	1
VS/Trient bis Finhaut	565100	1400	25.05.2001	Ch. Germann	NMBE	4
VS/Verbier, Genévrier	583105	1460	16.7.1959	J. Steffen	MHNG	4
VS/Vercorin	607122	1320	13.08.1968	P. Scherler	NMBE	1
VS/Vérossaz	564117	1140	27.05.1973	P. Scherler	NMBE	1
VS/Zwischbergen	652112	1340	19.6.2006	P. Sonderegger	cCG	4
total:						271