Rhodiola rosea L. 'Mattmark', the first synthetic variety is launched in Switzerland

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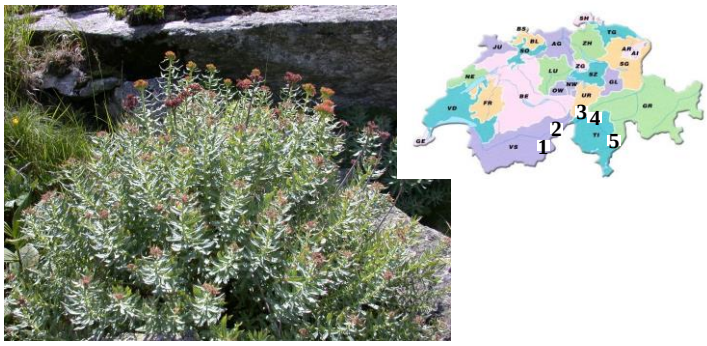

Fig 1. Swiss populations sampled: 1 Mattmark, 2 Binntal, 3 Nomnom, 4 Piano Canali, 5 Unteralp

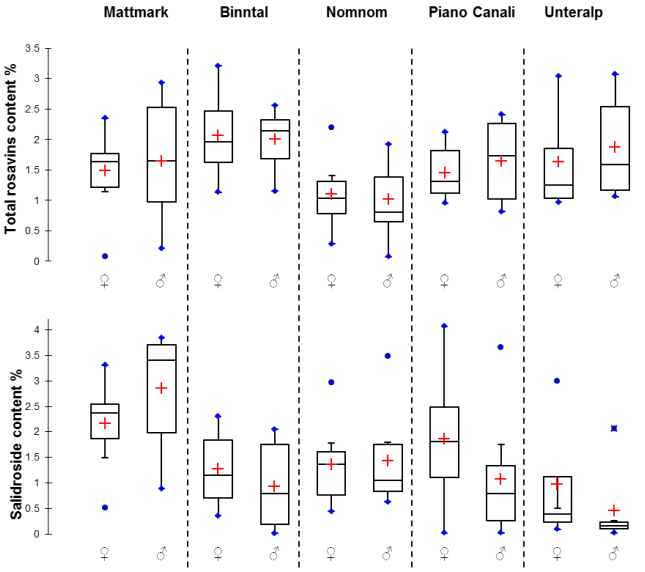

Fig 2. Variation of the contents in total rosavins and in salidroside [% of dry weight] in the rhizomes and roots of female (♀) and male (♂) *Rhodiola rosea* from five populations in the Swiss Alps

		Salidroside %	Rosavins %	Nb
♀	**M9**	2.04	2.07	3
	M11	2.28	2.35	4
	M13	2.47	1.63	3
	M14	3.31	1.64	2
♂	**M2**	3.31	2.52	1
	M6	3.82	2.93	1
	M8	3.35	2.03	1
	M15	3.31	2.55	1

Fig 3. 'Mattmark' îs the first synthetic variety obtained from a poly-cross between the most productive and salidroside/rosavins-rich individuals from the population in Mattmark in the Swiss Alps. Nb is the number of individual plants involved in the polycross.

Introduction

Rhodiola rosea, also called Golden Root or Roseroot, is an adaptogenic medicinal plant from alpine and arctic regions that is known to reduce stress, trauma, anxiety and fatigue. The main active compounds are salidroside and rosavins (rosarin, rosavin, rovin). With the pauperization of natural populations worldwide as a result of the demand for raw material from pharma-industries, domestication and selection of this plant has become a critical issue in order to conserve natural populations, particularly in Russia and Mongolia. In addition, fraudulent material containing non-*Rhodiola rosea* plant parts is suspected to pollute the market.

In this study, we have estimated the phytochemical variability of salidroside and total rosavins in five natural populations in the Swiss Alps in order to select the best population for a polycross and propose the first synthetic cultivar-population of *Rhodiola rosea*.

Material and methods

Non-destructive rhizome cuttings were sampled in 2006 from 93 plants in five sites in the Swiss Alps (Fig. 1) and screened for their salidroside and rosavins contents by HPLC-DAD analysis.

Results

An important variability was observed among and within the populations, and no significant difference was observed between male and female. With an average content of 1,49% (± 1,15) for salidroside and 1,57% (± 0,74) for rosavins, the population in Mattmark (Saas Fee, Valais) near the famous Matterhorn turned out to be the most productive and vigorous (Fig. 2). The best plants from Mattmark were selected and a polycross was performed to produce the Alpine cultivar 'Mattmark', the first synthetic variety of *Rhodiola rosea* (Fig. 3 and 4).

Bioeconomy

Cultivation of *R. rosea* in the Swiss Alps has started in 2005 and covers less than 1ha for now. To avoid frauds and adulteration, several pharmaceuticals industries have now shown their interest in 'Mattmark', which might be a good incentive to enhance the production in the Alps.

Fig 4. Seed production of the new variety 'Mattmark' in Bruson (CH)

Conclusions

- Domestication and breeding of *Rhodiola rosea* are important steps to preserve natural populations, ensure supply of standardized raw material and prevent frauds. A survey of the genetic diversity of *R. rosea* in the Alps with microsatellite markers is currently carried out.
- The new variety 'Mattmark' shows good dry weight rhizomes production, high salidroside and rosavins contents, and good seeds production available through MediSeeds (www.mediseeds.ch)
- It was first commercially planted in 2011 in Switzerland (Valais), and seeds have then been sold in France, Italy, Germany and Canada.

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