

DAVIS EXPEDITION FUND

REPORT ON EXPEDITION/PROJECT

Expedition/Project Title: Hybrid zones in *Rhododendron* subsection *Taliensia*.....

Travel Dates: 16th of May to 16th of June 2008.....

Location: China, Yunnan & Sichuan Province.....

Group Members: Tobias Marczewski.....

Aims: Collection of silica samples and specimens of selected *Rhododendron* populations.....

OUTCOME (not less than 300 words):-

See attached report

Report for the Davis Expedition Fund

Hybrid zones in *Rhododendron* subsection *Taliensia*

Rhododendron collection expedition to China

16th of May to 16th of June 2008

Tobias Marczewski August 2008

Introduction

The genus *Rhododendron*, is extremely species-rich, with a center of diversity in the Sino-Himalayan region, particularly the eastern Himalayas. Genetic barriers to gene flow between species appear to be almost non-existent at the level of subgenera and extensive hybridization seems to occur in the wild within certain species complexes (Chamberlain 1982, Zhang et al. 2007). Obviously this poses problems to taxonomy, which can not be resolved without an in depth study of populations where hybridization is occurring. Furthermore Rhododendrons of subsection *Taliensia* in Yunnan and Sichuan province have rather disjunct distribution patterns due to the fact that they grow mostly at altitudes between 3000 and 4500 meters, leading to an island-like occurrence on mountain ranges or inselbergs and in some cases species are only recorded for a few mountains. Molecular data on the actual diversity and differentiation of populations, along with assessment of how they are influenced by hybridization, will help to answer questions regarding speciation and conservation issues in the subsection.

Objectives

After a previous collection expedition to China, which took place in autumn 2007 (The Rhododendron, Camellia & Magnolia Group RHS Bulletin 95, Nov 2007 p.8) it became evident that it would be desirable to collect further allopatric populations for several species of which only few or single populations were sampled. Therefore this second collection trip was undertaken to complement the samples successfully collected in 2007. Furthermore going a second time in spring during the flowering season of the species was offering the advantage to broaden the understanding of the morphological variability observable in many hybrid zones and collect herbarium specimens with flowers.

The main objectives were:

1. obtain silica samples of:
 - *R. clementinae* (2 populations)
 - *R. roxieanum* var. *roxieanum* (2 populations)
 - *R. roxieanum* var. *cucullatum*
 - *R. aganniphum* (1 population +)
 - *R. phaeochrysum* (1 population +)
2. complement the collections from 2007 on Lao Jun Shan and Baima Shan with flowering specimens.

Report

After arriving in Kunming on Saturday the 17th of May and two days of preparations we (Dr. Lianming Gao, my counterpart from KIB; Liu Jie, a masters student at KIB who already joined the expedition in 2007; our driver Yang Kun, and I) set off for Lao Jun Shan. As I already knew this location from last year, everything went as planned and it was no problem to obtain the desired additional silica samples. As none of us experienced problems with the altitude we decided to leave one day before schedule and move on to the new populations. According to specimen information *R. clementinae* can be found on mountains around Tacheng and therefore this was our next place of choice. As the specimens were rather historical (all by Gorge Forrest 1923-37), we did not have accurate locality information and we relied on hints we obtained from local people. After two unsuccessful attempts to find the species with the help of information provided by the locals, we realised that we were facing two major problems. Firstly for the inexperienced eye, especially not taking the indumentum into account, some leaves of the rather common *R. beesianum* can apparently look like *R. clementinae*. Secondly obtaining reliable information from the local people about the altitude of the mountains in the area, which would have allowed us to identify suitable sites, turned out to be too difficult a task. These circumstances along with the uncertainty of how much time would be needed to find the better documented populations led us to the decision to move on and not invest more time near Tacheng.

Luckily, after this somewhat discouraging start we were to become more successful. Near the peak of Baima Shui Shan as well as *R. roxieanum* var. *roxieanum* (~*oroneastes*) and *R. proteoides* we encountered a hybrid swarm population which looked at first sight like the *R. aganniphum* x *R. phaeochrysum* population from the 2007 trip, not collected far from this location. However, it turned out that there were virtually no *R. aganniphum* plants present and the altitudinal range covered by these in the other population was apparently occupied by individuals that look very much like a stabilised hybrid, morphologically resembling a backcross to *R. phaeochrysum*.

On the next scheduled stop at Shika Shan, we were able to meet one of my objectives by sampling a second population of *R. roxieanum* var. *roxieanum*.

Already having encountered the unexpectedly different composition of the *R. aganniphum* x *R. phaeochrysum* hybrid population on Baima Shui Shan, our next locality on Da Shui Shan held a further surprising discovery regarding these two species. We encountered an apparently similar habitat alongside a road with a mixed population of both species on the slopes, therefore expecting to find a similar hybrid swarm. To my surprise we could not find any hybrids at all! Up to the present day I can not offer a satisfying explanation for this absolutely different behavior of these species at seemingly equivalent localities and in my opinion it will be an important contribution to the understanding of hybrid zones to elucidate differences and similarities between these two populations.

Following these exciting discoveries we then visited Haba Shui Shan and Luo Ji Shan and completed the success of the expedition by finding the long anticipated population of *R. clementinae* and one additional population of *R. roxieanum* var. *cucullatum* respectively.

Finally we could not obtain a second population of *R. clementinae* because of the start of the monsoon rain. However, meeting all other objectives and further more the observations regarding *R. aganniphum* and *R. phaeochrysum* along with many flowering specimens made this expedition more successful than expected.

Acknowledgments

I truly want to thank Lianming Gao from KIB for advice with the planning of the whole expedition, invaluable help regarding Chinese formalities and last but not least for excellent field assistance; Liu Jie for assistance in the field and Yang Kun for his driving skills.

I am also very thankful to David Ranking for providing very detailed locality informations.

References

Chamberlain, D. F., 1982. A revision of *Rhododendron* II. subgenus *Hymenanthes*. Notes R. Bot. Gard. Edinburgh 39, 209-486

Milne, R. I., 2004. Phylogeny and biogeography of *Rhododendron* subsection *Pontica*, a group with a tertiary relict distribution. Mol. Phyl. Evol. 33, 389-401

Zhang, J.-L., Zhang, C.-Q., Gao, L.-M., Yang, J.-B., Li, H.-T., 2007. Natural hybridization origin of *Rhododendron agastum* (Ericaceae) in Yunnan, China: inferred from morphological and molecular evidence. J. Plant Res. 120, 457-463



Figure 1 Locations of sampled populations

Timeline:

(localities in bold are shown on the map in Figure 1, page 3)

16.05.2008	departure from Edinburgh
17.- 19.05	expedition preparation in Kunming
20.05	travel to Dali
21.- 23.05	work at Lao Jun Shan
24.05	travel to Tacheng
25.05	Xiao Cao Ba mountain
26.05	Mo Cha Pa mountain
27.05	travel to Benzilan
28/29.05	work on Baima Shui Shan
30.05	travel to Zhongdian (Shangri-La)
31.05	collections on Shika Shan
01.06	travel to Weng Shui
02.06	collections on Da Shui Shan , travel to Zhongdian
03.06	travel to Wai Shui Tai
04.06	travel to Haba Village
05.06	collections on Haba Shui Shan
06.06	travel to Lijiang
07.06	travel to Lugu Hu
08.06	travel to Luoji Town
09.06	collections on Luoji Shan , travel to Puge
10.06	travel to Jiaozi Shan
11.06	Jiaozi Shan, travel to Kunming
12.- 15.06	work in Kunming
16.06.2008	flight back to Edinburgh

Silica Samples
collected:

Specimens collected

Lao Jun Shan

<i>R. clementinae</i>	20
<i>R. roxieanum</i> var. <i>roxieanum</i>	38
<i>R. roxieanum</i> var <i>cucullatum</i>	13

8

Baima Shui Shan

<i>R. roxieanum</i> var. <i>roxieanum</i>	18
<i>R. aganniphum</i> x <i>phaeochrysum</i>	36
<i>R. aganniphum</i>	33
Hybrids indet.	10

18

Shika Shan

<i>R. roxieanum</i> var. <i>roxieanum</i>	33
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2

Da Shui Shan

<i>R. aganniphum</i>	34
<i>R. phaeochrysum</i>	25

6

Haba Shui Shan

<i>R. clementinae</i>	37
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2

Luoji Shan

<i>R. roxieanum</i> var <i>cucullatum</i>	31
<i>R. sphaeroblastum</i>	19

6

Total **347**

42

Expenditure

Description	Cost	(£1 = ¥13.56)	
return ticket Edinburgh – Chengdu	£484.30		
plane ticket Chengdu – Kunming	£67.60		
plane ticket Kunming – Chengdu	£67.90		
Visa	£40.00		
overweight luggage	£4.87	¥ 66	
transport including driver (¥3/km, 4560km)	£1,008.85	¥ 13,680	
food	£421.76	¥ 5,719	see details below
accommodation	£505.16	¥ 6,850	see details below
other expenses	£206.12	¥ 2,795	see details below
posting of specimens	£169.62	¥ 2,300	
bank charge to transfer money to KIB account	£39.00		
Total	£3,015.17		
Income (Davis Expedition Fund)	£2,500.00		
Personal contribution	£515.17		

Details of costs in the field

Food and Hotel costs are, except for Kunming, for four people (Lianming Gao, Liu Jie, Yang Kun and Tobias Marczewski)

Date	Location	Food	Hotel	Other
17/05/08 - 20/05/08	Kunming, Dali	¥ 1,050	¥ 1,320	
21/05/08 - 24/05/08	Laojun Shan	¥ 540	¥ 960	¥ 290 (guide, road charge)
24/05/08 - 27/05/08	Tacheng	¥ 480	¥ 360	¥ 350 (guide)
27/05/08 - 30/05/08	Benzilan	¥ 560	¥ 450	¥ 100 (fees)
31/05/08 -	Zhongdian	¥ 540	¥ 720	¥ 660 (cable car)
01/06/08 - 02/06/08	Daxue Shan	¥ 530	¥ 570	
03/06/08 - 05/06/08	Haba Shan	¥ 509	¥ 520	¥ 300 (guide, road charge)
06/06/08 - 07/06/08	Lijiang, Lugu Hu	¥ 515	¥ 490	¥ 373 (road charge)
08/06/08 - 09/06/08	Luoji Shan	¥ 390	¥ 640	¥ 596 (cable car)
10/06/08 - 11/06/08	Jiaozi Shan	¥ 405	¥ 500	¥ 126 (fees)
12/06/08 - 15/06/08	Kunming	¥ 200	¥ 320	
	Total	¥ 5,719	¥ 6,850	¥ 2,795