

Sustainability of harvest of commercially threatened medicinal plant *Aconitum spicatum* (Briihl) Stapf in central Nepal



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Introduction

- Nepal harbors >2,000 species of non timber forest products (NTFPs) of which 90% are medicinal & aromatic plants (MAPs)
- More than 100 species of MAPs are traded commercially
- MAPs have been identified as one of the 19 goods and services by Nepal Trade Integration Strategy, 2010 as having export potential
- Nepal is also a member of WTO since 2004
(source:ANSAB 2010)



Ophiocordyceps sinensis

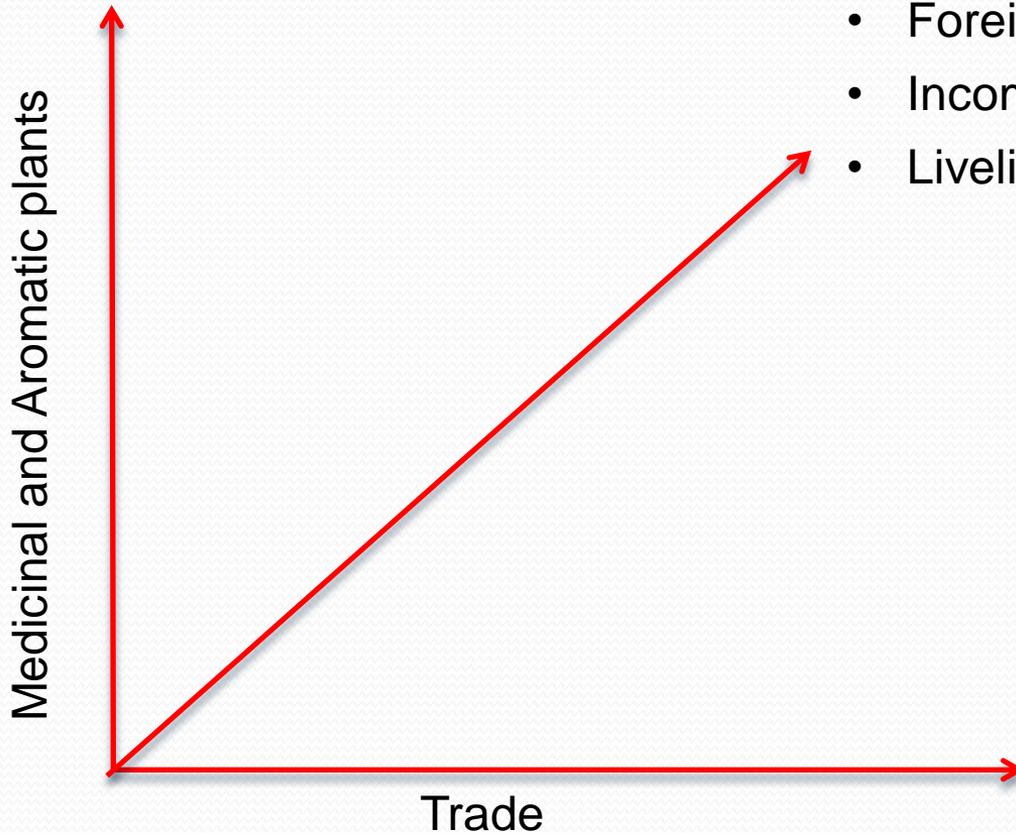


Fritillaria cirrhosa



Aconitum spicatum

MAPs & Trade relationship



- 33 MAPs identified by the government of Nepal for commercial farming

Economic Prosperity

- Foreign trade and exchange
- Income and employment
- Livelihood improvement of people



Source: IUCN

Major threats and challenges on sustainable uses of MAPs

- ❖ Illegal harvesting and trade
 - ❖ Premature and overharvesting
 - ❖ Inadequate awareness about the species biology and sustainability
 - ❖ Over grazing and other human disturbances
 - ❖ Lack of science-based management
- As a result, population of many species of MAPs declining, reproduction and growth rate reduced, and community composition and ecosystem is also changing



Study MAP species

Aconite (Aconitum spicatum)

Status: Vulnerable species

Habit: Perennial herb

Parts use: Tubers

Habitat: Moist places at 3000-4300 m

Regeneration: Tubers and seeds.

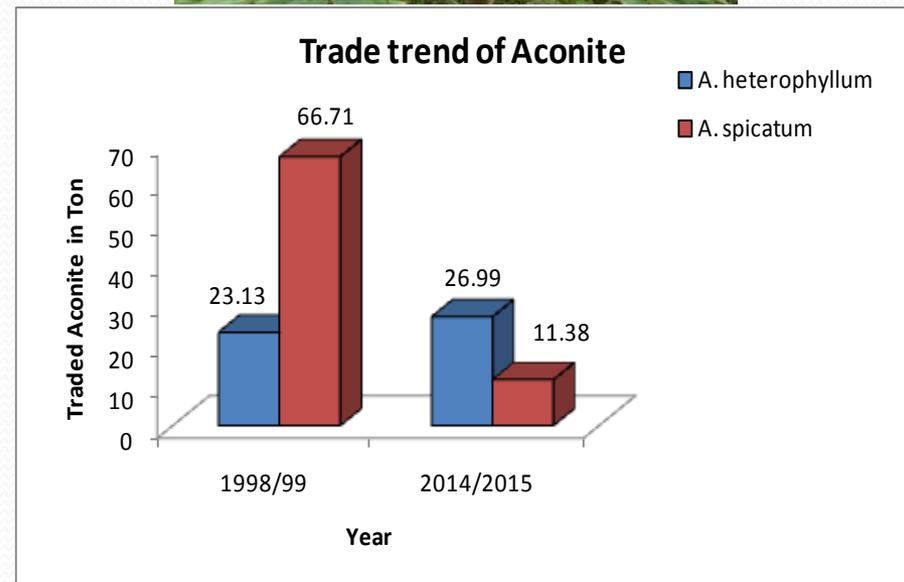
Use: Highly poisonous, medicinal

Local medicinal use – Cuts and wounds fever, headache, lung and intestine infections and cough

Allopathic Use :Analgesic and antipyretic

Prioritized by the government of Nepal for economic development

Trade: In decreasing order and approx 100% of the harvested tuber is traded to India



Source: Olsen 2005, TGGN 2016

Objectives

Broader objective:

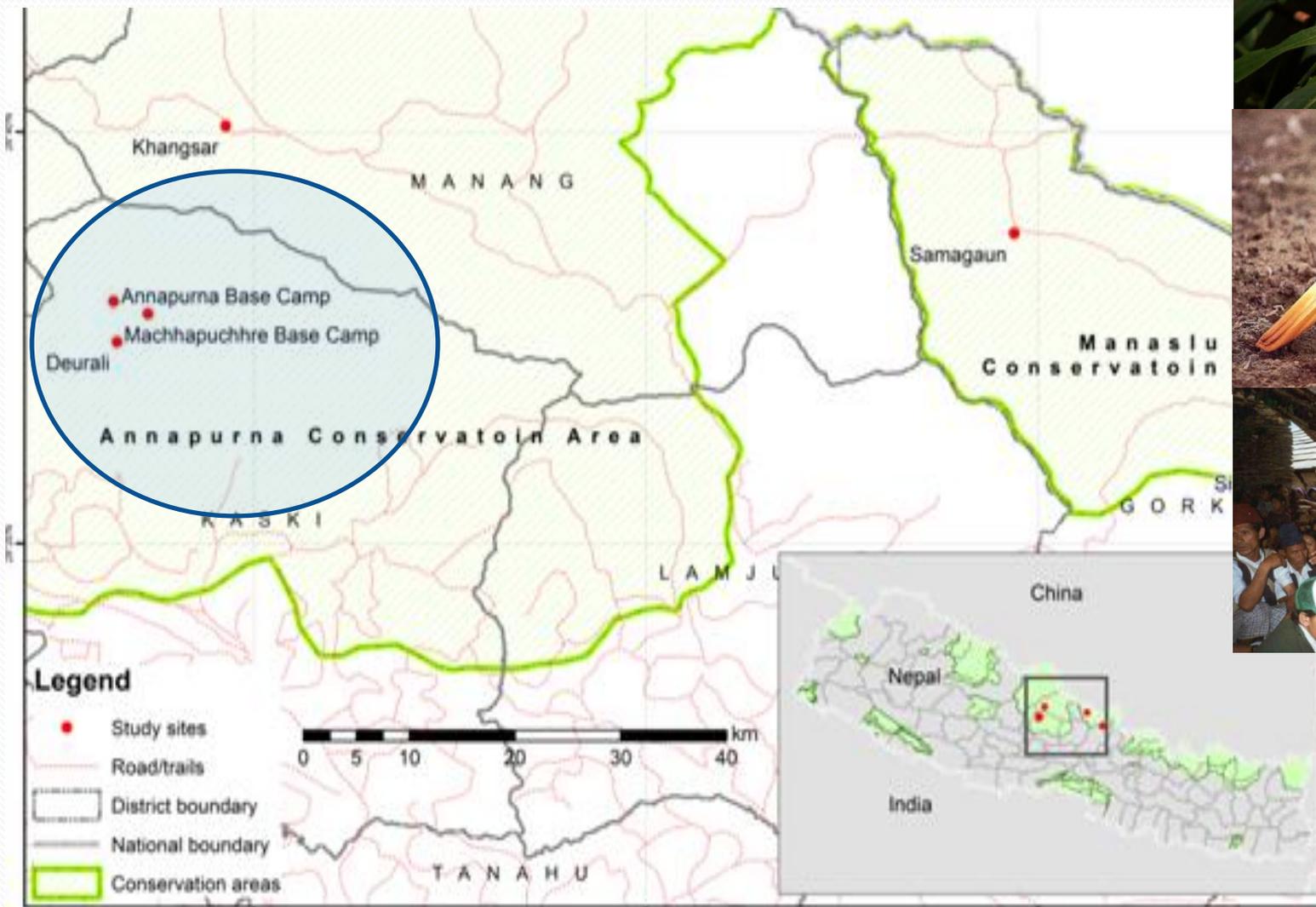
To develop a sustainable harvesting model and management guidelines of *Aconitum spicatum*

Specifically:

To assess the effect of harvesting on biological characters of *Aconitum spicatum* along an elevation gradient in central Nepal

Study site

Annapurna Conservation Area (ACA)



Source: ACAP 2014

Materials and method

1. Reconnaissance Survey

Local harvesters consulted, study area identified and mapped

2. Permanent plot establishment

3 transects (2 x 18 m) in 3 populations (3200, 3600 and 3900 m); each divided into nine subplots (2 x 2 m)

Population Dynamics

5. Population monitoring and habitat assessment

Survival, recruitment. Enrichment planting, biomass estimation and habitat assessment

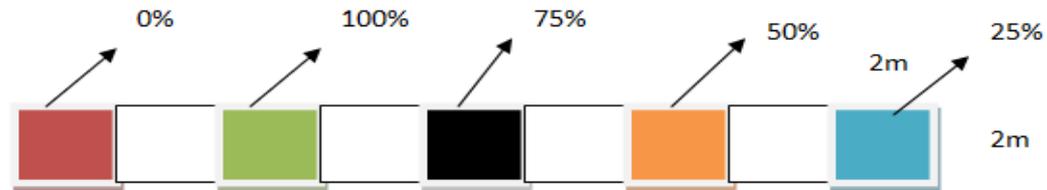
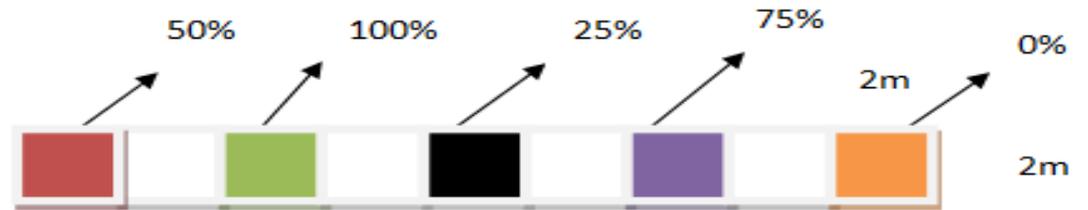
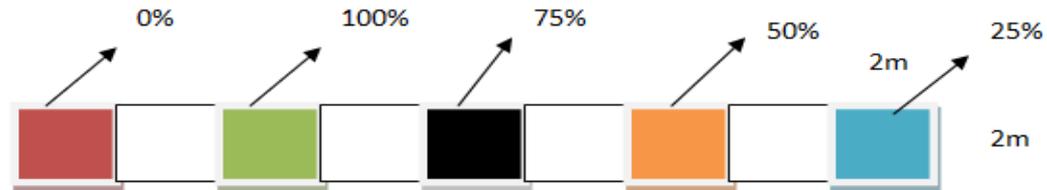
3. Harvest simulation

each subplot randomly assigned into harvest treatment of 0, 25, 50, 75 & 100%

4. Stage classification and tagging

Sd, Jv, Adv and ADr are tagged

Sampling design (*Aconitum Spicatum*): (belt transect)

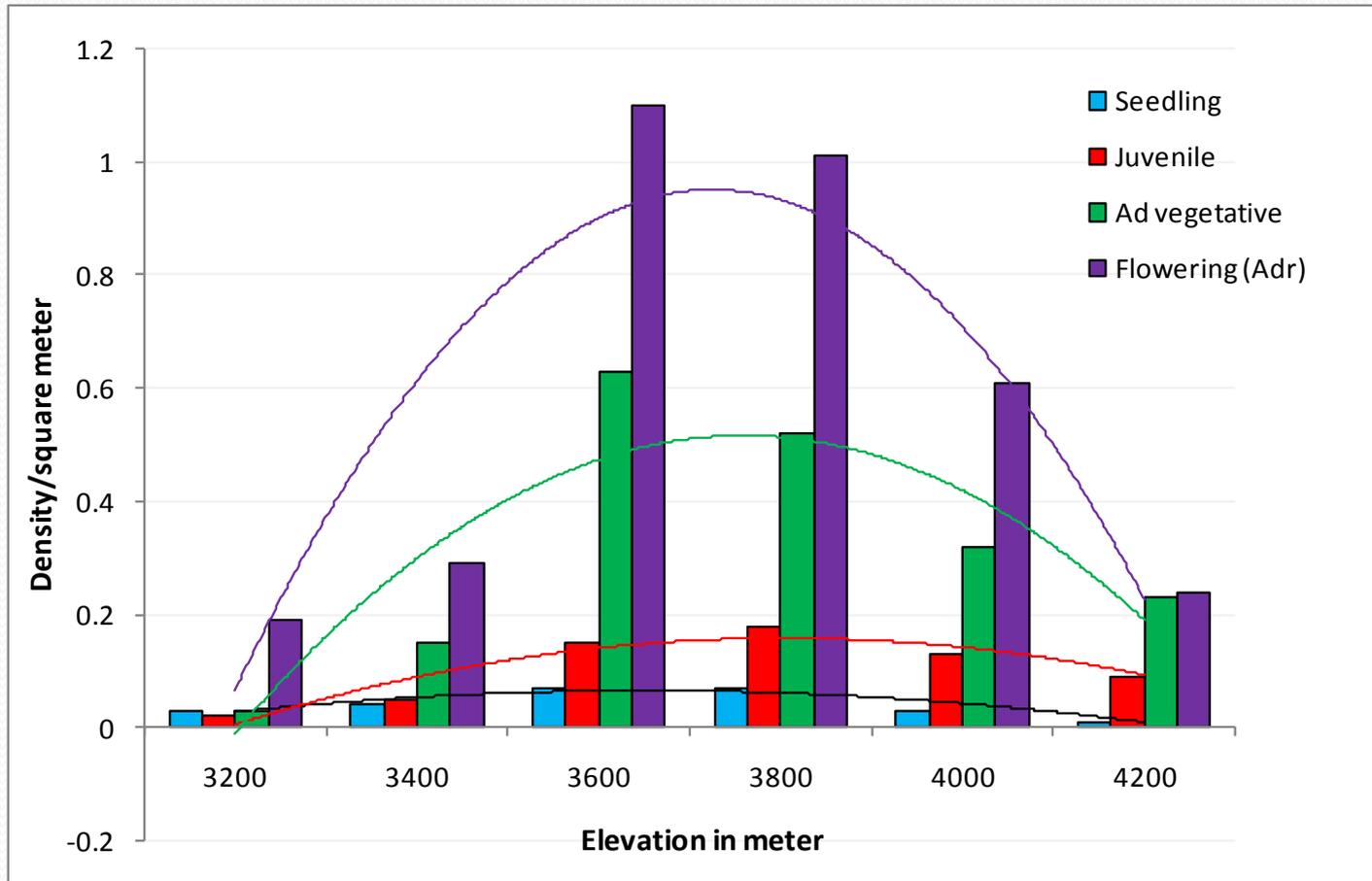


Some snaps of field work



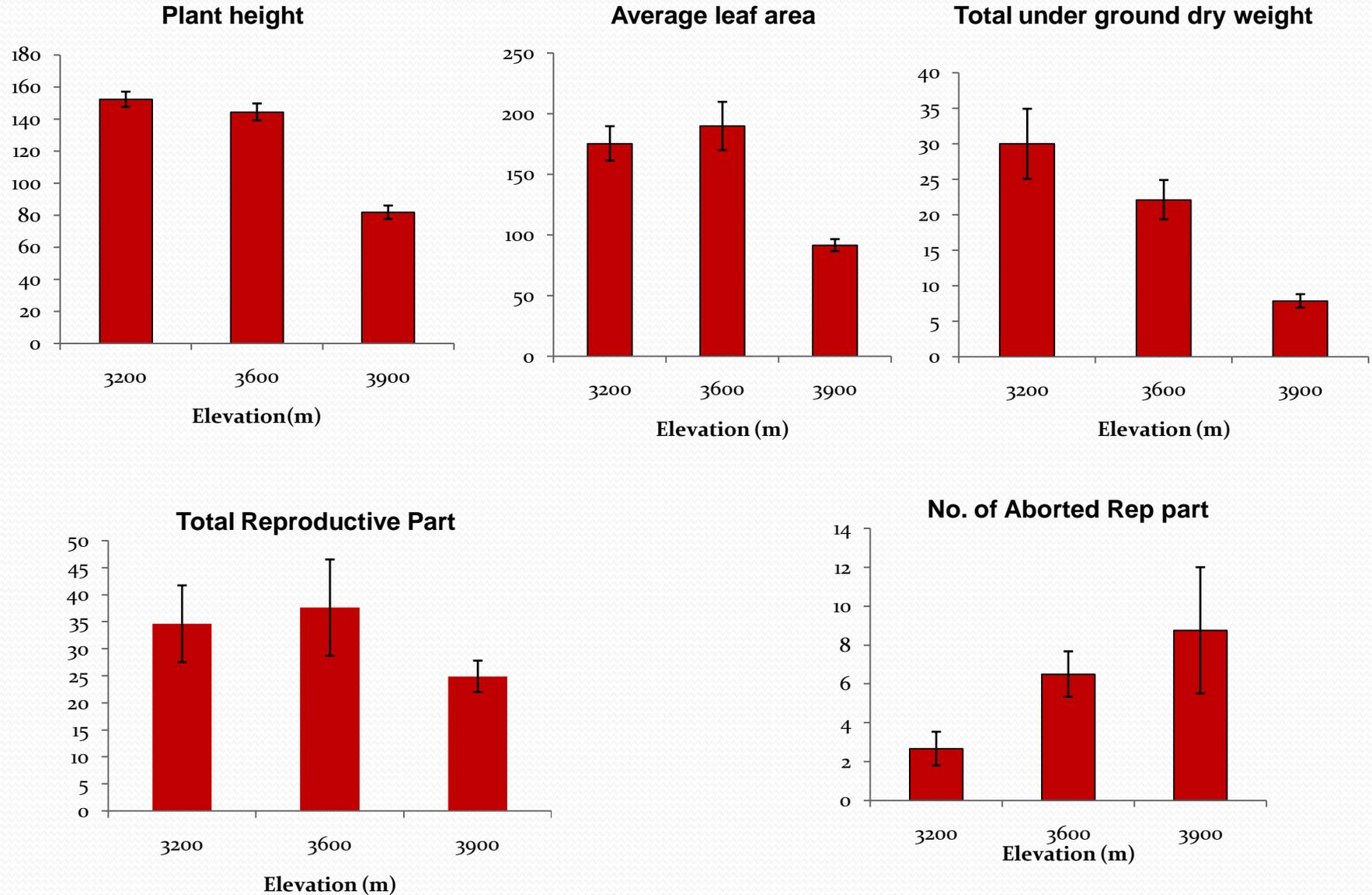
Result & Discussion

- ❖ Density in all stages was found highest between 3600 and 3800m.



Result contd..

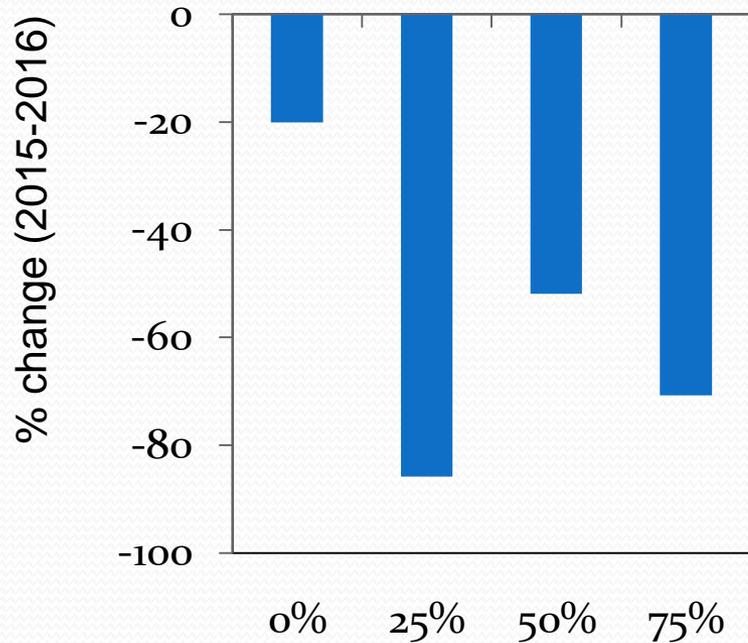
❖ Variation of Life history traits along the elevation gradient



Effect of Harvest on seedling and adult density:

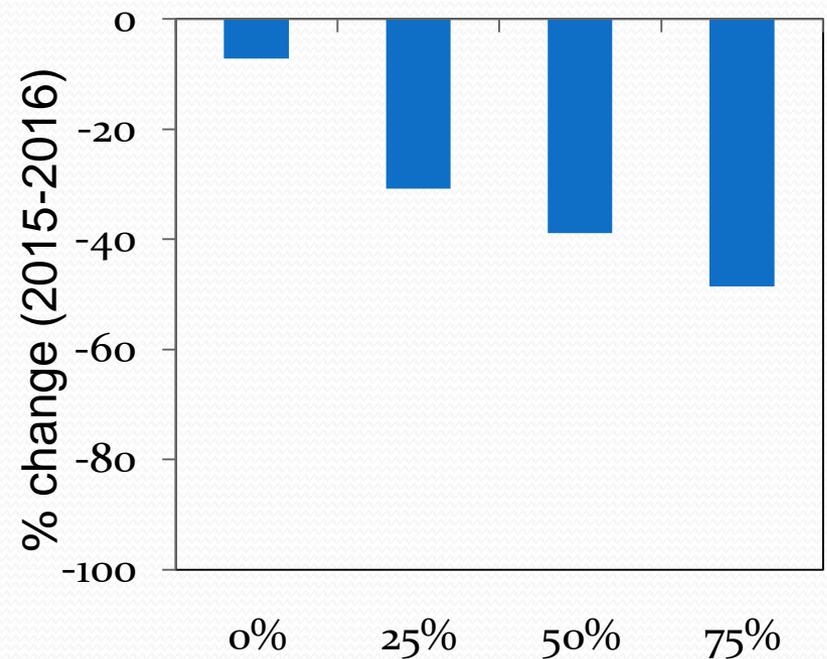
Harvesting has negative impact on the seedling and flowering density.

Seedling density



Harvesting level

Reproductive adult density

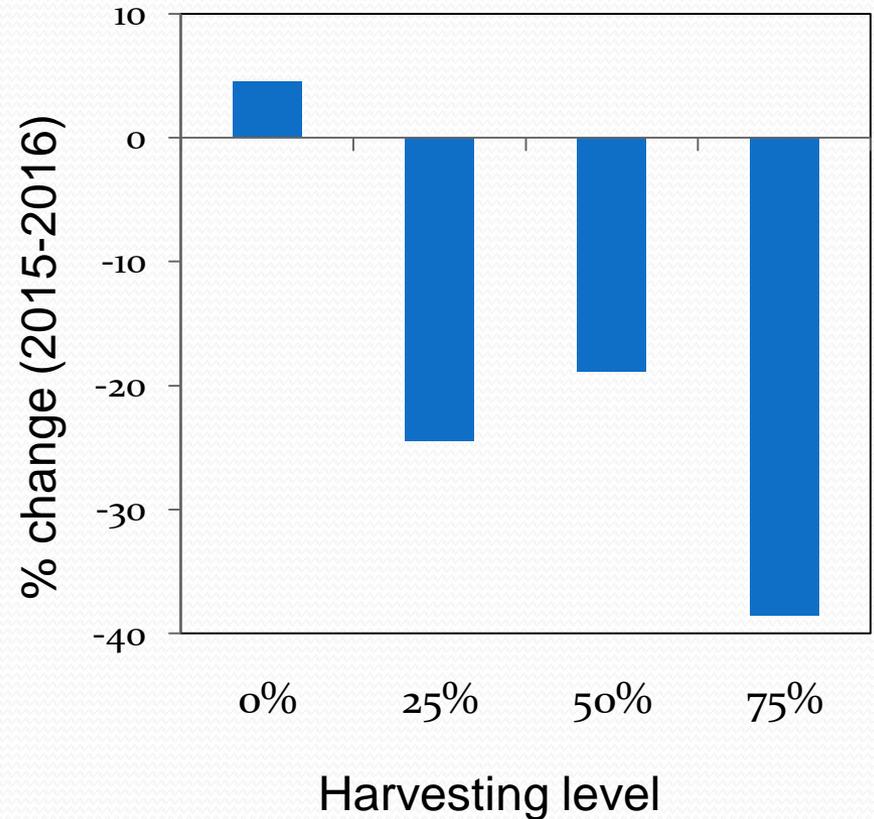
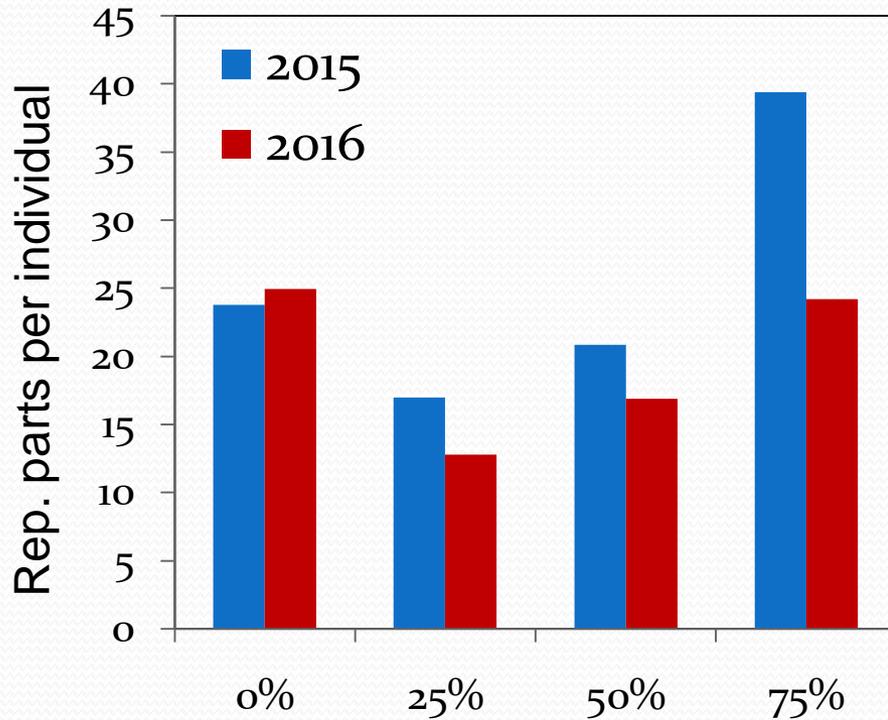


Harvesting level

Result contd..

Effect of harvest on total reproductive output:

Harvest has negative impact on total reproductive output of the individual.



Conclusions

- Plants growing in different altitude exhibit variations in a number of vegetative and reproductive characters
- Fitness of *Aconitum spicatum* decreases with increasing elevation
- Harvesting greatly effect reproductive output and density of adults and seedlings

Recommendations

- A general awareness is needed to be created among the collectors and the local people about the population biology and conservation value of the species.
- Management should focus on increasing seedling recruitment and reducing damage to the reproductive adults so as to maintain long term viability of available resource base.

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Thank You!!!