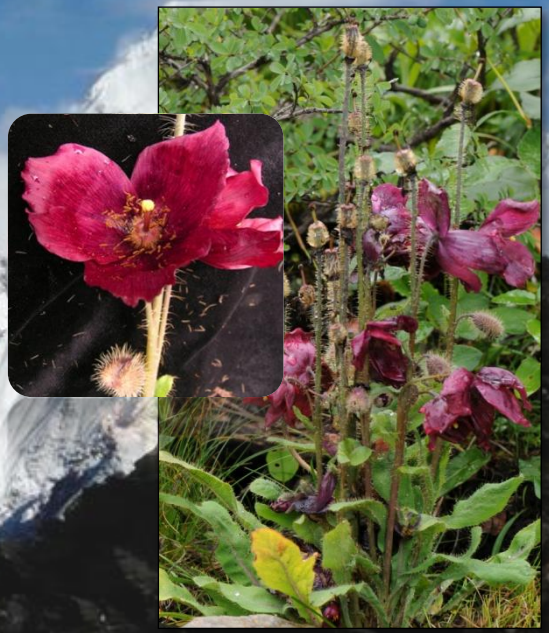
Introducing two newly described species of *Meconopsis*



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Overview

- Two new species – 1. *M. autumnalis*
  2. *M. manasluensis*
- Speciation
- Future work
  - Flora of Nepal
  - Morphometric/genetic study

Egan, P.A. (2011) **Meconopsis autumnalis and M. manasluensis (Papaveraceae), two new species of Himalayan poppy endemic to central Nepal with sympatric congeners**. Phytotaxa 20: 47–56.

Overview

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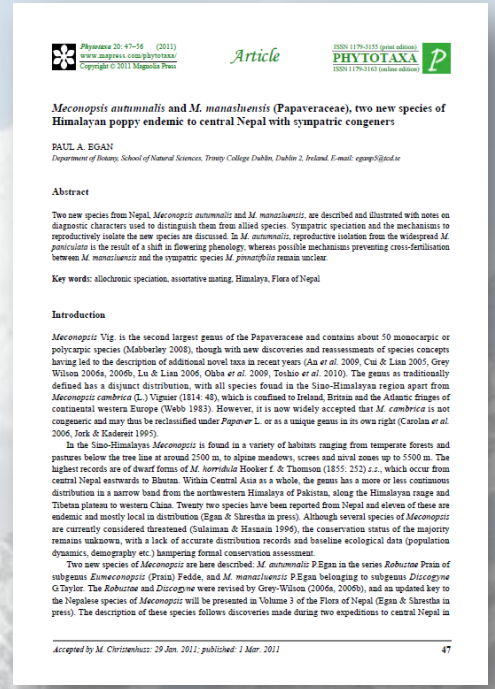

Phytotaxa 20: 47–56 (2011)
www.mapress.com/phytotaxa/

Article

ISSN 1179-3155 (print edition)
PHYTOTAXA
ISSN 1179-3163 (online edition)

Meconopsis autumnalis **and** ***M. manasluensis*** **(Papaveraceae), two new species of Himalayan poppy endemic to central Nepal with sympatric congeners**

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Abstract

Two new species from Nepal, *Meconopsis autumnalis* and *M. manasluensis*, are described and illustrated with notes on diagnostic characters used to distinguish them from allied species. Sympatric speciation and the mechanisms to reproductively isolate the new species are discussed. In *M. autumnalis*, reproductive isolation from the widespread *M. paniculata* is the result of a shift in flowering phenology, whereas possible mechanisms preventing cross-fertilisation between *M. manasluensis* and the sympatric species *M. pinnatifolia* remain unclear.

Key words: allochronic speciation, assortative mating, Himalaya, Flora of Nepal

Introduction

Meconopsis Vig. is the second largest genus of the Papaveraceae and contains about 50 monocarpic or polycarpic species (Mabberley 2008), though with new discoveries and reassessments of species concepts having led to the description of additional novel taxa in recent years (An *et al.* 2009, Cui & Lian 2005, Grey Wilson 2006a, 2006b, Lu & Lian 2006, Ohba *et al.* 2009, Toshio *et al.* 2010). The genus as traditionally defined has a disjunct distribution, with all species found in the Sino-Himalayan region apart from *Meconopsis cambrica* (L.) Vignier (1814: 48), which is confined to Ireland, Britain and the Atlantic fringes of continental western Europe (Webb 1983). However, it is now widely accepted that *M. cambrica* is not congeneric and may thus be reclassified under *Papaver* L. or as a unique genus in its own right (Carolan *et al.* 2006, Jork & Kadereit 1995).

In the Sino-Himalayas *Meconopsis* is found in a variety of habitats ranging from temperate forests and pastures below the tree line at around 2500 m, to alpine meadows, screes and nival zones up to 5500 m. The highest records are of dwarf forms of *M. horridula* Hooker f. & Thomson (1855: 252) *s.s.*, which occur from central Nepal eastwards to Bhutan. Within Central Asia as a whole, the genus has a more or less continuous distribution in a narrow band from the northwestern Himalaya of Pakistan, along the Himalayan range and Tibetan plateau to western China. Twenty two species have been reported from Nepal and eleven of these are endemic and mostly local in distribution (Egan & Shrestha in press). Although several species of *Meconopsis* are currently considered threatened (Sulaiman & Hasnain 1996), the conservation status of the majority remains unknown, with a lack of accurate distribution records and baseline ecological data (population dynamics, demography etc.) hampering formal conservation assessment.

Two new species of *Meconopsis* are here described: *M. autumnalis* P.Egan in the series *Robustae* Prain of subgenus *Eumeconopsis* (Prain) Fedde, and *M. manasluensis* P.Egan belonging to subgenus *Discogyne* G.Taylor. The *Robustae* and *Discogyne* were revised by Grey-Wilson (2006a, 2006b), and an updated key to the Nepalese species of *Meconopsis* will be presented in Volume 3 of the Flora of Nepal (Egan & Shrestha in press). The description of these species follows discoveries made during two expeditions to central Nepal in

Accepted by M. Christenhusz: 29 Jan. 2011; published: 1 Mar. 2011

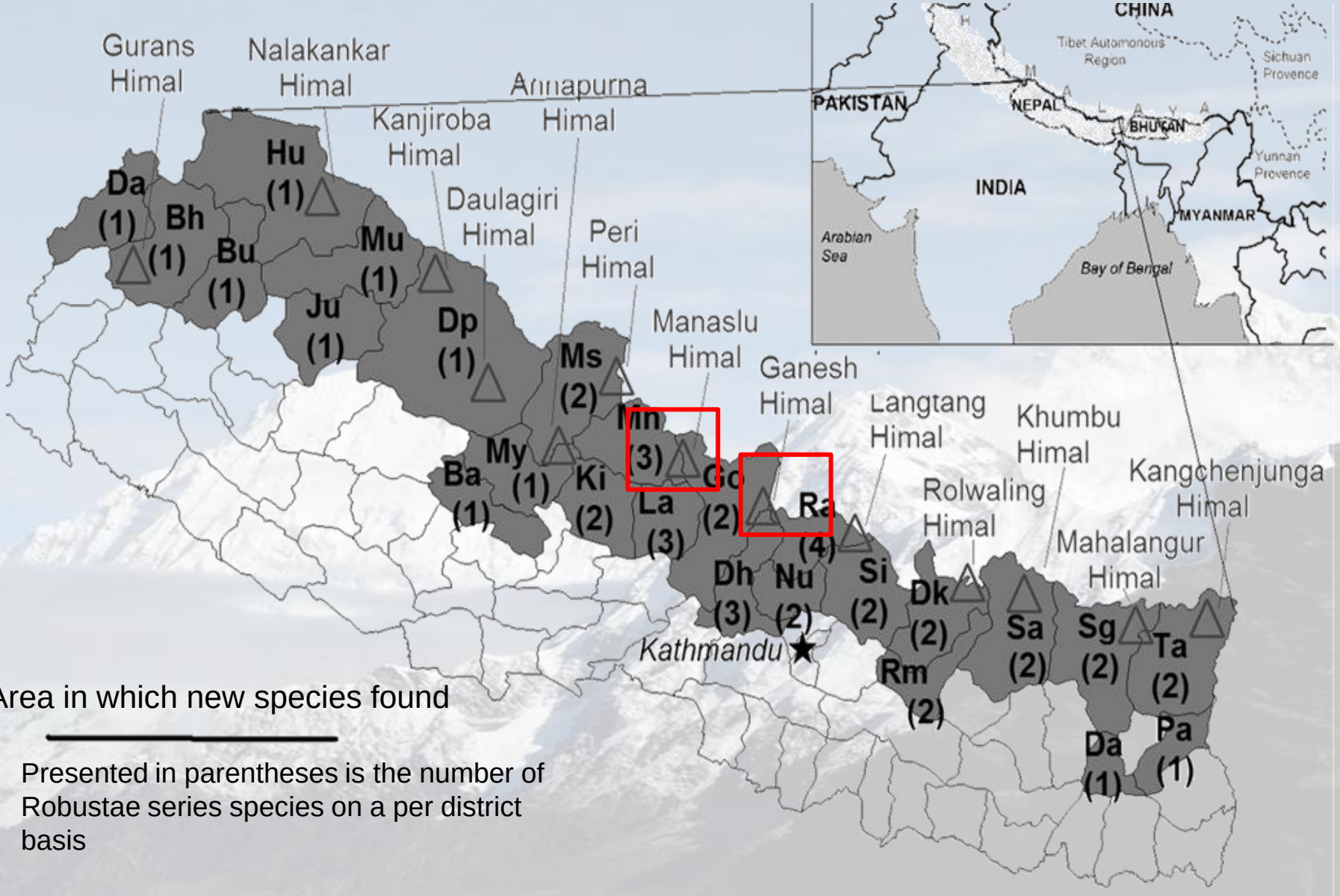
- Presentation & paper freely available (http://www.mapress.com/phytotaxa/content/2011/f/pt00020p056.pdf)

‘No man is an island’

Thanks to:

- **Dr. Colin Pendry** – RBGE/Flora of Nepal
- **Sharon Bradley** – illustrations
- **Dr. Mark Watson** – photos
- **Dr. James Cobb**
- **Dr. David Rankin**
- **Alan Elliott**

Photography:
Mike Hirst, Mark Watson, Margaret Thorne, Chris Grey-Wilson, Harry Jans, Martin Walsh



Area in which new species found

Presented in parentheses is the number of Robustae series species on a per district basis

New species

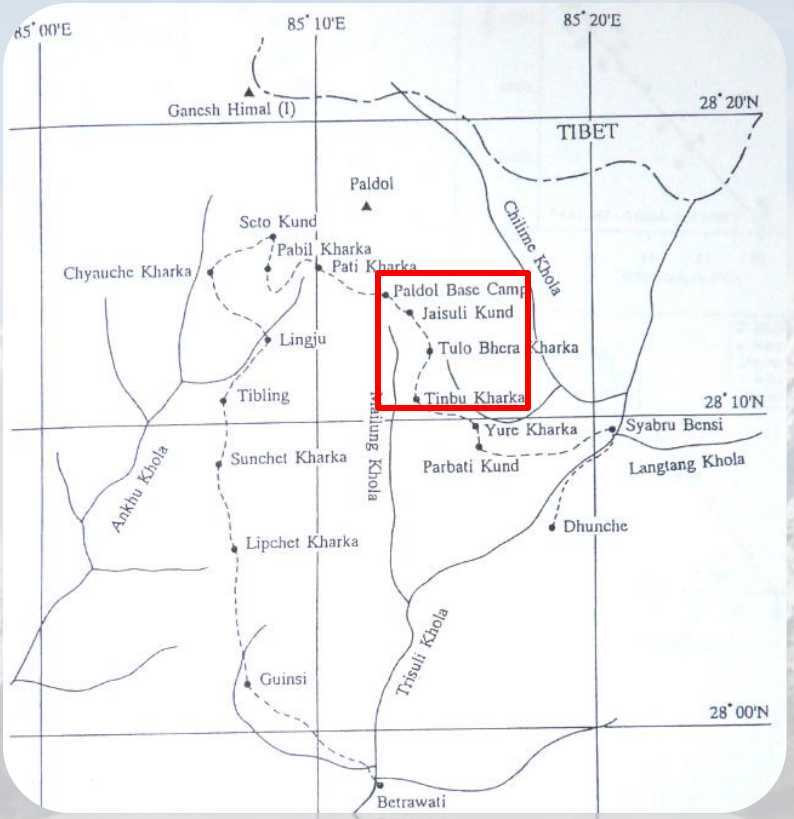
Meconopsis autumnalis P.A.Egan sp. nov.

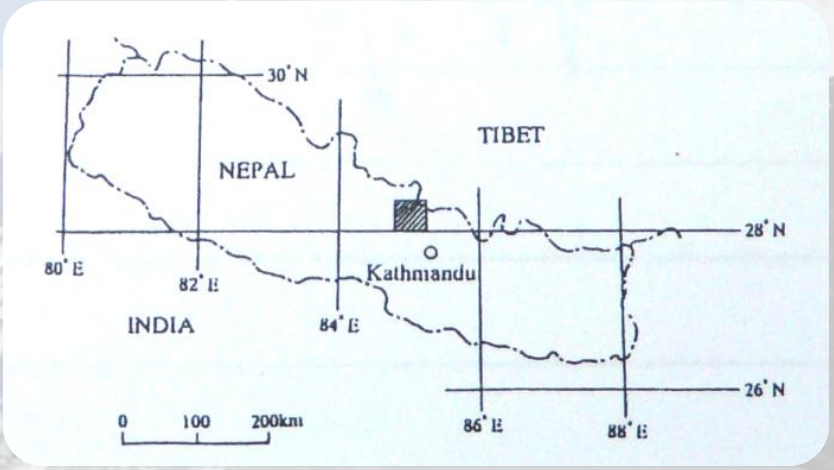
- Within genus = Robustae series
  - Monocarpic perennial
  - Large overwintering rosettes
- Within series = yellow-flowered, tall
- Central Nepal

Meconopsis autumnalis

- Stainton (& Bowes Lyon), Ganesh Himal in 1962
  → Interesting observations on '*Meconopsis sp.*'

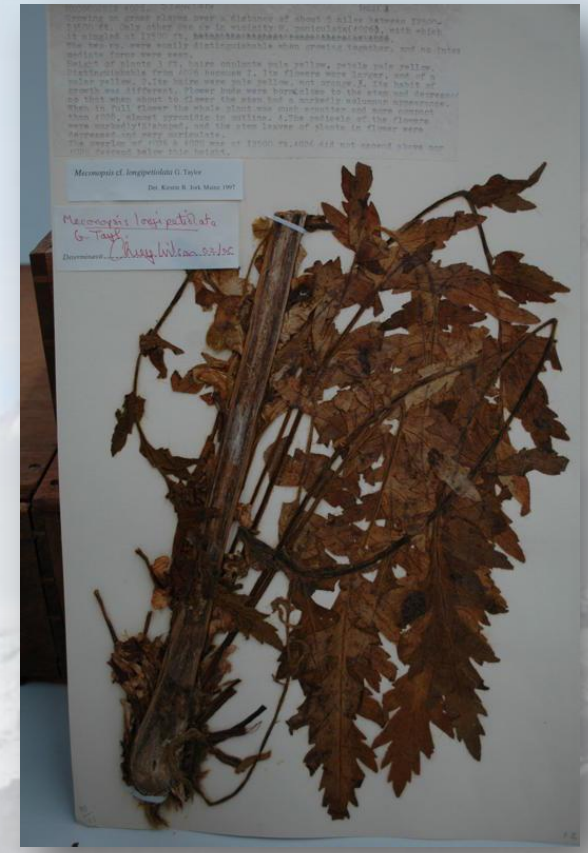
- Japanese (Miyamoto et al.) first floristic inventory in 1994

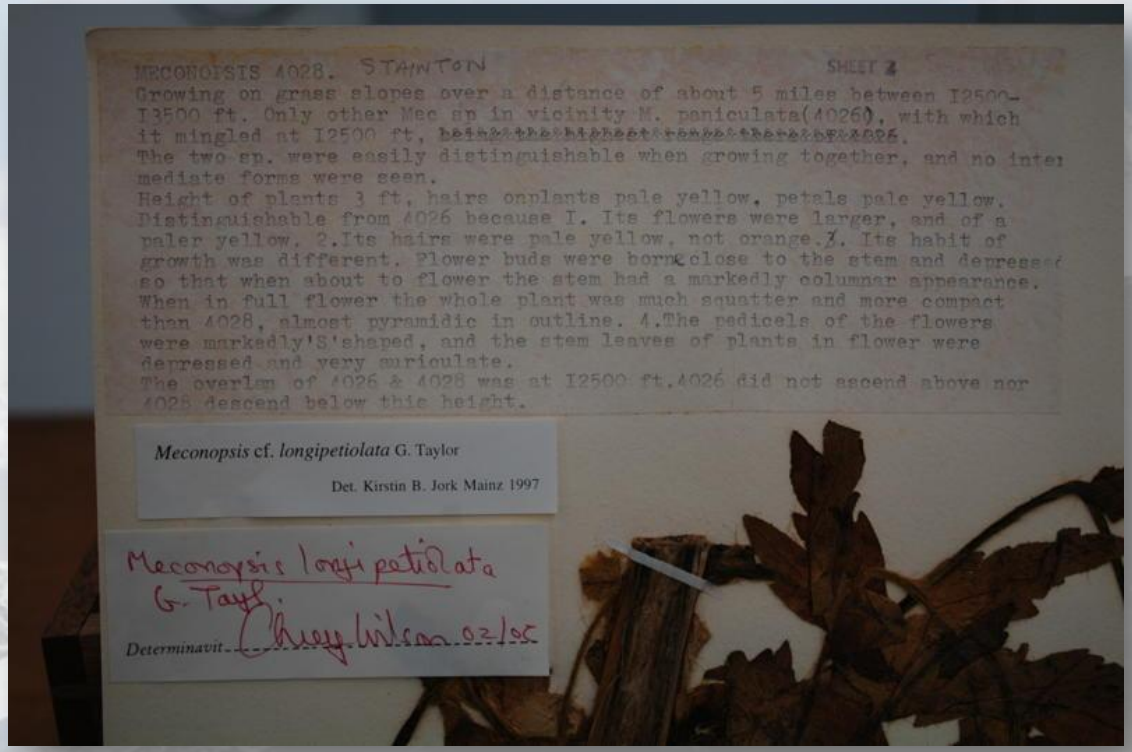




Meconopsis autumnalis

- Stainton (& Bowes Lyon), Ganesh Himal in 1962
  - → Interesting observations on specimen which support new species





Credit: C. Grey-Wilson

Meconopsis autumnalis

Morph. feature	Stainton's entity	*M. autumnalis*	*M. paniculata*	Agreement
Plant height	~ 92 cm	≥ 95 cm	≥ 144 cm	✓
Flowers	Larger, paler yellow	7.5 cm across	6.4 cm across	✓
Pubescence	Pale yellow	Mostly orange	Various	✗
Inflorescence	Densely compact	Densely compact - flws 100	Sparsely compact - flws 117	✓
Cauline leaves	Depressed, auriculate	Depressed, auriculate	Spreading, rarely auriculate	✓

BUT…… how many indiv. Stainton's observation in relation to?

M. paniculata

M. autumnalis

M. paniculata

M. autumnalis

Capsule

Stigma

Cauline leaves

M. paniculata

M. autumnalis

Inflorescence

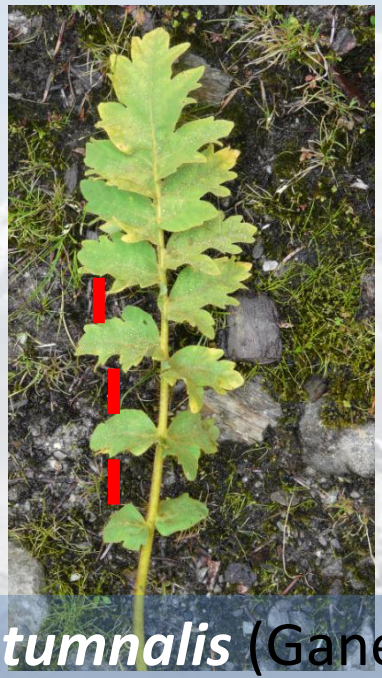
M. paniculata

M. autumnalis

M. napaulensis (of hort.)

M. autumnalis

M. paniculata (Langtang Himal)



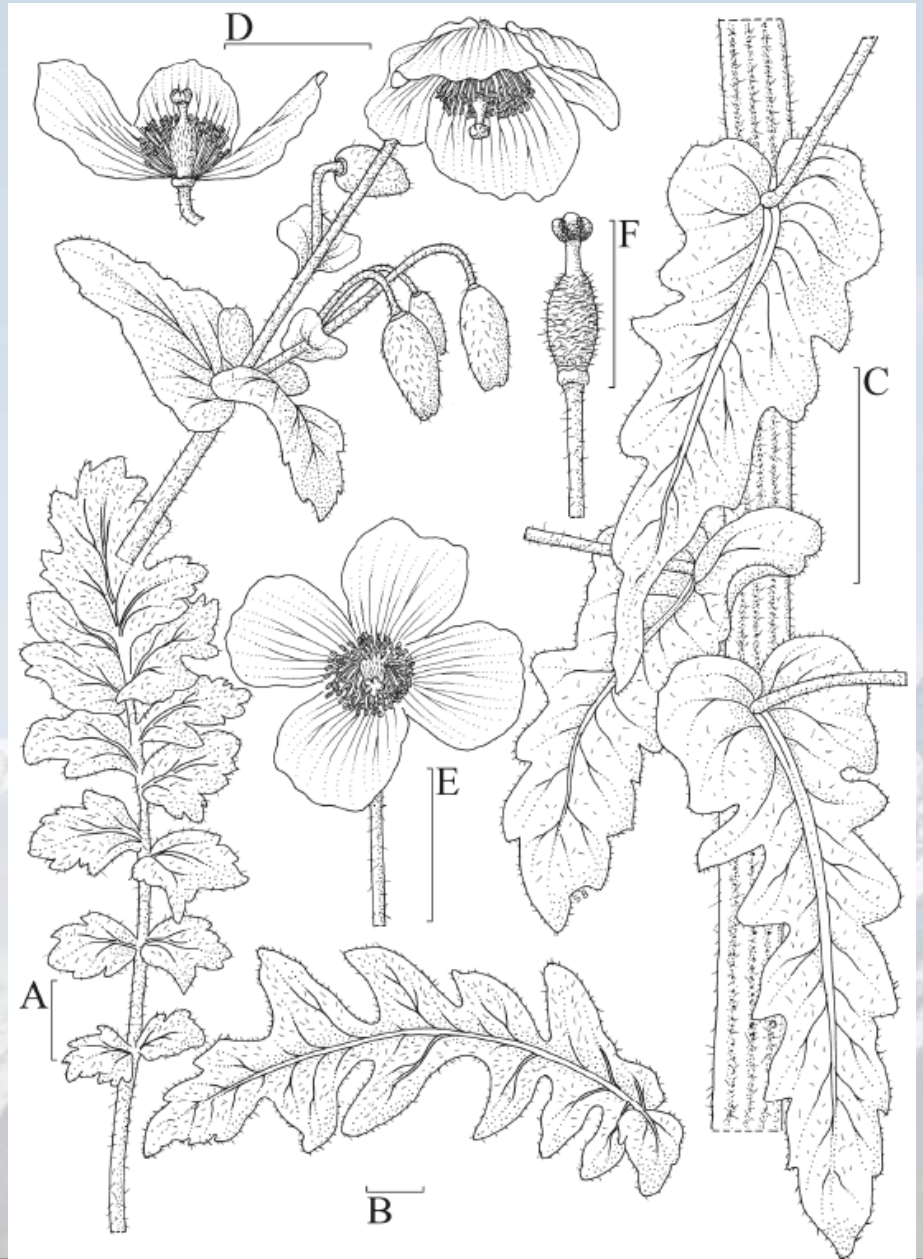
M. autumnalis (Ganesh Himal)

Meconopsis autumnalis - typical

Mike Hirst

Meconopsis autumnalis - the odd ones

Mike Hirst

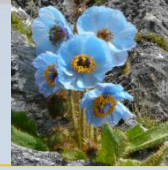


M. autumnalis
- Sharon Bradley

Meconopsis manasluensis P.A.Egan sp. nov.

- Within genus = Discogyne
  - Style with apical disk surmounting the ovary
- Within series = red-purple-flowered
  (i.e. *M. pinnatifolia*, *M. tibetica*)
- C Nepal narrows down
- No. of morphological traits unique
  (Table & picture comparison)

M. manasluensis



Meconopsis manasluensis

Morph. feature	*Mec. sp. nov.* 2	*M. tibetica*
Capsule	Narrowly ovoid to cylindric	Subglobose to broadly ellipsoidal
Stylar disc	Projecting beyond ovary	Not projecting beyond ovary
Inflorescence	Racemose & paniculate	Racemose
Stem no.	4 - 8	1
Buds	Ellipsoidal to narrowly ovoid	Subglobose
Pedicels	Conspicuously elongate	Short
Leaf margins	Entire	Sub-entire to coarsely toothed
Leaf apex	Subobtuse or rounded	Subacute

M. manasluensis - RBGE

M. tibetica – H. Jans & M. Thorne

Morph. feature	*Mec. sp. nov.* 2	*M. tibetica*
Capsule	Narrowly ovoid to cylindric	Subglobose to broadly ellipsoidal
Stylar disc	Projecting beyond ovary	Not projecting beyond ovary
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M. manasluensis - RBGE

M. tibetica – M. Thorne

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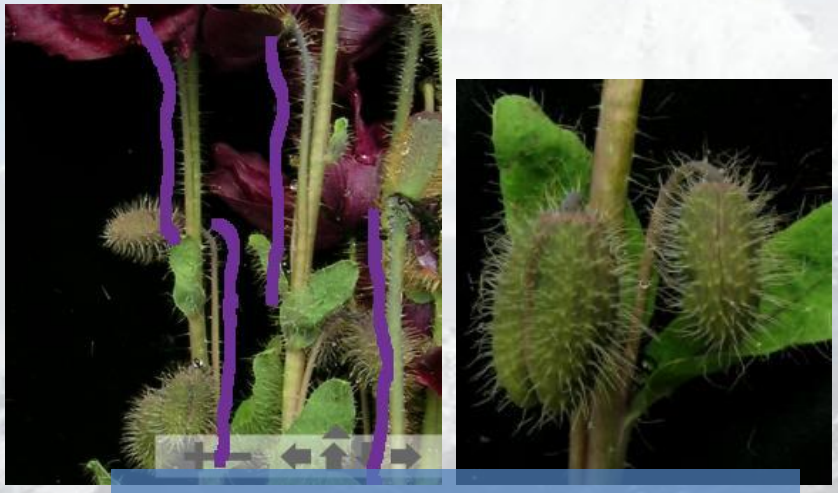

M. manasluensis - RBGE

M. tibetica – H. Jans

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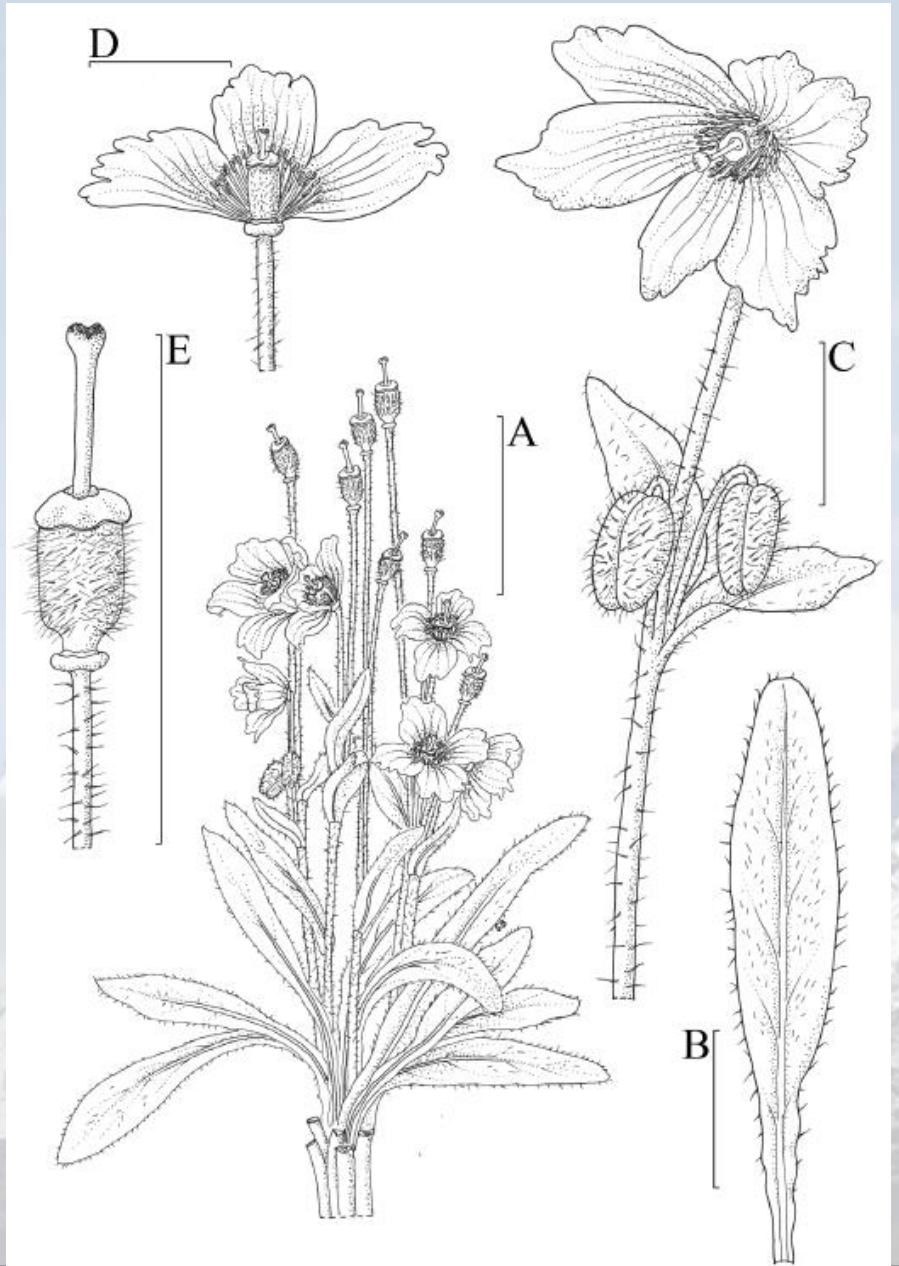
M. manasluensis - RBGE

M. tibetica – H. Jans



M. manasluensis

- Sharon Bradley

Speciation

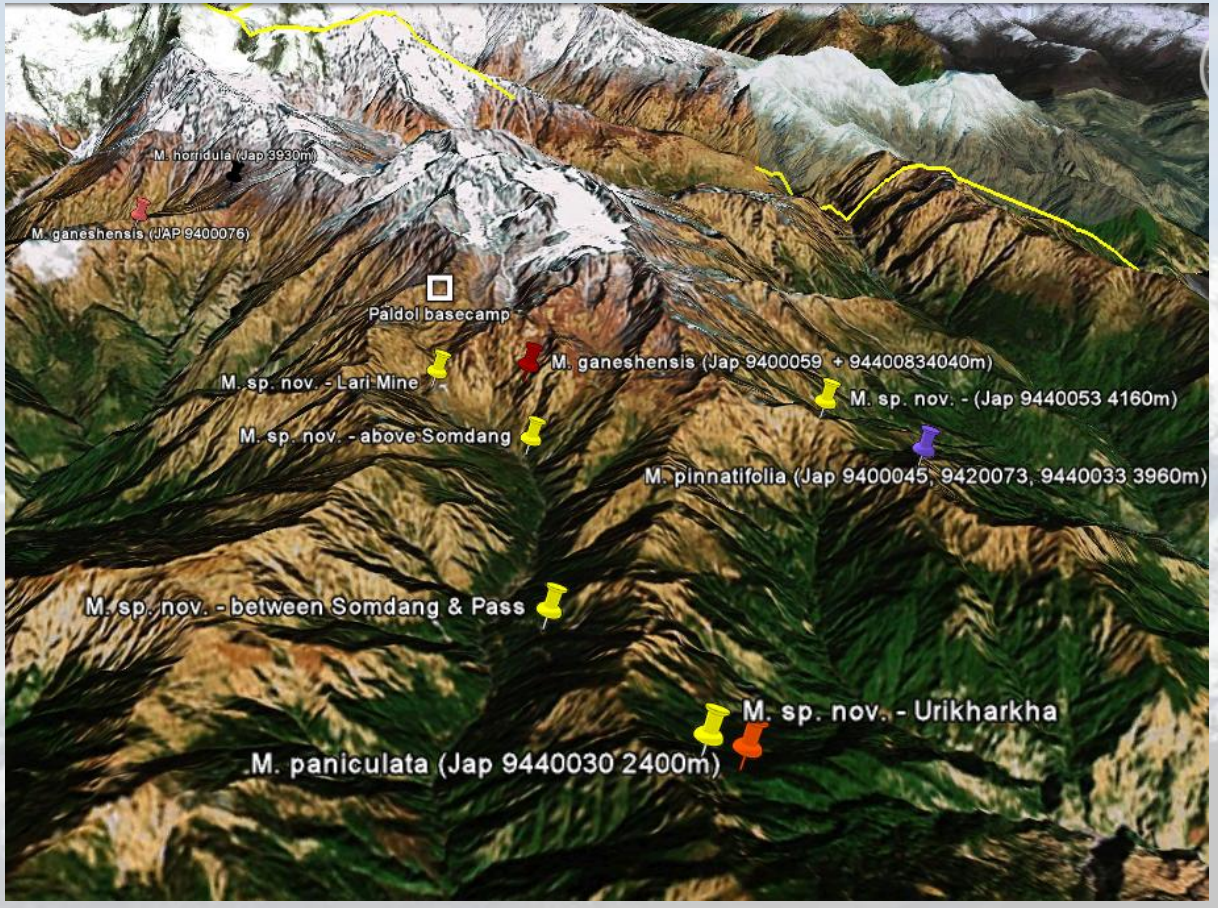
- Flowering ecology (temporal reproductive barriers)

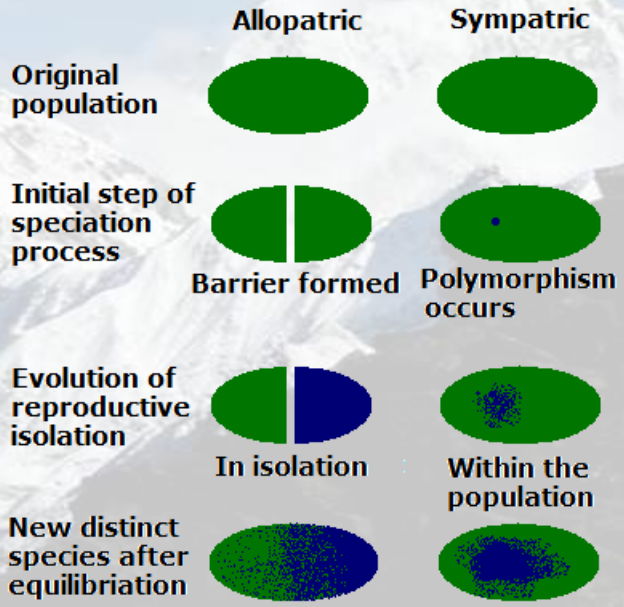
M. autumnalis

17 August 2008

M. paniculata

- Some geographical overlap
  → No morphological introgression observed

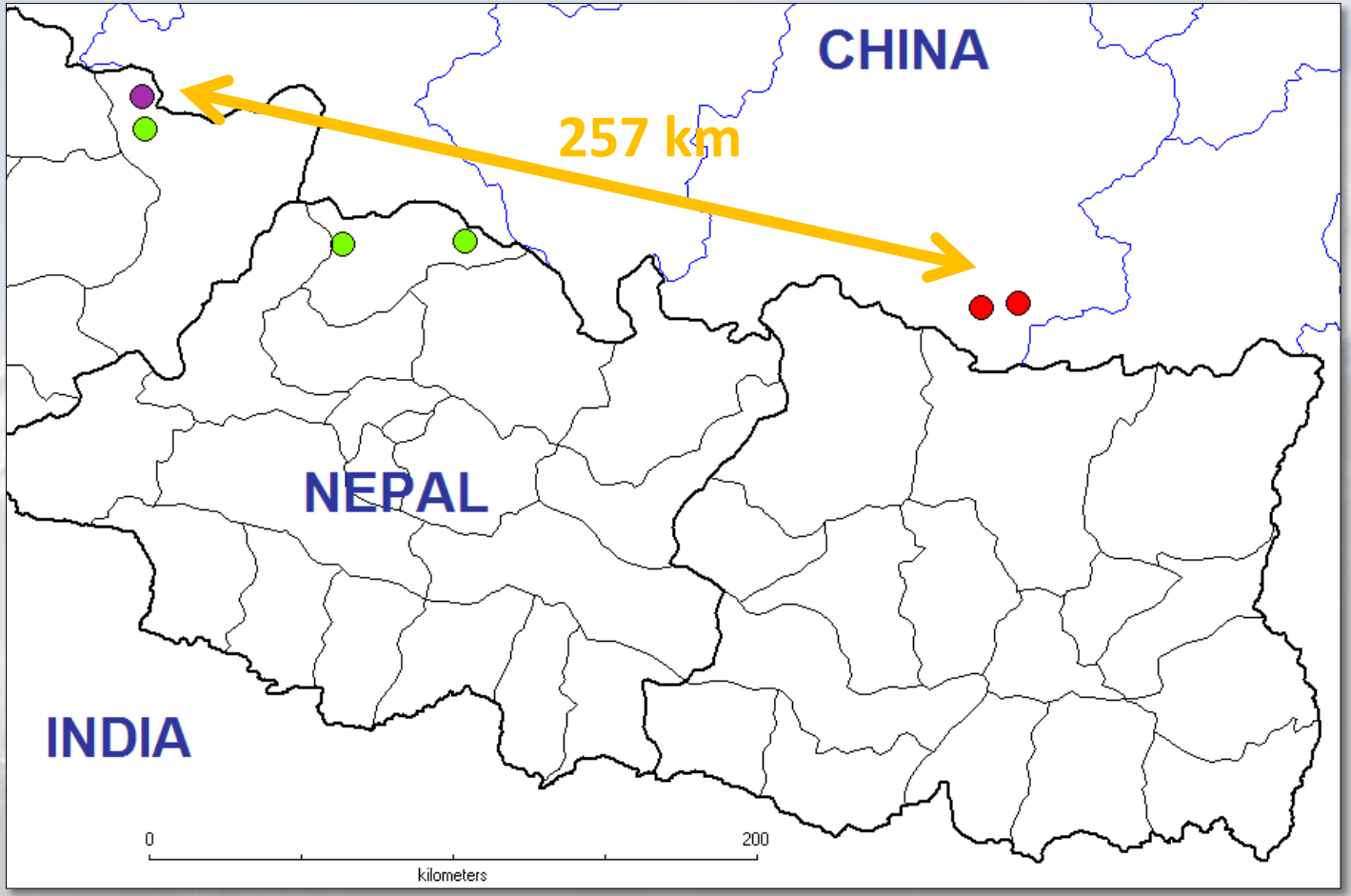




- Competition the driver of sympatric speciation?

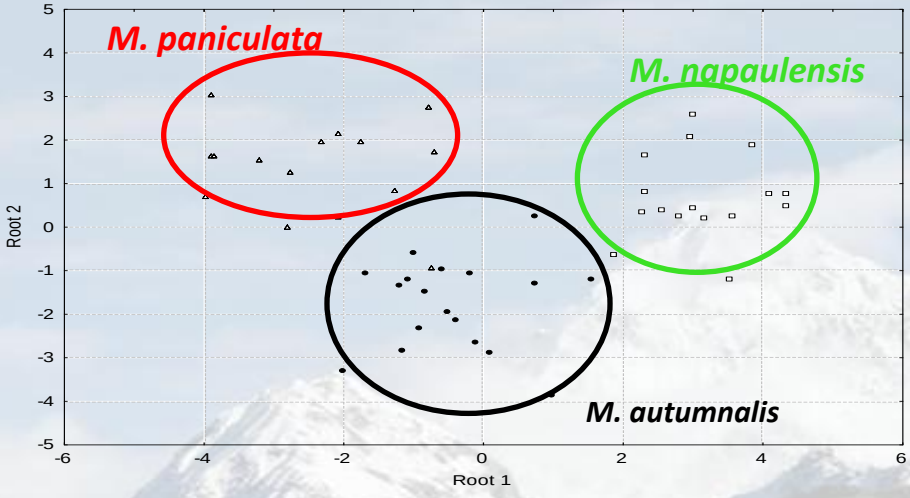
- Mechanisms reproductively isolating species unknown

- Distribution: *M. tibetica* (red), *M. pinnatifolia* (green) & *M. manasluensis* (purple)



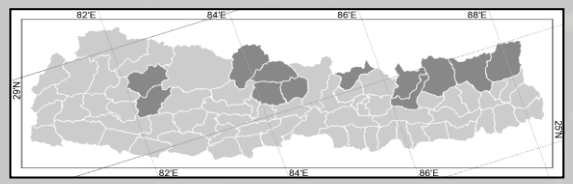
Future

- Morphometric study
  → incl. genetics data



Flora of Nepal

- *Meconopsis*, *Cathcartia* (Egan & Shrestha) - Flora of Nepal (Volume 3)
  → 22 species, 11 endemics + district distribution
  → Internet accessible specialist data



Thank you

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