



Buzz Pollinator Niche Responses Under Climate Change in India

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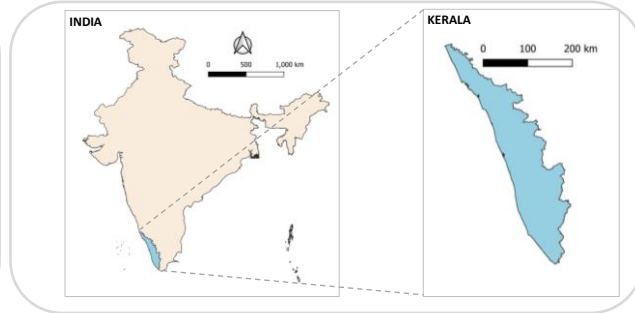
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Introduction

Pollinator losses are a major threat to global food security. Buzz pollinators' inherent ability of sonication is vital for release of pollen from specialised poricidal anthers. Halictid bee, *Nomia westwoodi* or *Hoplonomia westwoodi*, is a native solitary bee that buzz pollinates crops especially of Solanaceae family. Their habitat loss in severe climate may affect agricultural productivity of these plants.

Study area



Objectives

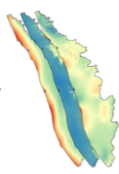
- To explore changes in habitat suitability of bee species *Nomia westwoodi* in historical and future climate.
- To find key bioclimate variables explaining *Nomia* bee distribution.

Methodology

Species data
Nomia westwoodi



Bioclimatic variables



CHELSA (v 2.1)

19 Bioclimatic rasters
Resolution- 30 arc sec
Historical data- 1979-2013
Future data- 2041-2070
GCM- GFDL-esm4
SSP-370, 585

Preprocessing

Species data
Duplicate removal
Spatial thinning (~1 km grid)

Bioclimatic data
Extract to study area
Conversion to ASCII grids



Model fitting

Maxent
(v 3.4.4)

Machine learning
correlative SDM

Output format: Cloglog

Features: Auto
Replicates:10
Iterations:1000
Replicated run type:
Bootstrap

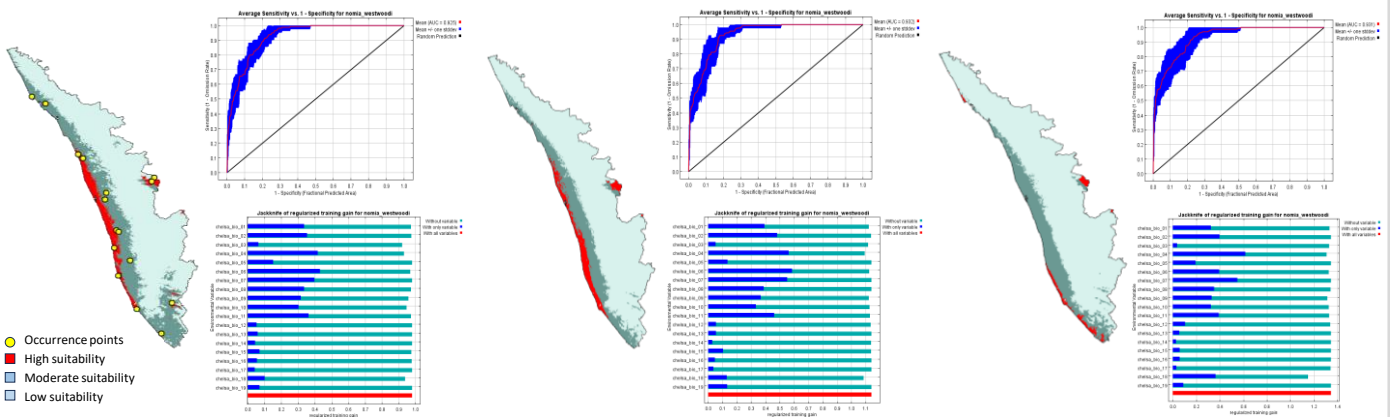
Model evaluation
AUC

Results

Historical (1979-2013)

SSP 370 (2041-2070)

SSP 585 (2041-2070)



Variables contributions (1st 5)

Scenario	Variable	bio_04	bio_06	bio_09	bio_01	bio_03
Historical	Variable	bio_04	bio_06	bio_09	bio_01	bio_03
	%	20.5	18.7	14	11	7.4
SSP 370	Variable	bio_06	bio_04	bio_09	bio_18	bio_01
	%	28.5	26.2	10.7	7.6	5.4
SSP 585	Variable	bio_04	bio_18	bio_06	bio_07	bio_09
	%	25.9	21.2	14.1	9	8.4

Conclusions

High suitable habitat areas of *Nomia westwoodi* is projected to undergo both shifts and decline from historical potential distributions.

Bioclimatic variables **bio_04** (Temperature Seasonality), **bio_06** (Min Temperature of Coldest Month), **bio_09** (Mean Temperature of Driest Quarter) are important in defining *Nomia* bee habitat in various climate scenario.