Implementation of Global Pollination Project in India – an Overview

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Objectives & Components...

The development objective:
To achieve improved food security, nutrition and livelihoods through the enhanced conservation and sustainable use of pollinators

The immediate objective:
To harness the benefits of pollination services provided by wild biodiversity for human livelihoods and sustainable agriculture, through an ecosystem approach in selected countries

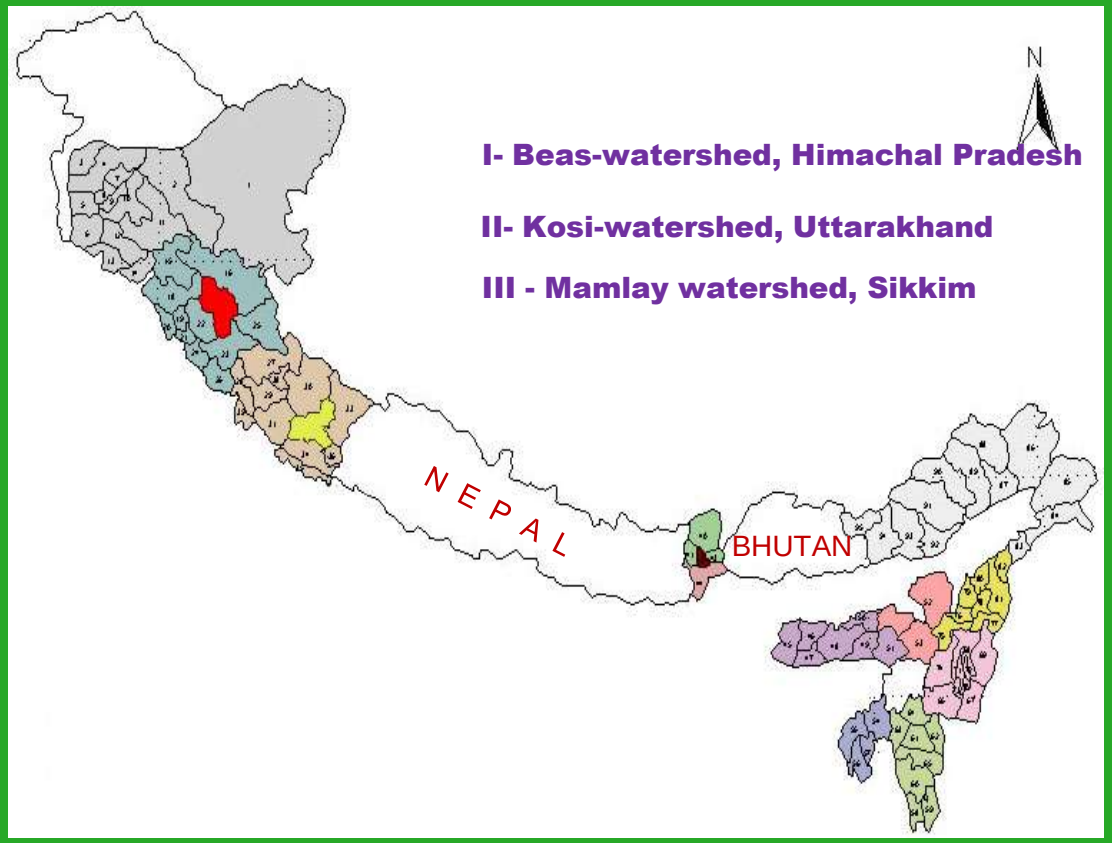
Development of a knowledge base

Extension & promotion of pollinator friendly Best Management Practices

***Capacity building for* Conservation and Management of Pollination Services**

Public awareness, mainstreaming and information sharing

India - *Target Area and Crops...*



India – *Target crops…*

Apple (*Malus domestica*)
Economically High Value horticultural crop

HP 892112 MT production

Large Cardamom (*Amomum subulatum*)
- major perennial cash crop of Sikkim .

An agrforestry species; + 4360 MT production ; 13.6 Million US $ cash flow

Mustard (*Brassica campestris*) grown for sustenance as mixed crop with wheat

Declining production…

Public Awareness – baseline…

STEP SITE	Target group	Total Number of respondents	Knowledge of pollination
Beas Watershed	Farmers/Orchardist	**175**	**167 (95.4%)**
Kosi -Watershed	Farmers	283	103
	Researchers	13	9
	Agricultural scientists	13	13
Total		**309**	**125 (40.4%)**
Mamlay-Watershed	Teachers	32	21
	Students	30	6
	Farmers	120	27
Total		**182**	**54 (29.6 %)**

Capacity Building - stakeholders

Knowledge baseline and trend assessment at beginning-stakeholders

Onsite demonstration on pre-design formats for socio-economic evaluation of pollination services

Organization and Integration of pollination component in the ToT programmes in the region

Organization of student/teacher focused biodiversity conservation trainings focusing on pollinators and their services

Capacity Building – knowledge generation…

On-site training by expert(s)

- STEP Site Managers
- STEP Site Partners
- Volunteer Students
- Progressive farmers

Field training (specimen collection & record keeping)

- Volunteer students
- Selected farmers

Good Practices - farmers profiles...

Khub Singh Negi – 83 year old fruit tree grower follows several good practices, which he has shared widely.

He sets an example of efficient record keeping by a farmer

Believes on formal trainings

PhurbaTshering Sherpa *(Upper Jubari)* & PassangChoajang *(Lower Jaubari)*

- part of a close-knit farming community of about 66 households, in the upper part of the Mamlay watershed near Namchi, Sikkim, both of them are trying to build farmers groups to effectively tackle the declining production of large cardamom

Prem Ballabh Pandey – a progressive farmer, who has been working towards strengthening of traditional farming system and promoting new livelihood options including apiculture.

Trends of Pollinator Diversity
&
Impacts on Yield

Apple Site– India...

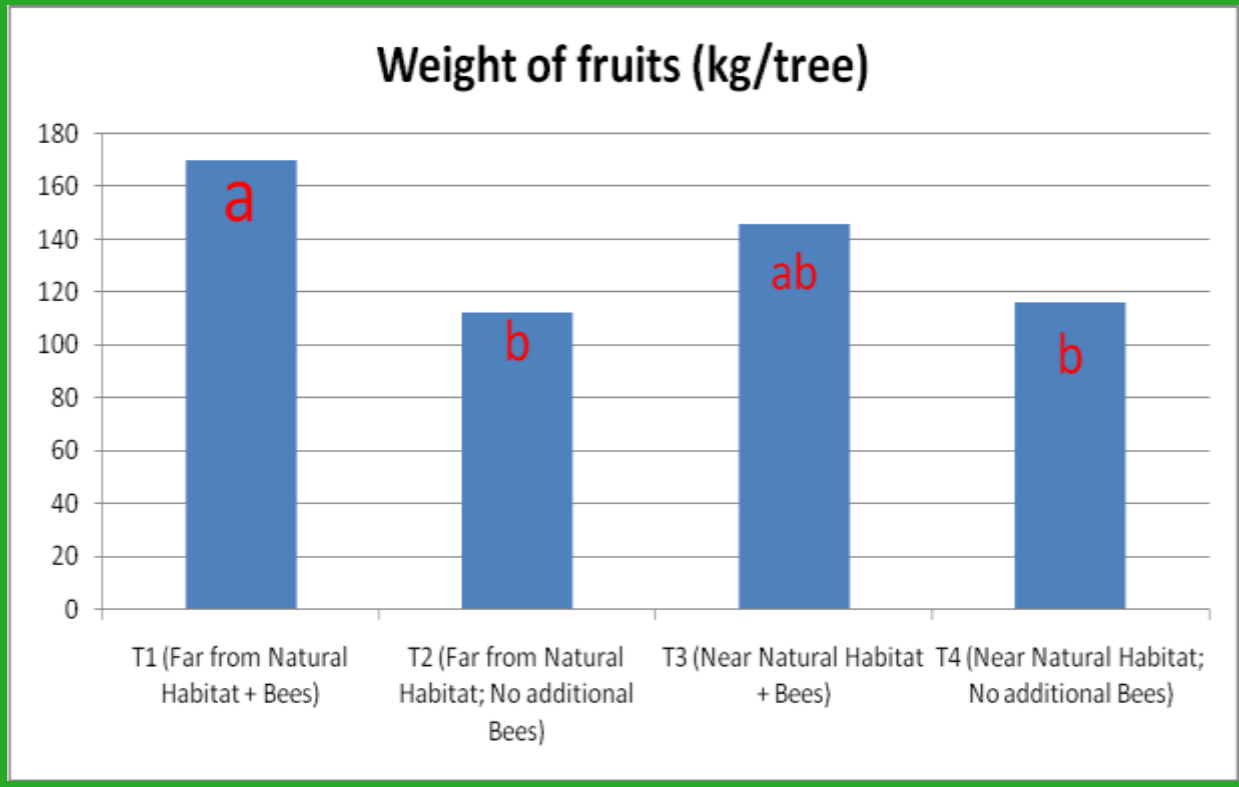
Scan Sampling (Annex 4)

[Observation of visitors on 250 open flowers]

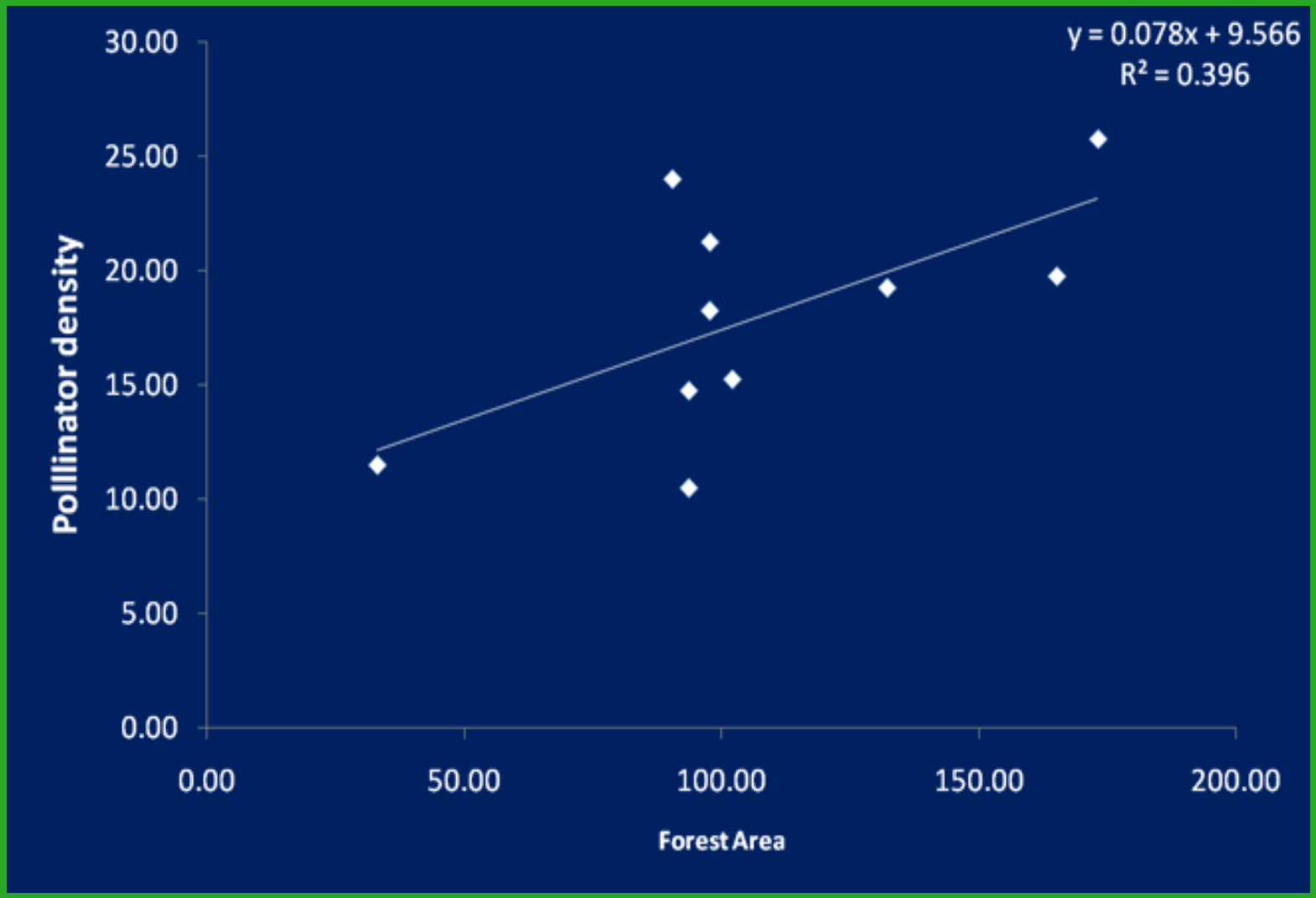
1. ***Apis cerana*** **as most frequent visitor followed by *Apis mellifera*, Syrphids, Dron flies and other wild bees**
2. **Increased *Apis mellifera* frequency in orchards with introduced bee hives**
3. **More Syrphid flies were found on the bloom in orchards near to the natural habitat**
4. **Poor density of Bumble bees**

Apple production…

Plots supplied with bee hives exhibit significantly increase in the apple production in intervention sites located far from natural habitats.

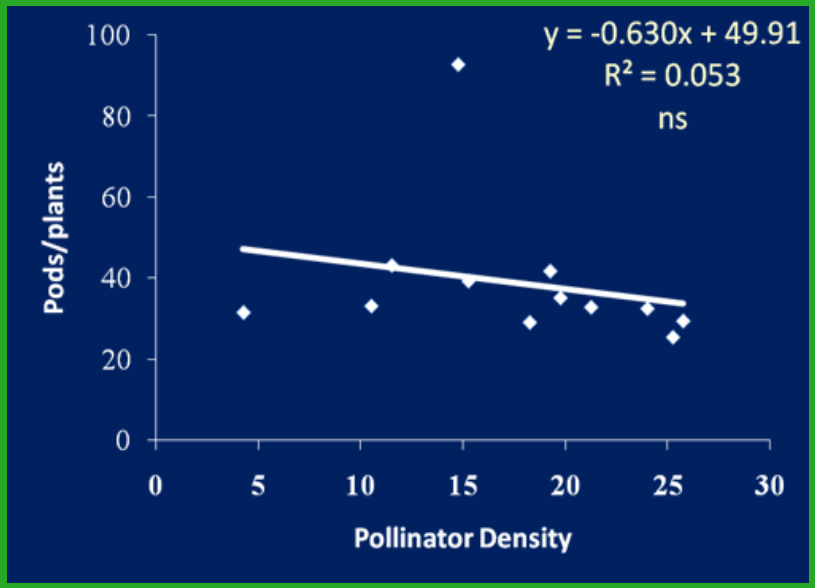


Mustard - Impact of forest availability...

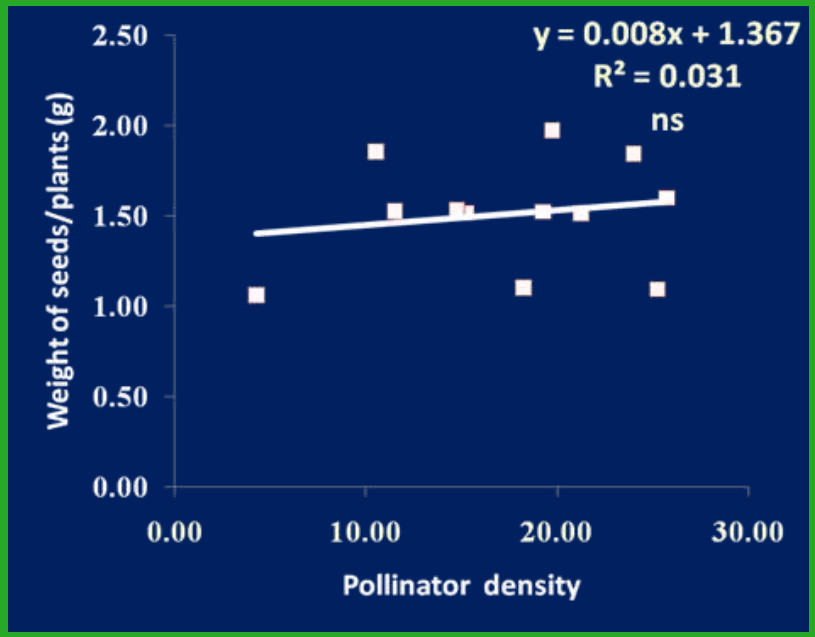


Impact of pollinator density ...

Number of pods per plant decline (ns, P>o.o5)



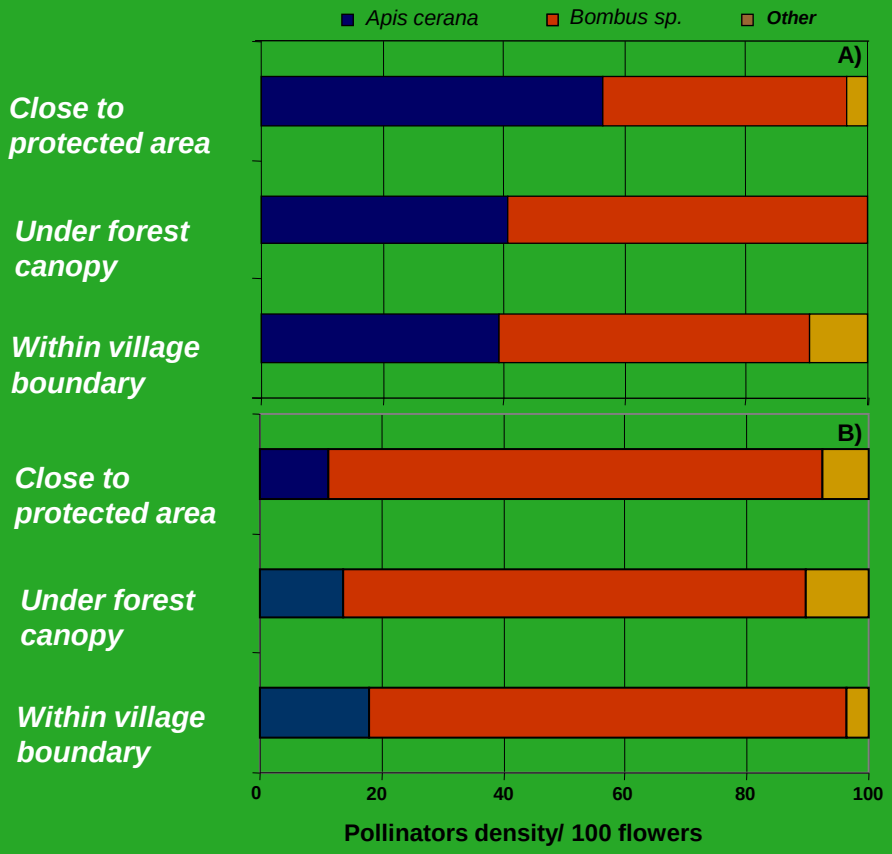
Per plant seed weight increases (ns, P>o.o5)



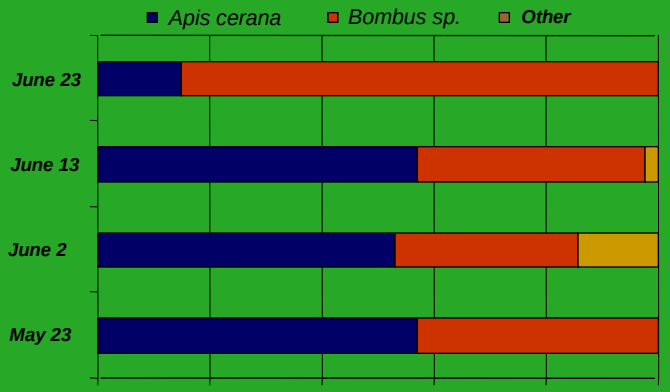
Impact of pollinator density ...

Pollinators	2010		2011	
	Introduced	Un introduced	Introduced	Un introduced
Indian bee	1.32	0.59	1.96	0.83
Italian bee	1.23	-	0.71	-
Other bees	0.15	0.16	0.04	0.13
Drone flies	0.15	0.23	0.11	0.19
Syrphids	0.17	0.12	0.23	0.22
Wasps	0.01	0.20	0.01	0.13
Butterflies	0.03	0.13	0.09	0.10
Other Dipterans	0.32	0.22	0.25	0.24
Yield (kg/ha.)	776.5	696.5	996.0	784.5

Large cardamom ...

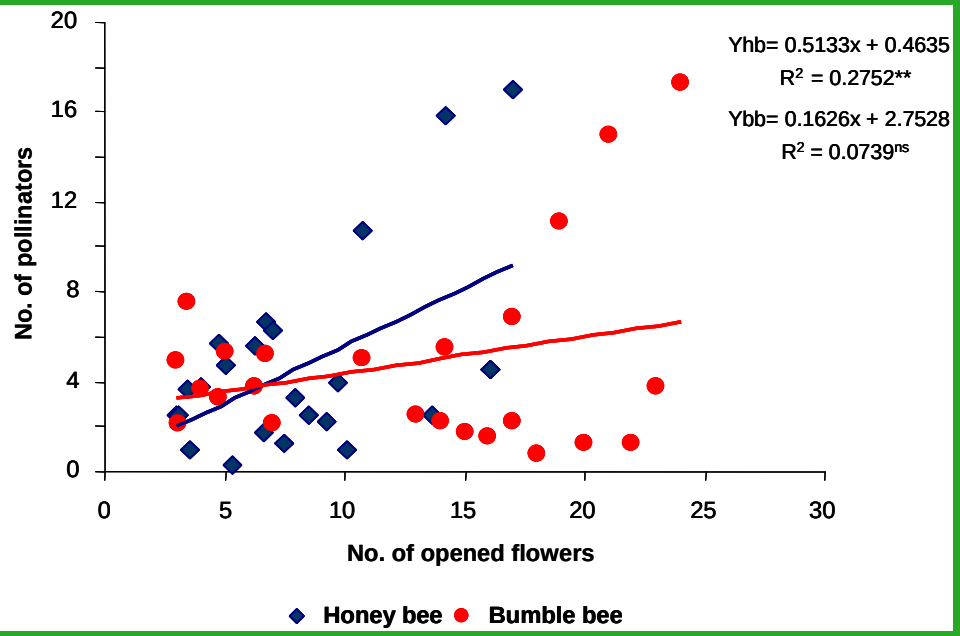


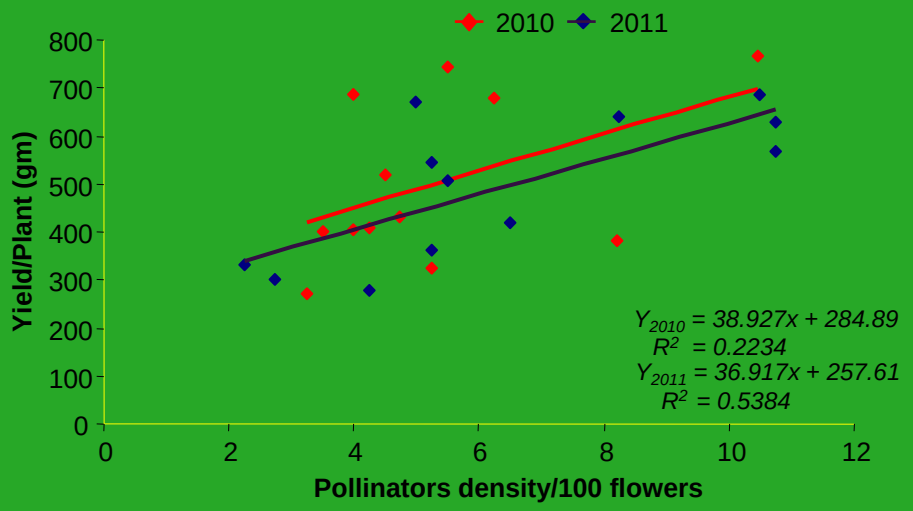
Effect of pollinator density per 100 flowers between sites in large cardamom crop for 2 years



Effect of pollinator density per 100 flowers between time frame in large cardamom crop for year

Large cardamom ...





Relationship between number of flowers on large cardamom and number of pollinators

Impact of pollinators density on production of large cardamom

Number of honeybee increased with increasing the number of flowers per plant of large cardamom (P<0.01)

Welcome to Indian Himalaya…

Thanks