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Mango in Association with Other Angiosperms in Gangetic West Bengal

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Abstract

A comprehensive and capacious floristic overview stretching out a span of over five years starting from 2000 has divulged that the entirety of 55 species of most commonly occurring angiosperm weeds grow in mango agro-ecosystems in Gangetic West Bengal. The chief families of the angiosperm-weed flora are poaceae, Cyperaceae, Asteraceae, Solanaceae, Loranthaceae, Orchidaceae, Moraceae, Malvaceae, Labiatae, Amaranthaceae, Acanthaceae and Convolvulaceae.
Key words : Angiosperm, Mango, Plant association, Weed.

In West Bengal the mango (*Mangifera indica* L.) is distributed throughout the length and breadth of the state except in hilly regions. The crop occupies about 80.9 thousand hectares in 2007-08 which is 41.64% of the total area under fruit crops (1—3). Vascular plants are integral part of mango orchards and among these angiosperm-weeds is serious menace to this crop. They compete with mango at all the stages of development for moisture, nutrient and light besides harboring insects, pests and diseases thereby reduce the organic productivity and growth characteristics. Inspite of this, weeds prevent soil erosion, add humus to the soil, used as fodder crops, provide important sources of nutrition to the wildlife and may be served as potential medicines and proteins. But rapidly changing climate and anthropogenic activities are adversely affecting these flora. The structure and composition of vegetation at a local scale is shaped by environmental factors and the diversity of plant species is strongly related to these. This paper provides the first hand information on the floristic diversity of mango based agro-ecosystems of Gangetic West Bengal and it virtually enumerates the angiosperm diversity.

Methods

West Bengal is a part of the Eastern India located between $21^0 31'$ and $27^0 14'$ N latitude and $85^0 51'$ and 89^0E longitude. The tropic of cancer passes through the middle of the state. The survey area is under the Gangetic Alluvial Zone. Climatically the region comes under tropical humid with rainfall of 1, 350 to 1,650 mm, annual normal temperature maximum 35. 0 C and minimum 15.6 C. The region is composed of alluvium carried by river Ganga and its tributaries. Soils are deep, medium fine to medium in texture, neutral to mildly alkaline in pH. Calcareousness is significant in large section, base saturation moderately high, NP status medium to medium low and potash status is medium to high, external drainage medium to low and internal drainage is moderate.

The orchards under study were specially selected to be the distant areas from highway, railway and residential zones. The vegetation was studied by quadrat method. The size of the quadrat was standardized to be one sq meter of effective measurement in the orchard to measure the density, abundance and frequency at the particular region. About ten quadrats were measured per orchard and all together fifty orchards were studied for the purpose. The checklist of the angiosperms was made and the plants were systematically arranged into their respective families and genera.

Results and Discussion

From the investigation of the assemblage of the indigenous and acclimatized angiosperms mingled with mango orchards of the Gangetic West Bengal, it is divulged that this domain is a preponderant zone of mesophytic Indo-Malayan elements in terms of

Table 1. Angiosperms occurring in association with *Mangifera indica* L.

	Taxon	Family
	I. Parasites	
1.	*Dendropthoe falcata* (L.f.) Ettingsh	Loranthaceae
2.	*Macrosolen cochinchinensis* (Lour.) Van Tiegh.	Loranthaceae
3.	*Viscum orientale* Willd.	Loranthaceae
	II. Epiphytes	
4.	*Acampe praemorsa* (Roxb.) Blatt and McCann	Orchidaceae
5.	*Rhynchostylis retusa* (L.) Bl. Bijdr.	Orchidaceae
6.	*Vanda tessellata* (Roxb.) Lodd ex. G. Don	Orchidaceae
	III. Permanent Epiphytes	
7.	*Allophylus serratus* (Roxb.) Kurz.	Sapindaceae
8.	*Ficus benghalensis* L.	Moraceae
9.	*Ficus religiosa* L.	Moraceae
10.	*Ficus rumphii Blume,* Bijdr.	Moraceae
11.	*Thespesia populnea* (L.) Soland. ex. Corr.	Malvaceae
	IV. Under Growth	
12.	*Abutilon indicum* (L.) Sw.	Malvaceae
13.	*Anisomeles indica* (L.) O. Ktze.	Labiate
14.	*Clerodendron infortunatum* auct. mult. non. L.	Verbenaceae
15.	*Costus speciosus* (Koen. ex. Retz.) Sw.	Zingiberaceae
16.	*Croton bonplandianum*	Euphorbiaceae
17.	*Desmodium gangeticum* (L.) Dc.	Fabaceae
18.	*Flacourtia indica* (Burm. f.) Merr.	Flacourtiaceae
19.	*Glycosmis pentaphylla* Dc.	Rutaceae
20.	*Leea crispa* Van. Royen.ex.	Leeaceae
21.	*Pavetta indica* L.	Rubiaceae
22.	*Pogostemon benghalensis* (Burm.f.) O.	Labiatae
23.	*Triumfetta rhomboidea* Jacq.	Tiliaceae
24.	*Solanum erianthum* D.Don.	Solanaceae
25.	Solanum sisymbriifolium Lam.	Solanaceae
26.	*Urena lobta* L.	Malvaceae
	V. Ground Cover	
27.	*Achyranthes aspera* L.	Amaranthaceae
28.	*Aerva lanata* (L.) Juss. ex.	Amaranthaceae
29.	*Ageratum conyzoides* L.	Asteraceae
30.	*Alocasia fornicata* (Roxb.) Schott.	Araceae
31.	*Andrographis paniculata* (Burm.f.) Wall.	Acanthaceae
32.	*Centella asiatica* (L.) Urb.	Umbeliferae
33.	*Cleome viscosa* L.	Cleomaceae
34.	*Colocasia esculenta* Schott.	Araceae
35.	*Commelina benghalensis* L.	Commelinaceae
36.	*Evolvulus nummularius* L.	Convolvulaceae
37.	*Hemigraphis hirta* (Vahl.) T. Anders	Acanthaceae
38.	*Mimosa pudica* L.	Mimosaceae
39.	*Parthenium hysterophorous* L. sp. pl.	Asteraceae
40.	*Physalis minima* L	Solanaceae
41.	*Solanum torvum* Sw.	Solanaceae
42.	*Vernonia cinerea* (L.) Less	Asteraceae
	VI. Ground Cover (Grass and Sedge)	
43.	*Cyperus compressus* L.	Cyperaceae
44.	*Cyperus corymbosus* Rottb.	Cyperaceae
45.	*Cyperus iria* L.	Cyperaceae
46.	*Cyperus rotundus* L.	Cyperaceae
47.	*Dactyloctenium aegyptium* (L.) Wild.	Poaceae
48.	*Oplismenus compositus* (L.) P. Beauv.	Poaceae
49.	*Setaria glauca* (L.) P. Beauv.	Poaceae
50.	*Saccharum spontaneum* L.	Poaceae
51.	*Echinochloa colona* (L.) Link	Poaceae
	VII. Climbers	
52.	*Coccinia grandis* (L.) Voigt.	Cucurbitaceae
53.	*Hoya carnosa* (L. f.) R. Br.	Asclepiadaceae
54.	*Mikania scandens* Auct. non. (L.) Willd.	Asteraceae
55.	*Ipomoea pes-tigridis* L.	Convolvulaceae

parasites, epiphytes, under growth and ground cover vegetations. This study has yielded factual and requisite information for an updating of the associated orchard flora in mango. It is worth mentioning that due to many industrial activities and hasty colonization and urbanization of the rural areas, unmerciful felling and ruination of the old plants, the primeval formation have long been ceased to be visible and the domain at once seems to be virtually penurious of any formation in commercial orchards. In the existing context, the vegetation of the orchards is unnatural

and pretended rather than original. However, the following species are found common in and around the natural orchards of Gangetic West Bengal (Table 1). The chief families of the associated flora of mango orchards are : Poaceae, Cyperaceae, Asteraceae, Solanaceae, Loranthaceae,Orchidaceae, Moraceae, Malvaceae, Labiatae, Amaranthaceae, Acanthaceae and Convolvulaceae.

In total 55 species representing 47 genera of 12 monocot and 43 dicot families are enumerates (Table 1). Poaceae is the most dominant family in the floristic scenario of orchard eco-system. In general, all the six taxa belonging to the family Loranthaceae and Orchidaceae are epiphytes. Among these six, *Dendropthoe falcata* (L.F.) Ettingsh is most bountiful. This taxon rises on the leading branches. The important orchid-epiphytes are *Acampe praemorsa* (Roxb.) Blatt and McCann., *Rhynchostylis retusa* (L.) Bl. Bijdr and *Vanda tessellata* (Roxb.) Lodd. ex. G.. Don. All the orchid species rise on the premier trunk. These taxa grow exuberantly on dense bark with ponderous mossy wreckage and uneven, rugged and cracked bark-surface. *Allophylus serratus* (Roxb.) Kurz., *Ficus benghalensis* L., *F. religiosa* L., *F. rumphii* Blume. Bijdr. and *Thespesia populnea* (L.) Soland. ex. Corr. occasionally grow in shaded fissures and crevices of mango trees besides their terrestrial growth. The predominant under growth vegetations are *Abutilon indicum* (L.) Sw., *Allophylus serratus* (Roxb.) Kurz., *Glycosmis pentaphylla* Dc., *Triumfetta rhomboidea* Jacq., *Costus speciosa* (Koen. ex. Retz.) Sw. and *Leea crispa* Van Royen ex. L. The dominant ground cover flora are *Alocasia fornicata* (Roxb.) Schott., *Colocasia esculenta* Schott., *Vernonia cinerea* (L.) Less, *Solanum torvum* Sw., *Commelina benghalensis* L., *Centella asiatica* (L.) Urb. and some grasses and sedges. *Mikania scandens* auct. non (L.) Willd. is a long climbing species found commonly in mango ecosystem. *Saccharum spontaneum* L. has been confined to out of the way and secluded orchards.

Parthenium hysterophorus L. sp. pl. is indubitably modish emigrant since some 50 years ago and it is discovered any where in the Gangetic West Bengal vis-a-vis in the mango orchards. It replaces other plants causing imbalances in the bio-diversity and yield losses in mango. Aroid like *Colocasia esculenta* Schott. is the well known member of the family Araceae for its edible value in West Bengal. The species is traditionally used to cure various disease and sources of food by the local and tribal people. The mango orchards also help to preserve medicinal plant species like *Centella asiatica* (L.) Urb., *Andrographis paniculata* (Burm. f.) Wall, *Costus speciosus* (Koen. ex. Retz.) Sw. *Coccinia grandis* (L.)Voigt., *Croton bonplandianum* Baill.

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