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ORIGINAL ARTICLE

Weed species composition of Pineapple based cropping system at Northern Part of West Bengal, India.

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ABSTRACT
Weed flora is a common problem in any crop field.For the better management of crop understanding of weed vegetation is obligatory.Though Pineapple is one of the most stress tolerating plant but it cannot cope with a number of competitive weeds at a time. Hence, the present study was aimed at documenting the weeds in Pineapple fields of Northern part of West Bengal.Weed surveys are useful for determining the phytosociological and ecological status of weed species in agricultural fields and their impact on the crop. The purpose of this study was also to evaluate the level of the diversity and species richness of weed in the Pineapple field. Randomly selected 60 fields were surveyed using 1m X 1m quadrate. The coverage (percentage) of 1m and the average height of each species (cm) in each quadrate were measured. Species abundance was expressed as the average height (cm') and species diversity was calculated using Shanon-Wiener Index (H).
Key Words: *Weed, Pineapple field, Phytosoiology, IVI, Community Index, Control, aggressiveness.*

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INTRODUCTION

Weed is defined as "a plant out of place or an unwanted plant or a plant with a negative importance or plant that compete with man for the soil''[1].Weed flora is a common problem of every crop field and cause troublesome in crop field. For management of weed control it is necessary to determine the phytosociological status. Phytosociological surveys are very useful for determining the ecological status of weed species in crop fields [2] and impact of the weeds on the crop. Weed species occur in high abundance in all agricultural lands. Weeds having tendency of numerous seed production and efficient capability to resist the adverse environmental condition. They have effective spatial dispersal ability and/or persistent propagule like tuber, rhizome seeds etc[3-4] .Thus, weed propagule originating from adjacent sources have a high potential to penetrate and incorporate into an agricultural field. Presence of weeds is a serious problem of any commercial gardens or field and such weeds cause a great loss in yield.The control measure of such weed is a major challenge to the cultivated and managing authorities of the agricultural fields. The problem is same in the Pineapple fields. Pineapple dominates the world trade of tropical fruits, although other fruits have gained market share.It is the best positioned fruit since its trade is oriented to developed countries as Japan, USA and Europe communities [5].Pineapple i.e., *Ananas comosus* (L) Merr. belonging to family Bromeliaceae is also considered as one of the important economic crops of West Bengal. Weed interference is one of the most important factors to decrease the yields of Pineapple up to 34% [6].

Pineapple is a non climacteric tropical fruit plant. It is the third most important tropical fruit in the world production after Bananas and Citrus.It is highly valued for its nutritional and nutraceutical properties. It has properties that help to fight against various illness and sicknesses such as sinusitis, arthritis, indigestion, infections of the stomach and intestines. Due to these utility it has a world wide demand. Pineapples grow well in on a wide range of soils. Some pineapples are grown on the upland sandy soils, but most of the commercially grown pineapples are on riverain silt loams, clay loams and clay high in organic matter, that have benefitted from improved drainage and water control systems. Best growth is achieved on well-drained, fertile, sandy loam soils with a pH range of 4.5-5.5. Although the pineapple plant is fairly resistant to drought, it requires a medium to high evenly distributed rainfall for good growth and the production of healthy fruits. It will grow with an annual rainfall as high as 2,500 mm once adequate drainage is provided [7]. Such a condition also favours the rapid growth of various types of weeds. Weeds are a major constraint to pineapple production and can incur a significant cost if not managed successfully. Pineapple plants are slow growing and do not cover the ground well enough to suppress weeds from developing in the first six to eight months of its growth. Competition from weeds is much more severe at this stage since the pineapple plants are less vigorous. This is the critical period for weed control in pineapple since this is the time when the plant needs the conditions that will ensure vigorous growth and establishment. The plants can take "care of themselves" after this stage. Weeds grow faster than the pineapple and compete with the crop for mineral nutrients, water and sunlight [8]. By so doing they reduce the growth, yields, quality and income to the farmer. Some weeds act as the alternative hosts to the several pathogen of the crop. Thus the study of weed diversity is of much importance for the maintenance and management of any crop.

MATERIAL AND METHODS

Study area:

West Bengal is one of the leading pineapple producing states in the country.In West Bengal Pineapple is widely cultivated in the northern part including the district Jalpaiguri Darjeeling and North Dinajpur.As the Northern region of the state diversity of unwanted plants in crop fields is very common, it is suitable for the study of Ecological relationships and community clustering of weeds. In this study, weed species are investigated in some famous and oldest Pineapple gardens of District Alipur Duar, Jalpaiguri, Coohbehar Darjeeling and Uttar Dinajpur.

Table 1: Location of the study site

DISTRICT	SUB-DIVISION	BLOCK
DARJEELING	SILIGURI	PHANSIDEWA, KHARIBARI
UTTAR-DINAJPUR	ISLAMPUR	CHOPRA, GOALPOKHAR-I, GOALPOKHAR-II
JALPAIGURI	SADAR	RAJGANJ, SADAR
	MALBAZAR	MALBAZAR, MATIALI
ALIPURDUAR	SADAR	KUMARGRAM
COOCHBEHAR	TUFANGANJ	TUFANGANJ-I AND TUFANGANJ-II

Vegetation survey and data analysis

The vegetation survey was undertaken During the cultivation time of 2014, 2015 and 2016. The weed diversity of the region was studied by quadrate method [1,2,9]. For this purpose regular excursions were arranged at least once in a week during the time of cultivation. Some excursions were conducted in the organic crop fields i.e., where pesticides were avoided. The excursions were arranged in such a way that it covered the entire study regions. As a result most of the weeds could be collected in different growth stages.All the weeds encountered in the field sites were collected and identified carefully. Random quadrate method was adopted for studying phytosociological attributes of weeds. All the weeds from each quadrate were collected separately in polythene bags. All the plant species encountered in quadrates were listed. Weed specimens were collected for confirmation of identification and some workers and official staffs of the garden were interviewed and questioned about problematic weeds in their gardens. In every field, five quadrate of 1 x 1 m^2 was used to vegetation survey. In each quadrate, the height of every plant species were measured. Species abundance was expressed as the average height (cm) of each species in each quadrate.

Identification

The collected weeds were identified on the spot and in the laboratory on the basis of their natural characters with the help of identification keys, Bengal Plants (D. Prains) [10] and other relevant literature. Herbarium Prepared from identified weeds are stored carefully.

Data Analysis Techniques:
To analyse the level of diversity in weed vegetation several phytosociological parameters like frequency,Relative frequency, density and Relative density etc., were calculated [11].Then IVI of trees were made to determine the dominant species of the crop field.Dominance is a significant indicator of species composition in any ecosystem including crop field. The dominance of any species refers to its relative value or importance in its habitat . Or in other language it is the measure of the degree of influence of the species on the habitat.To asses the over all impact of a species Importance Value Index was determined by adding Relative frequency, Relative density and Relative Basal Area .

Frequency (%):Frequency refers to the degree of dispersion of individual species in an area and usually expressed in terms of percentage. It is calculated by the equation:

$$\text{Frequency}(\%) = \frac{\text{No. of plot in which the species is present}}{\text{Total No. of plots sampled}} \times 100$$

Density: Density refers to the expression of the numerical strength of a species.It is calculated by the equation:

$$\text{Density} = \frac{\text{No. individuals of the species}}{\text{Total No. of plots sampled}}$$

Relative Frequency (%):Relative Frequency is the degree of dispersion of individual species in an area in relation to the number of all the species occurred.

$$\text{Relative Frequency}(\%) = \frac{\text{Frequency of the species}}{\text{Frequency of all the species}} \times 100$$

Relative Density (%): Relative Density is the measure of numerical strength of a speies in respect to the total number of individual of all the species.It can be determined by the equation.

$$\text{Relative Density} = \frac{\text{Density of the species}}{\text{Density of all the species}} \times 100$$

Relative Dominance (%): Dominance is the parameter which is determined by the value of average height.For the comparative analysis Relative dominance is determined. It is the coverage value of a species with respect to the sum of coverage of the rest of the species in the area.

$$\text{Relative dominance or Relative height} = \frac{\text{Average height of the species}}{\text{Average height of all the species}} \times 100$$

Importance Value Index: Importance Value Index is used to determine the overall impact of each species in the community structure. It is calculated by the addition of the percentage values of the relative frequency, relative density and relative dominance (Relative Basala Area).
IVI= Relative Frequency + Relative Density + Relative dominance

Data Processing and Phytosociological Analysis:
All the phtosociological data collected from different sources were tabulated and analysed individually.The data collected were used to compute some community indices like,

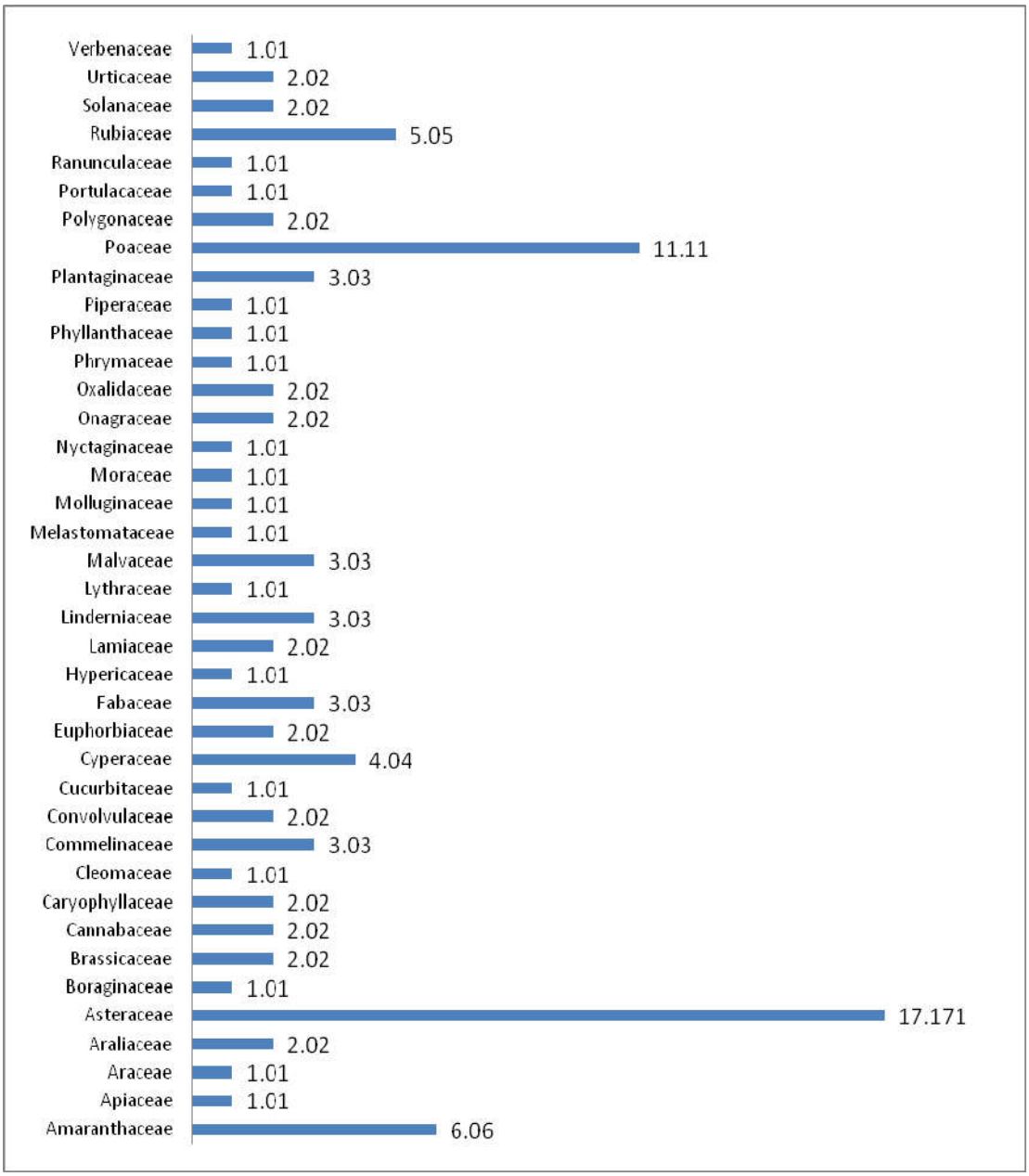
(a) **Species diversity (H')**: Species diversity was determined by the Shannon-Weiner Index (Shannon and Weiner, 1963). It was calculated by the equation,$(H') = -\sum[(ni / N). \ln (ni / N)]$
Where ni= IVI of individual species and N= total IVI of all the species[12].

(b) **Species dominance (Cd)**: Species dominance was calculated by the Simpson Index (Simpson, 1949):
$Cd = \Sigma (ni/N)^2$,
Where ni= IVI of individual species and N= total IVI of all the species [13].

(c)**Equitability of evenness (e)**: Equitability of evenness is the measure of the degree of relative dominance of each species in the habitat. It was determined according to Pielou (1966) as:
Evenness (e) = H'/log S
where, H'= Shannon index, S = number of species [14].

RESULT AND DISCUSSION

The present study showed that Pineapple crop fields are rich in weed flora.A total of 99 weed species belonging to 39 angiosperm families were recorded from the study area.Most of the species of weed flora are herbaceous with broad leaf. Asteraceae was found to be the most dominant family in the weed flora of the studied crop with a percentage of (17.171%) followed by Poaceae (11.11%), Amaranthaceae(6.060%), Rubiaceae (5.050%) and Cyperaceae (4.040 %) respectively. The rest of the families with their respective percentages are shown in Graph 1. Highest IVI was recorded for *Desmodium triflorum* (L.) DC and lowest IVI were recorded for *Ipomoea aquatica* Forssk.IVI was also good for *Cynodon dactylon* (L.) Pers., *Commelina diffusa* Burm. f., *Melastoma malabathricum* L., *Spermacoce alata* Aubl., *Auxonopus compressus* (Swartz.) P.Beauv. (Table 2).



Graph 1. Status of weed families with their respective percentages

Table. 2: Different Phytosociological values

Sl. No	Name of The Plant	Family	H	D	A	Fr (%)	RD (%)	RF (%)	RH(%)
1	*Melastoma malabathricum* L.	Melastomataceae	34.466	1.000	0.250	25.000	0.4151	2.2059	2.4323
2	*Mitracarpus hirtus* (L.) DC	Rubiaceae	12.512	3.900	0.166	16.666	1.6192	1.4705	0.8829
3	*Colocasia esculenta* (L.) Schott.	Araceae	11.500	1.250	0.083	6.666	0.5189	0.5881	0.8115
4	*Commelina diffusa* Burm. f.	Commelinaceae	28.777	2.500	0.750	30.000	1.0379	2.6471	2.0308
5	*Scoparia dulcis* L.	Plantaginaceae	9.333	1.000	0.050	5.000	0.4151	0.4411	0.6586
6	*Cleome rutidosperma* DC.	Cleomaceae	14.727	1.375	0.183	13.333	0.5708	1.1764	1.0393
7	*Oplismenus burmanni* (Retz.) P.Beauv.	Poaceae	9.370	0.037	0.450	11.666	0.0153	1.0293	0.6612
8	*Cynodon dactylon* (L.) Pers.	Poaceae	14.300	3.727	2.050	55.000	1.5473	4.8531	1.0091
9	*Centella asiatica* (L.) Urb.	Apiaceae	13.500	1.111	0.166	15.000	0.4612	1.3235	0.9527
10	*Leucas aspera* (Willd.)Link	Lamiaceae	11.818	5.500	0.183	8.333	2.2834	0.7352	0.8340
11	*Bulbostylis densa* (Wall.) Hand.-Mazz.	Cyperaceae	7.172	2.230	0.483	21.666	0.9258	1.9117	0.5061
12	*Spermacoce alata* Aubl.	Rubiaceae	28.692	3.250	0.650	20.000	1.3493	1.7647	2.0248
13	*Oldenlandia lactea (Willd.) DC.*	Rubiaceae	8.562	2.666	0.260	10.000	1.1068	0.8823	0.6042
14	*Murdania nudiflora (L.)Brenan*	Commelinaceae	8.350	4.000	0.333	8.333	1.6607	0.7352	0.5892
15	*Dentella repens (*L.)J.R.Forst. & G.Forst.	Rubiaceae	7.886	3.333	0.500	15.000	1.3837	1.3235	0.5565
16	*Cyperus rotundus* L.	Cyperaceae	8.666	3.428	0.400	11.666	1.4232	1.0293	0.6115
17	*Phyllanthus fraternus* G.L. Webster	Phyllanthaceae	7.750	1.333	0.066	6.666	0.5534	0.5881	0.5469
18	*Hydrocotyle sibthorpioides Lam.*	Araliaceae	11.122	2.578	0.816	31.666	1.0703	2.7941	0.7848
19	*Hydrocotyle javanica* Thunb.	Araliaceae	10.461	2.600	0.216	8.333	1.0794	0.7352	0.7382
20	*Mukia maderaspatana* (L.) M.Roem.	Cucurbitaceae	18.000	1.500	0.050	3.333	0.6227	0.2940	1.2702
21	*Lindernia crustacea* (L.) F.Muell	Linderniaceae	5.545	2.750	0.183	6.666	1.1417	0.5881	0.3913
22	*Lindernia ciliate* (Colsm) Pennell	Linderniaceae	4.642	4.666	0.466	10.000	1.9372	0.8823	0.3275
23	*Kyllinga brevifolia* Rottb.	Linderniaceae	7.666	2.000	0.100	5.000	0.8303	0.4411	0.5410
24	*Ageratum connyzoides* L.	Asteraceae	14.000	3.500	0.233	6.666	1.4531	0.5881	0.9880
25	*Ageratum houstonianum* Mill.	Asteraceae	11.800	2.500	0.083	3.333	1.0379	0.2940	0.8327
26	*Alternanthera sessilis* (L.)R.Br. ex DC.	Amaranthaceae	10.944	2.250	0.300	13.333	0.9341	1.1764	0.7723
27	*Xanthium strumarium* L.	Asteraceae	20.500	2.000	0.100	5.000	0.8303	0.4411	1.4467
28	*Hypericum japonicum* Thunb.	Hypericaceae	7.214	3.500	0.233	6.666	1.4531	0.5881	0.5091
29	*Ludwigia perennis* L.	Onagraceae	20.235	1.888	0.283	15.000	0.7838	1.3235	1.4280
30	*Persicaria hydroiper* (L.) Delarbre	Polygonaceae	12.866	3.750	0.250	6.666	1.5569	0.5881	0.9079
31	*Oxalis corniculata* L.	Oxalidaceae	8.608	3.285	0.383	11.666	1.3638	1.0293	0.6074
32	*Oxalis debilis* Kunth	Oxalidaceae	9.333	2.000	0.100	5.000	0.8303	0.4411	0.6586
33	*Emilia sonchifolia* (L.) DC. ex DC.	Asteraceae	22.400	1.000	0.083	8.333	0.4151	0.7352	1.5808
34	*Alternanthera philoxeroides* (Mart.) Griseb.	Amaranthaceae	11.555	3.000	0.150	5.000	1.2455	0.4411	0.8154
35	*Urena lobata L.*	Malvaceae	23.400	1.000	0.083	8.333	0.4151	0.7352	1.6513
36	*Acmella calva* (DC.) R.K.Jansen	Asteraceae	15.000	2.000	0.066	3.333	0.8303	0.2940	1.0585
37	*Eclipta prostrata* (L.) L.	Asteraceae	12.666	3.000	0.100	3.333	1.2455	0.2940	0.8938
38	*Physalis minima* L.	Solanaceae	12.500	1.500	0.200	13.333	0.6227	1.1764	0.8821
39	*Pouzolzia zeylenica* (L.)Benn.	Urticaceae	10.416	2.400	0.200	8.333	0.9964	0.7352	0.7350
40	*Auxonopus compressus* (Swartz.) P.Beauv.	Poaceae	14.068	4.000	1.466	36.666	1.6607	3.2353	0.9928
41	*Portulaca oleracea L.*	Portulacaceae	12.555	1.800	0.1500	8.333	0.7473	0.7352	0.8860
42	*Oldenlandia diffusa (*Willd.) Roxb.	Rubiaceae	8.736	3.166	0.316	10.000	1.3144	0.8823	0.6165
43	*Stellaria media* (L.) Vill.	Caryophyllaceae	9.115	3.714	0.433	11.666	1.5419	1.0293	0.6432
44	*Boerhavia diffusa* L.	Nyctaginaceae	11.736	4.750	0.316	6.666	1.9721	0.5881	0.8282
45	*Dysphania ambrosioides* (L.)Mosyakin & Clemants	Amaranthaceae	19.444	1.125	0.150	13.333	0.4670	1.1764	1.3721
46	*Commelina benghalensis* L.	Commelinaceae	14.000	1.250	0.083	6.666	0.5189	0.5881	0.9880
47	*Amaranthus spinosus L.*	Amaranthaceae	12.962	1.928	0.450	23.333	0.8004	2.0588	0.9147
48	*Trema orientalis* (L.) Blume	Cannabaceae	18.750	1.333	0.066	5.000	0.5534	0.4411	1.3232
49	*Chromolaena odoratum* (L.) King & H.Rob	Asteraceae	25.076	1.625	0.216	13.333	0.6746	1.1764	1.7696
50	*Evolvulus nummularius* (L.) L.	Convolvulaceae	11.570	2.333	0.116	5.000	0.9686	0.4411	0.8165
51	*Desmodium heterophyllum* (Willd.)DC.	Fabaceae	10.730	2.888	0.433	15.000	1.1990	1.3235	0.7572

52	*Desmodium triflorum* (L.) DC.	Fabaceae	12.560	3.571	0.833	83.333	1.4826	7.3531	0.8863
53	*Mazus pumilus* (Burm.f.) Steenis.	Phrymaceae	6.375	2.666	0.133	5.000	1.1068	0.4411	0.4498
54	*Amaranthus viridis* L.	Amaranthaceae	17.250	1.333	0.066	6.666	0.5534	0.5881	1.2173
55	*Eleocharis retroflexa (Poir.) Urb.*	Cyperaceae	16.500	2.000	1.000	5.000	0.8303	0.4411	1.1644
56	*Cyperus iria* L.	Cyperaceae	18.560	3.571	0.416	11.666	1.4826	1.0293	1.3098
57	*Phyla nodiflora* (L.) Greene	Verbenaceae	8.846	1.625	0.216	8.333	0.6746	0.7352	0.6242
58	*Sida acuta* Burm.f.	Malvaceae	17.000	2.800	0.466	16.666	1.1625	1.4705	1.1997
59	*Heliotropium indicum* L.	Boraginaceae	12.333	2.250	0.300	13.333	0.9341	1.1764	0.8703
60	*Limnophila rugosa (Roth) Merr.*	Plantaginaceae	13.642	2.800	0.233	8.333	1.1625	0.7352	0.9627
61	*Glinus oppositifolius* (L.) Aug.DC.	Molluginaceae	11.660	2.250	0.300	13.333	0.9341	1.1764	0.8228
62	*Grangea maderaspatana* (L.) Poir.	Asteraceae	18.100	3.000	0.306	33.333	1.2455	2.9412	1.2773
63	*Solanum americanum* Mill.	Solanaceae	16.840	3.570	0.416	11.666	1.4821	1.0293	1.1884
64	*Parthenium hysterophorus* L.	Asteraceae	26.857	1.400	0.116	8.333	0.5812	0.7352	1.8953
65	*Laphangium luteoalbum* (L.) Tzvelev	Asteraceae	9.709	3.444	0.516	5.000	1.4298	0.4411	0.6851
66	*Melochia corchorifolia* L.	Malvaceae	23.150	1.300	0.216	16.660	0.5397	1.4700	1.6337
67	*Cuphea procumbens* Ortega	Lythraceae	8.205	4.250	0.566	13.333	1.7645	1.1764	0.5790
68	*Ludwigia peruviana* (L.) H.Hara	Onagraceae	20.750	1.200	0.033	16.666	0.4982	1.4705	1.4643
69	*Cardamine hirsuta* L.	Brassicaceae	10.380	3.000	0.350	11.666	1.2455	1.0293	0.7325
70	*Eleusine indica* (L.) Gaertn.	Poaceae	10.390	3.909	0.716	18.333	1.6229	1.6176	0.7332
71	*Rorippa indica* (L.) Hiern	Brassicaceae	13.750	1.000	0.066	6.666	0.4151	0.5881	0.9703
72	*Clerodendrum infortunatum L.*	Lamiaceae	23.346	1.733	0.433	25.000	0.7195	2.2059	1.6475
73	*Mimosa pudica* L.	Fabaceae	15.142	1.400	0.116	8.333	0.5812	0.7352	1.0685
74	*Echinochloa colona* (L.) Link	Poaceae	14.125	4.000	0.066	3.333	1.6607	0.2940	0.9968
75	*Digitaria sanguinalis (L.) Scop.*	Poaceae	10.653	3.250	0.433	13.333	1.3493	1.1764	0.7517
76	*Eragrostis unioloides* (Retz.) Nees ex Steud.	Poaceae	13.600	2.500	0.083	8.333	1.0379	0.7352	0.9597
77	*Eragrostis amabilis (L.) Wight & Arn.*	Poaceae	9.250	4.000	0.266	6.666	1.6607	0.5881	0.6527
78	*Chenopodium album* L.	Amaranthaceae	15.666	3.000	0.150	5.000	1.2455	0.4411	1.1055
79	*Digitaria bicornis* (Lam.)Roemer & J.A. Schultes ex. Loud	Poaceae	11.000	3.250	0.216	6.666	1.3493	0.5881	0.7762
80	*Cannabis sativa* L.	Cannabaceae	23.000	1.500	0.100	6.666	0.6227	0.5881	1.6231
81	*Blumea lacera* (Burm.f.) DC.	Asteraceae	18.250	1.000	0.066	6.666	0.4151	0.5881	1.2879
82	*Rumex maritimus* L.	Polygonaceae	21.750	1.000	0.066	6.666	0.4151	0.5881	1.5349
83	*Mecardonia procumbens* (Mill.)Small	Plantaginaceae	11.100	3.333	0.166	5.000	1.3837	0.4411	0.7833
84	*Drymaria cordata* (L.) Willd. Ex. Schult.	Caryophyllaceae	8.969	4.714	0.550	11.666	1.9571	1.0293	0.6329
85	*Mikania micrantha* Kunth.	Asteraceae	21.400	1.000	0.833	3.333	0.4151	0.2940	1.5102
86	*Synedrella nodiflora (L.) Gaertn.*	Asteraceae	15.600	2.500	0.0833	3.333	1.0379	0.2940	1.1009
87	*Saccharum spontaneum* L.	Poaceae	50.666	3.000	0.1500	5.000	1.2455	0.4411	3.5755
88	*Duchesnia crispa* (Forssk.) Cass.	Asteraceae	9.333	4.000	0.033	5.000	1.6607	0.4411	0.6586
89	*Ficus hispida* L.f.	Moraceae	18.500	1.000	0.033	3.333	0.4151	0.2940	1.3055
90	*Croton bonplandianus Baill.*	Euphorbiaceae	11.500	2.000	0.066	3.333	0.8303	0.2940	0.8115
91	*Peperomia pellucida* (L.) Kunth	Piperaceae	10.333	3.000	0.150	5.000	1.2455	0.4411	0.7292
92	*Euphorbia hirta* L	Euphorbiaceae	9.400	1.666	0.083	5.000	0.6916	0.4411	0.6633
93	*Dactyloctenium aegyptium (L.) Willd.*	Poaceae	14.800	1.666	0.033	5.000	0.6916	0.4411	1.0444
94	*Ipomoea aquatica* Forssk.	Convolvulaceae	12.500	1.000	0.033	3.333	0.4151	0.2940	0.8821
95	*Cyanthillium cinereum* (L.) H.Rob.	Asteraceae	11.600	1.666	0.166	10.000	0.6916	0.8823	0.8186
96	*Ranunculus sceleratus* L.	Ranunculaceae	26.400	1.666	0.0833	5.000	0.6916	0.4411	1.8630
97	*Boehmeria nivea (L.) Gaudich.*	Urticaceae	6.833	2.000	0.100	10.000	0.8303	0.8823	0.4822
98	*Crassocephalum crepidioides* (Benth.) S.Moore	Asteraceae	12.666	1.000	0.050	5.000	0.4151	0.4411	0.8938
99	*Leucas zeylanica* (L.) W.T.Aiton	Lamiaceae	10.692	1.857	0.216	11.666	0.7709	1.0293	0.7545

D= Density, Fr= Frequency,H=Height or Length, RD=Relative Density,RF= Relative Frequency,RH= Relative Height or Length

Table. 3: Different Community Inde values

Sl. No	Name of The	IVI	SI	Cd	E
1	*Melastoma malabathricum* L.	5.0533	0.068779792	0.0002836	0.20800394
2	*Mitracarpus hirtus* (L.) DC	3.9726	0.057256331	0.0001752	0.81137074
3	*Colocasia esculenta* (L.) Schott.	1.9185	0.032305025	0.0000408	0.26001746
4	*Commelina diffusa* Burm. f.	5.7158	0.075450207	0.0003628	0.52008503
5	*Scoparia dulcis* L.	1.5148	0.026700017	0.0000254	0.20800394
6	*Cleome rutidosperma* DC.	2.7865	0.043454746	0.0000862	0.28602422
7	*Oplismenus burmanni* (Retz.) P.Beauv.	1.7058	0.029391491	0.0000323	0.00766673
8	*Cynodon dactylon* (L.) Pers.	7.4095	0.091398608	0.0006098	0.77534211
9	*Centella asiatica* (L.) Urb.	2.7374	0.042851235	0.0000832	0.23110436
10	*Leucas aspera* (Willd.)Link	3.8526	0.055920629	0.0001648	1.14419710
11	*Bulbostylis densa* (Wall.) Hand.-Mazz.	3.3436	0.050111525	0.0001241	0.46391244
12	*Spermacoce alata* Aubl.	5.1388	0.069656169	0.0002933	0.67612558
13	*Oldenlandia lactea (Willd.) DC.*	2.5933	0.041062885	0.0000746	0.55461038
14	*Murdania nudiflora (L.)Brenan*	2.9851	0.045866918	0.0000989	0.83216612
15	*Dentella repens (*L.)J.R.Forst. & G.Forst.	3.2637	0.049177124	0.0001183	0.69336319
16	*Cyperus rotundus* L.	3.0640	0.046812836	0.0001042	0.71315639
17	*Phyllanthus fraternus* G.L. Webster	1.6884	0.029149377	0.0000316	0.27730519
18	*Hydrocotyle sibthorpioides Lam.*	4.6492	0.064571085	0.0002400	0.53632046
19	*Hydrocotyle javanica* Thunb.	2.5528	0.040555518	0.0000494	0.54088042
20	*Mukia maderaspatana* (L.) M.Roem.	2.1869	0.035870159	0.0000531	0.31203097
21	*Lindernia crustacea* (L.) F.Muell	2.1211	0.035006855	0.0000499	0.57209855
22	*Lindernia ciliate* (Colsm) Pennell	3.1470	0.047800601	0.0001100	0.97071850
23	*Kyllinga brevifolia* Rottb.	1.8124	0.030862089	0.0000364	0.41605800
24	*Ageratum connyzoides* L.	3.0292	0.04639647	0.0001019	0.72813909
25	*Ageratum houstonianum* Mill.	2.1646	0.03557833	0.0000520	0.52008503
26	*Alternanthera sessilis* (L.)R.Br. ex DC.	2.8828	0.044630086	0.0000923	0.46807152
27	*Xanthium strumarium* L.	2.7181	0.042613209	0.0000820	0.41605800
28	*Hypericum japonicum* Thunb.	2.5503	0.040524129	0.0000722	0.72813909
29	*Ludwigia perennis* L.	3.5353	0.052327715	0.0001388	0.39275715
30	*Persicaria hydroiper* (L.) Delarbre	3.0529	0.046680173	0.0001035	0.78015260
31	*Oxalis corniculata* L.	3.0005	0.046052086	0.0001000	0.68339143
32	*Oxalis debilis* Kunth	1.9300	0.032460228	0.0000413	0.41605800
33	*Emilia sonchifolia* (L.) DC. ex DC.	2.7311	0.042773587	0.0000828	0.20800394
34	*Alternanthera philoxeroides* (Mart.) Griseb.	2.5020	0.039916086	0.0000695	0.62411206
35	*Urena lobata L.*	2.8016	0.043639765	0.0000871	0.20800394
36	*Acmella calva* (DC.) R.K.Jansen	2.1828	0.035816562	0.0000529	0.41605800
37	*Eclipta prostrata* (L.) L.	2.4333	0.03904586	0.0000657	0.62411206
38	*Physalis minima* L.	2.6812	0.042156849	0.0000798	0.31203097
39	*Pouzolzia zeylenica* (L.)Benn.	2.4666	0.039468469	0.0000675	0.49928965
40	*Auxonopus compressus* (Swartz.) P.Beauv.	5.8888	0.077148641	0.0003851	0.83216612
41	*Portulaca oleracea L.*	2.3685	0.038219114	0.0000622	0.37446723
42	*Oldenlandia diffusa (*Willd.) Roxb.	2.8132	0.043781714	0.0000879	0.65863741
43	*Stellaria media* (L.) Vill.	3.2144	0.048597337	0.0001147	0.77263620
44	*Boerhavia diffusa* L.	3.3884	0.050632650	0.0001275	0.98820666
45	*Dysphania ambrosioides* (L.)Mosyakin & Clemants	3.0155	0.046232191	0.0001010	0.23401070
46	*Commelina benghalensis* L.	2.0950	0.034662547	0.0000487	0.26001746
47	*Amaranthus spinosus L.*	3.7739	0.055037891	0.0001581	0.40107530
48	*Trema orientalis* (L.) Blume	2.3177	0.037566862	0.0000596	0.27730519
49	*Chromolaena odoratum* (L.) King & H.Rob	3.6206	0.053302590	0.0001456	0.33803773
50	*Evolvulus nummularius* (L.) L.	2.2262	0.036382620	0.000055	0.48535925
51	*Desmodium heterophyllum* (Willd.)DC.	3.2797	0.049364755	0.0001194	0.60081121
52	*Desmodium triflorum* (L.) DC.	9.7220	0.111122855	0.0010498	0.74292135
53	*Mazus pumilus* (Burm.f.) Steenis.	1.9977	0.033369316	0.0000443	0.55461038
54	*Amaranthus viridis* L.	2.3588	0.038094853	0.0000617	0.27730519
55	*Eleocharis retroflexa (Poir.) Urb.*	2.4358	0.039077640	0.0000659	0.41605800
56	*Cyperus iria* L.	3.8217	0.055574684	0.0001622	0.74292135
57	*Phyla nodiflora* (L.) Greene	2.0340	0.033853592	0.000046	0.33803773
58	*Sida acuta* Burm.f.	3.8327	0.055697931	0.0001631	0.58252129
59	*Heliotropium indicum* L.	2.9808	0.045815168	0.0000986	0.46807152
60	*Limnophila rugosa (Roth) Merr.*	2.8604	0.044357665	0.0000908	0.58252129
61	*Glinus oppositifolius* (L.) Aug.DC.	2.9333	0.045242130	0.0000955	0.46807152
62	*Grangea maderaspatana* (L.) Poir.	5.4640	0.072946814	0.0003316	0.62411206
63	*Solanum americanum* Mill.	3.6998	0.054201750	0.0001520	0.74267080
64	*Parthenium hysterophorus* L.	3.2117	0.048565512	0.0001145	0.29123559
65	*Laphangium luteoalbum* (L.) Tzvelev	2.5560	0.040595684	0.0000725	0.71646361

66	*Melochia corchorifolia* L.	3.6434	0.053562026	0.0001474	0.27044021
67	*Cuphea procumbens* Ortega	3.5199	0.052150985	0.0001376	0.88417963
68	*Ludwigia peruviana* (L.) H.Hara	3.4330	0.051149488	0.0001309	0.24964482
69	*Cardamine hirsuta* L.	3.0073	0.046133765	0.0001004	0.62411206
70	*Eleusine indica* (L.) Gaertn.	3.9737	0.057268518	0.0001753	0.81322478
71	*Rorippa indica* (L.) Hiern	1.9735	0.033045246	0.0000447	0.20800394
72	*Clerodendrum infortunatum L.*	4.5729	0.063763577	0.0002322	0.36053683
73	*Mimosa pudica* L.	2.3849	0.038428905	0.0000631	0.29123559
74	*Echinochloa colona* (L.) Link	2.9515	0.045461995	0.0000967	0.83216612
75	*Digitaria sanguinalis (L.) Scop.*	3.2774	0.049337799	0.0001193	0.67612558
76	*Eragrostis unioloides* (Retz.) Nees ex Steud.	2.7328	0.042794545	0.0000829	0.52008503
77	*Eragrostis amabilis (L.) Wight & Arn.*	2.9015	0.044857065	0.0000935	0.83216612
78	*Chenopodium album* L.	2.7921	0.043523394	0.0000865	0.62411206
79	*Digitaria bicornis* (Lam.)Roemer & J.A. Schultes ex. Loud	2.7136	0.042557645	0.0000817	0.67612558
80	*Cannabis sativa* L.	2.8339	0.044034625	0.0000891	0.31203097
81	*Blumea lacera* (Burm.f.) DC.	2.2911	0.037223853	0.0000484	0.20800394
82	*Rumex maritimus* L.	2.5381	0.040370835	0.0000714	0.20800394
83	*Mecardonia procumbens* (Mill.)Small	2.6081	0.041247765	0.0000755	0.69336319
84	*Drymaria cordata* (L.) Willd. Ex. Schult.	3.6193	0.053287784	0.0001455	0.98069026
85	*Mikania micrantha* Kunth.	2.2193	0.036292814	0.0000547	0.20800394
86	*Synedrella nodiflora (L.) Gaertn.*	2.4328	0.039039503	0.0000657	0.52008503
87	*Saccharum spontaneum* L.	5.2621	0.070911667	0.0003075	0.62411206
88	*Duchesnia crispa* (Forssk.) Cass.	2.7604	0.043134301	0.0000846	0.83216612
89	*Ficus hispida* L.f.	2.0146	0.033595049	0.0000452	0.20800394
90	*Croton bonplandianus Baill.*	1.9358	0.032538418	0.0000416	0.41605800
91	*Peperomia pellucida* (L.) Kunth	2.4158	0.038823161	0.0000648	0.62411206
92	*Euphorbia hirta* L	1.7960	0.030637235	0.0000358	0.34655632
93	*Dactyloctenium aegyptium (L.) Willd.*	2.1771	0.035742005	0.0000526	0.34655632
94	*Ipomoea aquatica* Forssk.	1.5912	0.027785708	0.0000281	0.20800394
95	*Cyanthillium cinereum* (L.) H.Rob.	2.3925	0.038525997	0.0000635	0.34655632
96	*Ranunculus sceleratus* L.	2.9957	0.045994400	0.0000996	0.34655632
97	*Boehmeria nivea (L.) Gaudich.*	2.1948	0.035973361	0.0000534	0.41605800
98	*Crassocephalum crepidioides* (Benth.) S.Moore	1.7500	0.030003868	0.0000339	0.20800394
99	*Leucas zeylanica* (L.) W.T.Aiton	2.5547	0.040579368	0.0000724	0.38629304

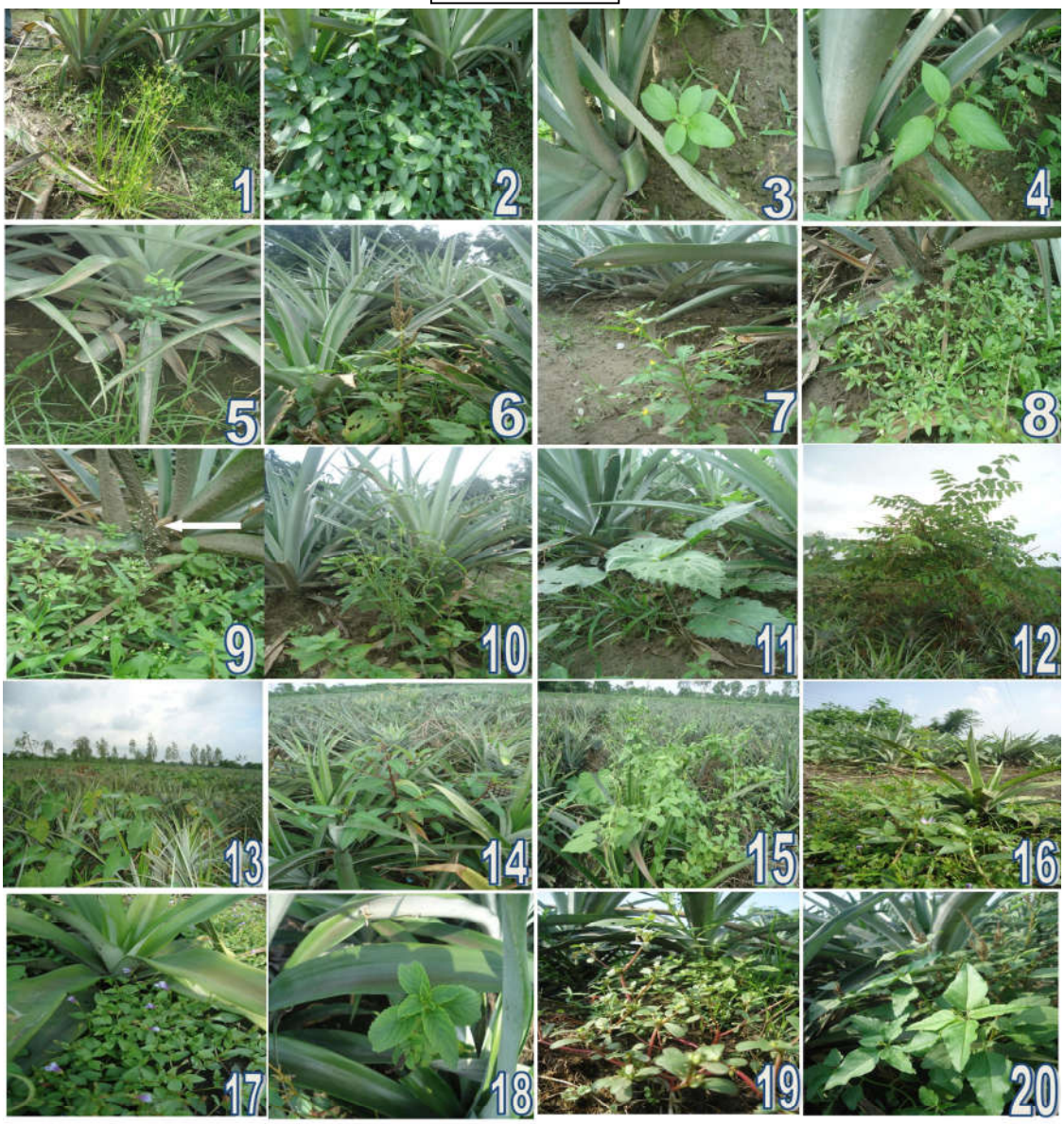
DISCUSSION

Management of weeds in any crop field is very essential as the every weed has the capacity to reduece crop yield upto a significant level. Different weed interacts different way with the crop. Their activities are also dependent on the soil property and method of agricultural practices. Thus without proper information regarding the identification of weeds and determination of their phytosociological status it is impossible to control them.This is very important because without information about type of weeds in each crops, control of these weeds is not effective.Proper information of weeds also prevent the indiscriminate use herbicides for weed control and management. In this regard the present study is very significant because till date there is no such proper scientific documentation of weed vegetation in Pineapple crop field.Thus in this study several phytosociological parameters and community indices of weed flora associated with pineapple crop were determined.

The research was conducted in Pineapple growing seasons of 2014, 2015 and 2016. The study revealed that the weed flora associated with Pineapple based cultivation includes terrestrial, aquatic, semiaquatic, climbing, vines etc.Their habits are also variable.Thus different weeds of the Pineapple field should be controlled by different ways.Mostly species were belong broad leaf group.Among broad leaf weeds most of species belong Asteraceae family. Broadleaf weeds generally dominated all the surveyed locations than grasses and sedges and higher concentration of the broadleaf weeds was observed under the canopies of mature Pineapple plant. The weeds belong to the family Asteraceae show high colonizing power due to high fruit production and efficient fruit and seed dispersal mechanisms readily brought about by wind.Highest IVI was recorded for *Desmodium triflorum* (L.) DC , which belongs to Fabaceae family. *Desmodium triflorum* (L.) DC was also found most frequent weeds of the pineapple field due to less completion with Pineapple plant. *Cynodon dactylon* (L.) Pers. is one of the prominent weed of the present work. It is one of the most noxious weeds of cultivation and its spread is so great and its ravages are so serious that in certain places. The eradication of the weed is so difficult on account of the underground stems which are very hardly and are not easy to destruct. Treatment of weedicide is also thus ineffective to control *Cynodon dactylon* (L.) Pers. The weed control before the flowering time the flower stalks should be cut off with grass-cutting swords. *Commelina diffusa* Burm. f. and *Murdania nudiflora* (L.)Brenan had

also recorded good IVI and density as they produce both aerial and subterranean seeds and also reproduce vegetatively.If the weed is removed by hand or mechanically, stems break off and root at the nodes, producing new plants. Thus, deweeding may indirectly multiply the plant.On the other hand *Ipomoea aquatica* Forssk. had lowest IVI, as it is suitable for aquatic habitat and not suitable for Pineapple crop field.Thus the weed showed poor growth and propagation. This study also attributed to its high light requirement,soil quality, amount of rainfall and other climatic factors, aggressive growth, short life cycle, large seed production with potent explosive seed dispersal mechanism. The present study may be helpful for farmers and agriculturists to find out the effects of weeds on the yield of crops and also helps in finding the role of herbicides in controlling the weeds. It also helps the scientists and policy makers involved in the management of weeds.Thus the work also recommend for further studies of allelopathic interation between host and weeds and also about the relation of aggressiveness with the mode of propagation of the weeds.

Plate -I



1. *Cyperus iria* L., 2. *Commelina diffusa* Burm.f., 3. *Spermacoce alata* Aubl., 4. *Trema orientalis* (L.) Blume, 5. *Phyllanthus reticulatus* Poir., 6. *Amaranthus viridis* L., 7. *Ludwigia perennis* L., 8. *Glinus oppositifolius* (L.) Aug.DC., 9. *Eragrostis amabilis* (L.) Wight & Arn., 10. *Leucas aspera* (Willd.) Link, 11. *Clerodendrum infortunatum* L., 12. *Trema orientalis* (L.) Blume, 13. *Colocasia esculenta* (L.) Schott., 14. *Melastoma malabathricum* L., 15. *Mikania micrantha* Kunth., 16. *Cleome rutidosperma* DC., 17. *Lindernia crustacea* (L.) F.Muell., 18. *Limnophila rugosa* (Roth) Merr., 19. *Portulaca oleracea* L., 20. *Croton bonplandianus* Baill.

Plate -II

21. *Alternanthera philoxeroides* (Mart.) Griseb., 22. *Ficus hispida* L.f., 23. *Emilia sonchifolia* (L.) DC. ex DC., 24. *Mukia maderaspatana* (L.) M.Roem., 25. *Pouzolzia zeylanica* (L.) Benn., 26. *Cyperus iria* L., 27. *Kyllinga sp.*, 28. *Xanthium strumarium* L., 29. *Hydrocotyle sibthorpioides* Lam., 30. *Hypericum japonicum* Thunb., 31. *Ludwigia perennis* L., 32. *Urena lobata* L., 33. *Bulbostylis densa* (Wall.) Hand.-Mazz., 34. *Hydrocotyle sibthorpioides* Lam. And *Cynodon dactylon* (L.) Pers., 35. *Desmodium heterophyllum* (Willd.) DC., 36. *Mitracarpus hirtus* (L.) DC., 37. *Axonopus compressus* (Sw.) P.Beauv., 38. *Saccharum spontaneum* L., 39.A PINE APPLE garden of BIDHAN-NAGAR, 40.A WEEDY PINE APPLE GARDEN OF RAJGANJ

Plate -III

41. *Oxalis corniculata* L., 42. *Centella asiatica* (L.) Urb., 43. *Stellaria media* (L.) Vill., 44. *Laphangium luteoalbum* (L.) Tzvelev, 45. *Oxalis debilis var. corymbosa* (DC.) Lourteig, 46. *Mecardonia procumbens* (Mill.) Small, 47. *Ageratum houstonianum* Mill., 48. *Solanum americanum* Mill., 49. *Chenopodium album* L., 50. *Scoparia dulcis* L., 51. *Alternanthera sessilis* (L.)R. Brown ex de Candolle, 52. *Acmella calva* (DC.) R.K.Jansen, 53. *Rorippa indica* (L.) Hiern, 54. *Rumex maritimus* L., 55. *Dentella repens* (L.) J.R.Forst. & G.Forst., 56. *Ipomoea aquatica* Forsskål, 57. *Drymaria cordata* (L.) Willd. ex Schult., 58. *Physalis minima* L., 59.A PINE-APPLE GARDEN OF CHOPRA (ISLAMPUR), 60.A PINE-APPLE GARDEN OF CHENGMARI (KUMARGRAM)

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