

DAMAGES TO WEED PLANTS AND CONSERVATION STRATEGIES

Introduction:

Weeds are naturally growing plants on forest floors and majority of them are considered as useless. Weeds are very much invasive even in many natural conditions. Disturbance is a natural force which changes community framework. Various kinds of disturbance play important roles to alternate density as well as structure of plant community among the selected weed species. Forest fire, flood, winds, climate change etc. are the leading ecological disturbances. Human impact on weed community, forest cleaning or clearing, grazing and browsing by cattle, attack by insects or fungus on plant parts are significant biological threats to the existence of weeds.

All these kinds of disturbances not only affect the weeds natural life, but create impacts on environmental constructions. Deforestation is a burning problem of the whole world which stimulates the environmental change very rapidly.

Even though the sprouting and growth rate of weed plants are very high, their competition for nutrition over space as well as their over utilization by local people for meeting daily needs put them to a questionable situation.

Seasonal alternation of weed plant density indicates loss or gain of plants in selected forests areas. Present study reveals the nature and cause of damage or loss of the weeds, selected here, in four selected forest areas of Paschim Medinipur district.

Materials and Methods:

Materials: All four plant samples as stated in chapter 2.

Methods:

Damages of various natures caused to the species under study were recorded. The nature of damage was scrutinized, noting the parts of plants and extent of damage. Causal agents of these damages were also taken into account and grossly classified.

Density of plant samples were calculated in specified area using the formulae i.e. plant density = Total number of plant samples / total area measured, in a particular time. Different biological factors influencing the alternation of density of plant samples as well as loss of plant species were enumerated.

Results and Discussion:

Weed plants restore their dominance due to their invasiveness. Weeds show high resistance power than cultivated plants. The nature of soil of all four-selected areas is acidic, whereas, plants growing on alkaline soil is prone to any kind of infection. Nominal infection is witnessed in many instances for the species chosen in the study, but hardly cause any serious damage. A fungal infection was found in the leaf of *Lantana camara* Linn. and appeared as spots on adaxial surface of *Lantana camara* Linn. These spots were seen to increase in size in a few weeks and led to the defoliation. *Corynespora cassiicola* was found to form necrotic spots on leaf area of *Lantana camara* Linn.

This fungal infection was found to occur mostly in the months of July to September, and highest infection was found in the months of August and September. Fungal infection on this plant was found to have somewhat correlation with rainfall.

No trace of damage due to grazing and browsing were found in *Lantana camara* Linn. due to their pungent smell and the presence of hair on leaf surface. But village people utilized this plant in their daily life for various purposes, curing ailments, production of utility goods, parboiling of rice grain etc.

Crotalaria pallida Ait. is majorly destroyed by 'Pod Borer' i.e. *Maruca vitrata*. Fruit is completely damaged by the attack of pod borer. These insects are not only fed by the fruit of *Crotalaria pallida* Ait but also are completing their life cycle they're on this plant only. Rampant uprooting of this plant for multiple use by village people is a way to regulate their population. Grazing and browsing, human interference etc. cause rapid destruction of plant population in this case.

Population of *Ocimum canum* Sims is affected by grazing and browsing, forest cleansing and human interference due to over exploitation of that plant. No significant microbial attack is found on this plant.

Similarly, *Tephrosia purpurea* Linn is damaged particularly by grazing and browsing, forest cleansing and human interference. A beetle commonly known as ‘Tephrosia beetle’, attacks on leaf of this plant in the month of February to March. As a result of this, some minute spots are seen to appear on leaflets of *Tephrosia purpurea*. The table no. 6.1 shows occurrences of damage to selected weed plants by causes of damage.

Table 6.1: Causes of Damage of plant species.

Plant \ Cause of Damage	Grazing & Browsing	Human Interference	Cleansing	Fungal Attack	Insect	Affected Parts
<i>Lantana camara</i> Linn	-	+	+	+	-	Leaf, Whole Plant.
<i>Crotalaria pallida</i> Ait.	+	+	+	-	+	Fruit, Whole Plant.
<i>Ocimum canum</i> Sims.	+	+	+	-	-	Whole Plant.
<i>Tephrosia purpurea</i> Linn.	+	+	+	-	+	Leaf, Whole Plant.

‘+’ indicates occurrences and ‘-’ indicates absence.

Aforesaid discussion regarding damage and loss of four weeds in selected forest areas have shown direct impact on their population composition as well, as on their densities. In case of *Lantana camara* the population density varies monthly or remains as seasonal aspects. A notable change in density of weeds are found in all selected areas of every

chosen species. In month of July and August, density of *Lantana camara* is very high due to germination in field and lowest in month of November to March. During this time local people cut this plant for parboiling of rice and in winter season for fuel purpose. Table Nos. 6.2 to 6.4 show the pattern of changes in density of *Lantana camara* Linn from 2014 to 2016 in the four selected Beats.

Table 6.2: Population density (Plants / sq. Mt) of *Lantana camara* Linn. (Year-2014).

Month \ Beat	Ramrama	Kalaikunda	Gurguripal	Bhadutala
January	0.051	0.034	0.081	0.027
February	0.051	0.020	0.072	0.013
March	0.051	0.017	0.064	0.013
April	0.051	0.017	0.064	0.004
May	0.051	0.017	0.064	0.004
June	0.051	0.017	0.064	0.004
July	0.104	0.098	0.085	0.032
August	0.111	0.106	0.119	0.069
September	0.148	0.108	0.136	0.092
October	0.124	0.097	0.119	0.076
November	0.092	0.076	0.076	0.050
December	0.048	0.038	0.059	0.032

Table 6.3: Population density (Plants / sq. Mt) of *Lantana camara* Linn. (Year-2015).

Month \ Beat	Ramrama	Kalaikunda	Gurguripal	Bhadutala
January	0.051	0.034	0.081	0.027
February	0.051	0.020	0.072	0.013
March	0.051	0.017	0.064	0.013
April	0.051	0.017	0.064	0.004
May	0.051	0.017	0.064	0.004
June	0.051	0.017	0.064	0.004
July	0.104	0.098	0.085	0.032
August	0.111	0.106	0.119	0.069
September	0.148	0.108	0.136	0.092
October	0.124	0.097	0.119	0.076
November	0.092	0.076	0.076	0.050
December	0.048	0.038	0.059	0.032

Table 6.4: Population density (Plants / sq. Mt) of *Lantana camara* Linn. (Year-2016).

Month \ Beat	Ramrama	Kalaikunda	Gurguripal	Bhadutala
January	0.033	0.024	0.047	0.023
February	0.014	0.017	0.038	0.018
March	0.014	0.010	0.034	0.013
April	0.014	0.010	0.034	0.013
May	0.014	0.010	0.034	0.013
June	0.014	0.010	0.034	0.013
July	0.033	0.024	0.059	0.037
August	0.062	0.052	0.094	0.074
September	0.085	0.086	0.102	0.106
October	0.085	0.086	0.098	0.106
November	0.048	0.062	0.085	0.069
December	0.033	0.034	0.051	0.013

Similarly, plant density of *Crotalaria pallida* Ait. increases in the month of August and September due to germination in rain water and gradually decreasing from the month of October to December. Table 6.5 to 6.7 show the pattern of changes in density of *Crotalaria pallida* Ait. from 2014 to 2016 in the four selected beats.

Table 6.5: Population density (Plants / Sq. Mt) of *Crotalaria pallida* Ait. (Year-2014).

Month \ Beat	Ramrama	Kalaikunda	Gurguripal	Bhadutala
August	0.080	0.075	0.070	0.060
September	0.090	0.080	0.075	0.085
October	0.090	0.060	0.055	0.080
November	0.074	0.050	0.044	0.065
December	0.056	0.033	0.040	0.058

Table 6.6: Population density (Plants / Sq. Mt) of *Crotalaria pallida* Ait. (Year-2015).

Month \ Beat	Ramrama	Kalaikunda	Gurguripal	Bhadutala
August	0.070	0.060	0.077	0.076
September	0.075	0.091	0.087	0.080
October	0.070	0.091	0.077	0.065
November	0.070	0.075	0.077	0.055
December	0.040	0.025	0.033	0.042

Table 6.7: Population density (Plants / Sq. Mt) of *Crotalaria pallida* Ait. (Year-2016).

Month \ Beat	Ramrama	Kalaikunda	Gurguripal	Bhadutala
August	0.050	0.060	0.044	0.078
September	0.080	0.070	0.064	0.098
October	0.060	0.030	0.042	0.058
November	0.035	0.030	0.032	0.036
December	0.010	0.016	0.027	0.012

As it was noted that *Ocimum canum* Sims, population density rises in the month of June and July and decreases from September to November.

Residents of all four-selected forest areas use leaf, root and whole plant for worshipping Goddess 'Kalika, to eradicate 'Diwali Bug' or 'Shyama poka' during month September and October. At the onset of every winter village people make garland, locally called as 'Tulsi Mala' from semi dried stems of *Ocimum canum* Sims. Due to overutilization of 'Bon Tulsi' its density was found to lessen. Table 6.8 - 6.10 show the pattern of changes in density of *Ocimum canum* Sims from 2014 to 2016 in the four selected Beats.

Table 6.8: Population density (Plants / Sq. Mt) of *Ocimum canum* Sims (Year-2014).

Month \ Beat	Ramrama	Kalaikunda	Gurguripal	Bhadutala
June	0.051	0.063	0.030	0.071
July	0.072	0.082	0.069	0.097
August	0.072	0.058	0.069	0.081
September	0.066	0.042	0.055	0.045
October	0.061	0.036	0.022	0.045
November	0.061	0.025	0.006	0.045
December	0.055	0.011	0.002	0.035

Table 6.9: Population density (Plants / Sq. Mt) of *Ocimum canum* Sims (Year- 2015).

Month \ Beat	Ramrama	Kalaikunda	Gurguripal	Bhadutala
June	0.050	0.049	0.051	0.045
July	0.097	0.079	0.094	0.082
August	0.072	0.065	0.071	0.061
September	0.051	0.065	0.066	0.061
October	0.042	0.065	0.031	0.061
November	0.033	0.047	0.025	0.014
December	0.021	0.038	0.021	0.010

Table 6.10: Population density (Plants / Sq. Mt) of *Ocimum canum* Sims (Year- 2016).

Month \ Beat	Ramrama	Kalaikunda	Gurguripal	Bhadutala
June	0.032	0.027	0.051	0.022
July	0.069	0.073	0.094	0.062
August	0.058	0.040	0.077	0.044
September	0.058	0.036	0.055	0.029
October	0.058	0.036	0.049	0.023
November	0.037	0.015	0.043	0.011
December	0.018	0.007	0.012	0.011

In accordance with the population density of *Tephrosia purpurea* Linn. is higher in month of August and September whereas the density of this plant meagers from December to March. In that months forest fringe people prepare dye from flowers and seeds of this plant and utilize whole plant for making 'cleaning tool'. Regarding unscientific uses of that plant lowers the density of *Tephrosia purpurea* Linn. Table Nos. 6.11 to 6.13 shows the pattern of changes in density of *Tephrosia purpurea* from 2014 to 2016 in the four selected Beats

Table 6.11: Population density (Plants / Sq. Mt.) of *Tephrosia purpurea* Linn (Year-2014).

Month \ Beat	Ramrama	Kalaikunda	Gurguripal	Bhadutala
August	0.035	0.044	0.066	0.055
September	0.068	0.088	0.073	0.078
October	0.061	0.072	0.073	0.064
November	0.061	0.058	0.073	0.057
December	0.057	0.046	0.054	0.057
January	0.052	0.038	0.043	0.041
February	0.044	0.031	0.043	0.022
March	0.035	0.023	0.033	0.022

Table 6.12: Population density (Plants / Sq. Mt.) of *Tephrosia purpurea* Linn (Year-2015)

Month \ Beat	Ramrama	Kalaikunda	Gurguripal	Bhadutala
August	0.057	0.062	0.071	0.068
September	0.081	0.092	0.089	0.096
October	0.078	0.076	0.089	0.062
November	0.072	0.072	0.089	0.056
December	0.046	0.061	0.071	0.051
January	0.046	0.053	0.038	0.043
February	0.046	0.034	0.023	0.018
March	0.032	0.028	0.021	0.016

Table 6.13: Population density (Plants / Sq. Mt.) of *Tephrosia purpurea* Linn (Year-2016)

Month \ Beat	Ramrama	Kalaikunda	Gurguripal	Bhadutala
August	0.041	0.064	0.052	0.048
September	0.073	0.088	0.079	0.091
October	0.056	0.067	0.032	0.075
November	0.040	0.063	0.032	0.066
December	0.037	0.024	0.032	0.052
January	0.037	0.013	0.026	0.044
February	0.037	0.011	0.026	0.031
March	0.037	0.005	0.022	0.016

It is worthwhile to mention that in this district, particularly in Kalaikunda area, the villagers use the above-mentioned plants as fuel for preparation of Molasses from ‘Silver Date Palm’ or ‘Indian Date Palm’ i.e. *Phoenix sylvestris* Roxb in winter season. For this,

the density of above mentioned weeds is negatively correlated with density of Indian date palms.

Though all these weed plants are useful in the sense of human welfare but common people are not aware of that in specific ways, no effective role is played either by local panchayat members or by functionaries of Forest Department. Hence local village people and members of forest protection committees are completely ignorant about the facts of utility and conservation of these weeds. It is only the timber yielding plants which are target products to FPC members and functionaries of Forest Departments.

Need for Conservation

The need for conservation of *Lantana camara* and other three weeds is linked well with several economic and social objectives. Those are:

- i) more fuel wood supply for domestic as well as industrial uses,
- ii) provisions for quality raw material for craft making,
- iii) supply of qualitatively better fuel wood,
- iv) improved and durable raw material for crafts and furniture making and
- v) availability of better quality raw material for pharmaceutical, dyeing and bleaching purposes.

The quantitative and qualitative degradations of these weed plants are linked with important factors like

- a) density decay
- b) stunted growth
- c) falling biomass output due to several anthropogenic factors, and
- d) environmental hazards like storm, flood, drought, forest fire etc.

All these factors are responsible for reduction in output and degradation of quality of product. In fact, forest cleaning, grazing and browsing by cattle, human interference and rampant uprooting of plants for medicinal as well as other utility purposes, habitat transfer, pollution, climate change etc. are responsible for changing the density and growth of all these weeds namely, *Lantana camara*, *Crotalaria pallida*, *Ocimum canum* and *Tephrosia purpurea*.

Conservation Strategies

Besides quantitative and qualitative improvement, the programme of conservation aims to protect the loss of plant, helps in poverty reduction, attempts sustainable development and promotes the usefulness of the genetic resources. To attain these targets of conservation, the following strategies are important:

- a) The actors at the interface i.e. the forest fringe people, tribals, craftsmen and traders of wood, craft, plants for pharmaceutical uses etc. should utilize this resource in more careful and judicious ways.
- b) While collecting and harvesting this plant resource, each collector must keep in mind its current stock and the rate of depletion.
- c) The rate of harvesting and collection of this plant resource must be an important concern of the Forest Protection Committees under Joint Forest Management. It should be included in the Annual Action Plan of the Concerned Beat and Range of Forests. For non-forest areas, this matter will be dealt with by the concerned Gram Panchayats under the leadership of Karmadhakshya of Bon-o-Bhumi Sanrakshan of Block Panchayat Samity.
- d) Awareness of the villagers, particularly of the tribals in respect of conservation of this resource must be promoted through posters, campaigns, rallies etc on appropriate occasions like Bana-Mahotsav, World-Environment Day etc.

- e) Since resource consumed is less and the value of output is high, the craftsmen must be encouraged to care for this issue of conservative use.
- f) Karmodhakshyas, Bon-o-Bhumi Samrakshan both at GP and Block Panchayat Samity levels need to be deeply involved in promoting such economically sensitive wild crop growing, nurturing and harvesting and for that if so necessary appropriate workshops and trainings should be organized at Block or district level.
- g) This type of programme may involve local NGOs and Village Clubs for propagation of this venture among the villagers, particularly younger section of the communities.
- h) The distinguished and successful performing units of GPs, FPCs, Village Clubs, educational institutions *etc* in terms of propagation of the knowledge and scheme, organizational capability and involvement of the participants may be awarded with recognition and prizes every year.

Summary:

Weeds, on the basis of utilization are now considered as useful plants to common village people. Weeds are naturally germinated and thrived on soil without any effort instinctively. Still then many an environmental factor have direct effect on their existence as well as survivorship.

Resistance power of weeds are more than any type cultivated and hybrid plant because of their instinct spirit and invasiveness. From the present survey it was experienced that microbial and fungal attack were often not fatal for these selected weeds i.e. *Lantana camara* Linn, *Crotalaria pallida* Ait., *Ocimum canum* Sims and *Tephrosia purpurea* Linn. rather actions of different animals like, grazing and browsing by cattle and anthropogenic interference like, clearing of forest floor, harvesting of twigs etc. severely damage these plants most effectively. Unscrupulously uprooting of such weeds by village people was recorded to reduce the density of occurrence of them and to wipe out.

Members of forest protection committees, forest departmental officials, even panchayat members were noted to concede with the utility of non-wood forest products (NWFP), in addition to major forest products. But still now only little attention is paid to weeds. In such a state steps to take urgent actions for conservation and management as well as for scientific collection, processing and marketing of products harnessed from such useful weeds has paramount importance.

So, grazing and browsing by cattle shall be restricted. Some regular, however detrimental, events like forest firing, complete clearing of weeds etc. are recommended to be kept in abeyance, as far as possible to reap best economic benefits of using these wealth for craft making, pharmaceutical production etc. Most strikingly these weeds even proving food to

the livestock of villagers through natural activities like browsing and grazing itself has immense utilitarian significance.

Fig 6.2: Graphical representation of population density (Plants / sq. Mt) of *Lantana camara* Linn. (Year- 2014).

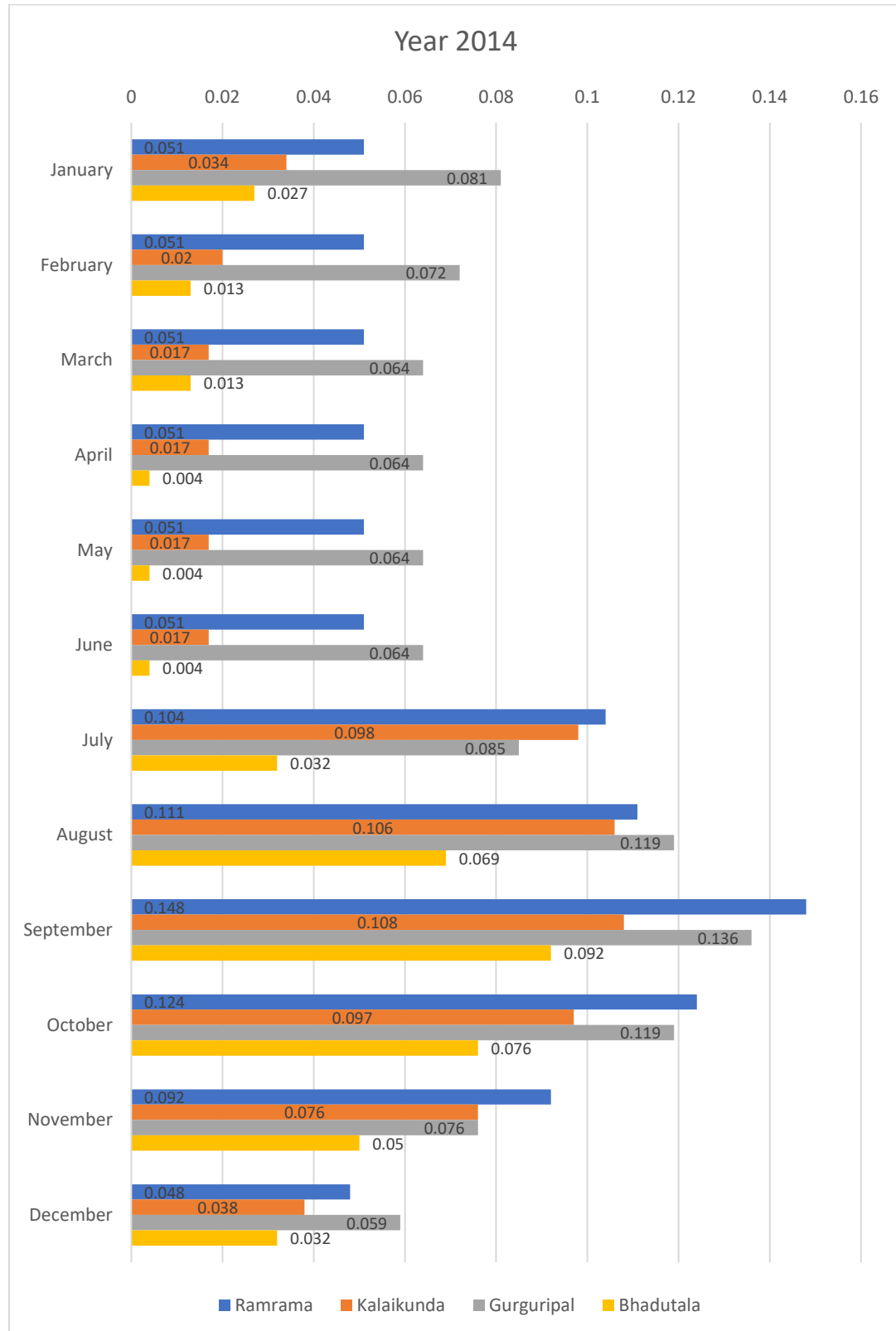


Fig 6.3: Graphical representation of population density (Plants / sq. Mt) of *Lantana camara* Linn. (Year- 2015).

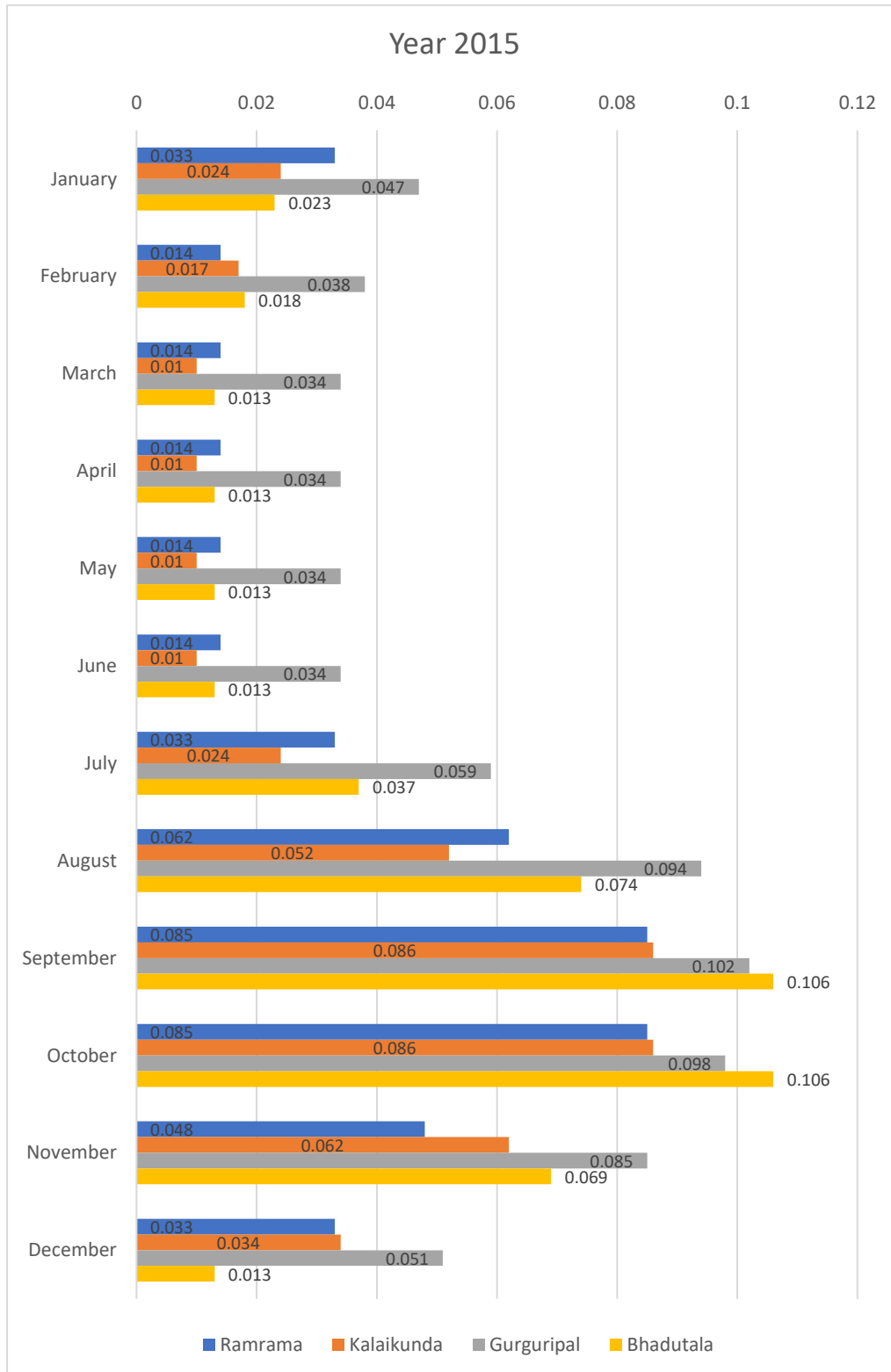


Fig 6.4: Graphical representation of population density (Plants / sq. Mt) of *Lantana camara* Linn. (Year- 2016).

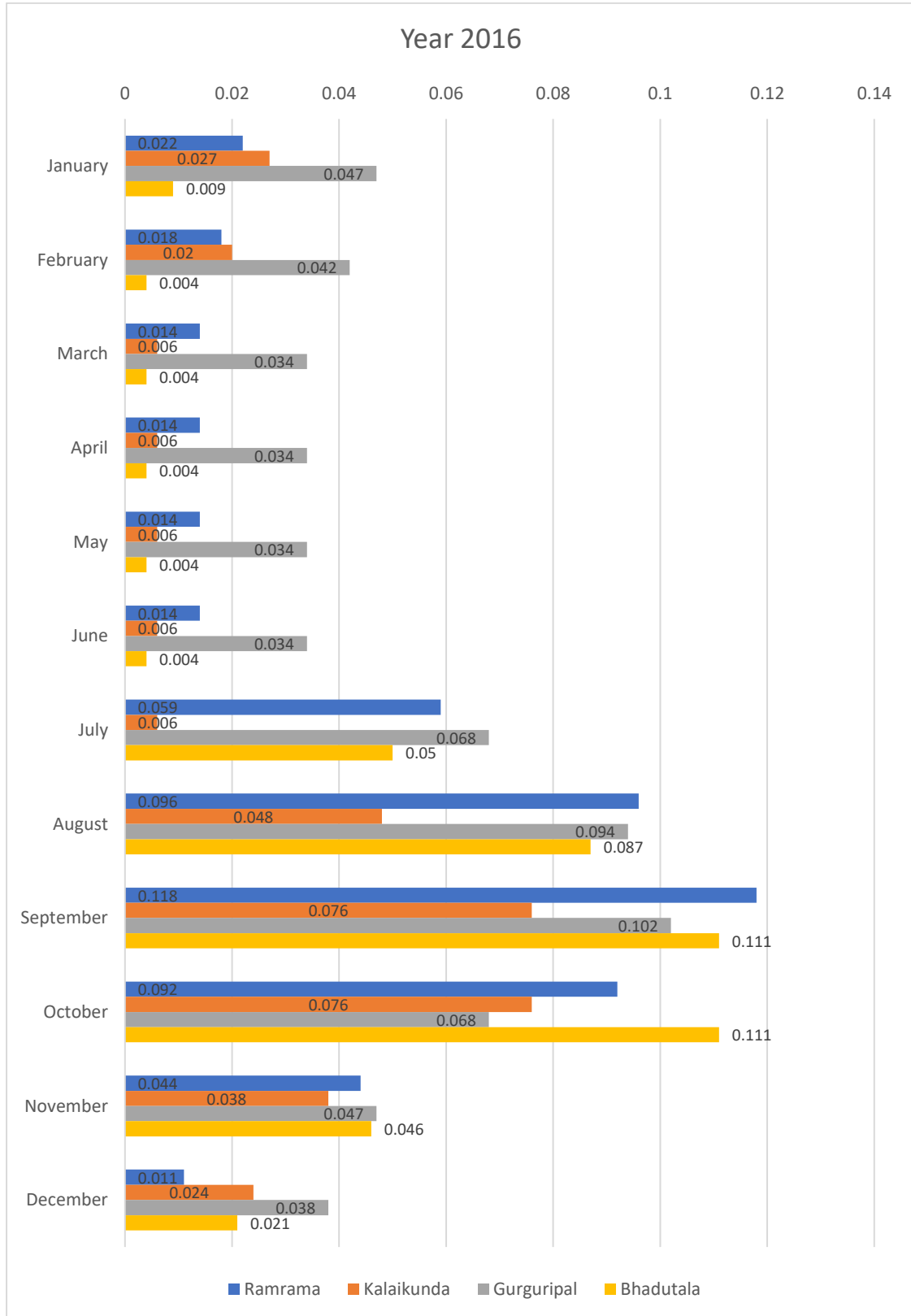


Fig 6.5: Graphical representation of population density (Plants / sq. Mt) of *Crotalaria pallida* Ait. (Year- 2014).

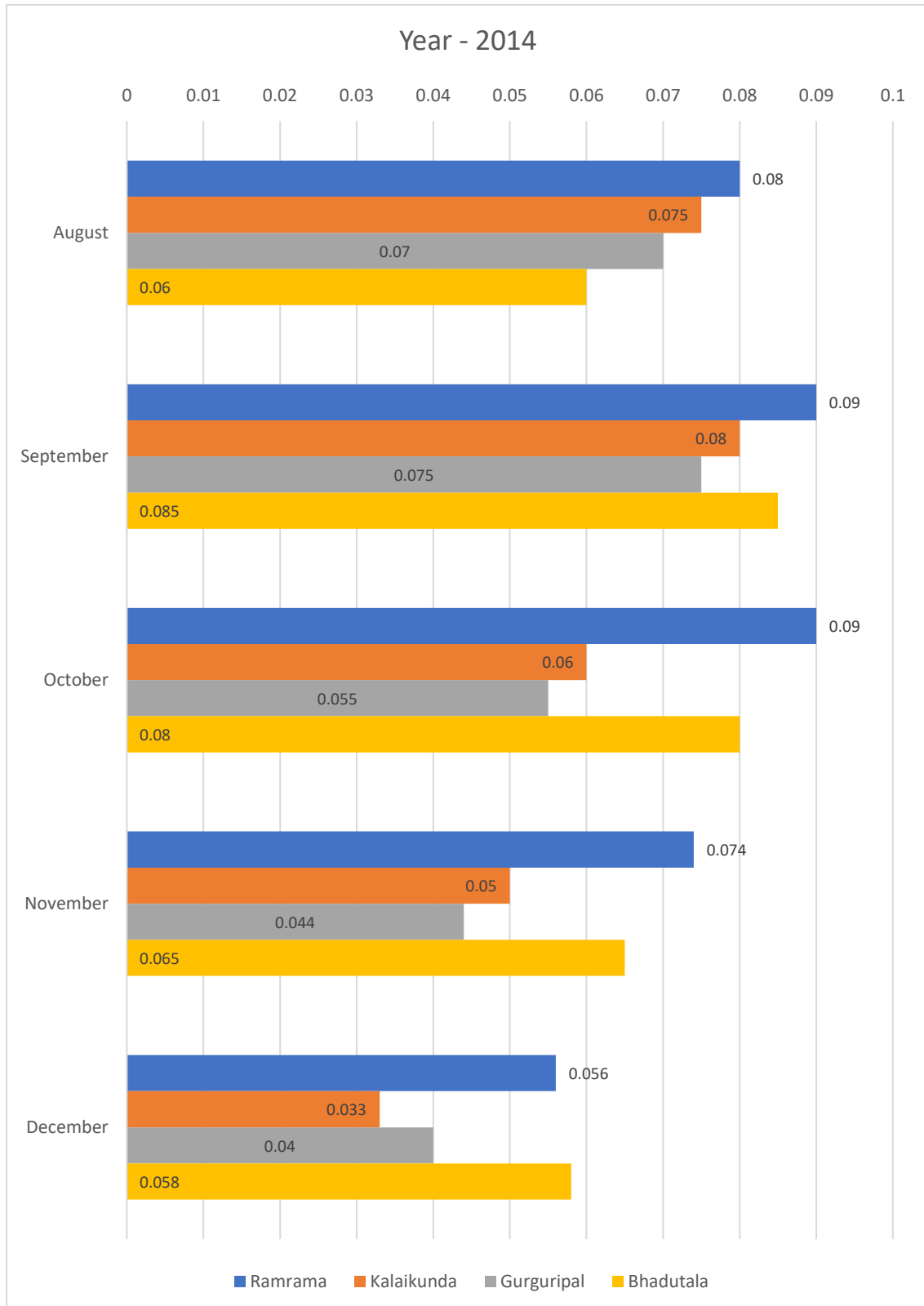


Fig 6.6: Graphical representation of population density (Plants / sq. Mt) of *Crotalaria pallida* Ait. (Year- 2015).

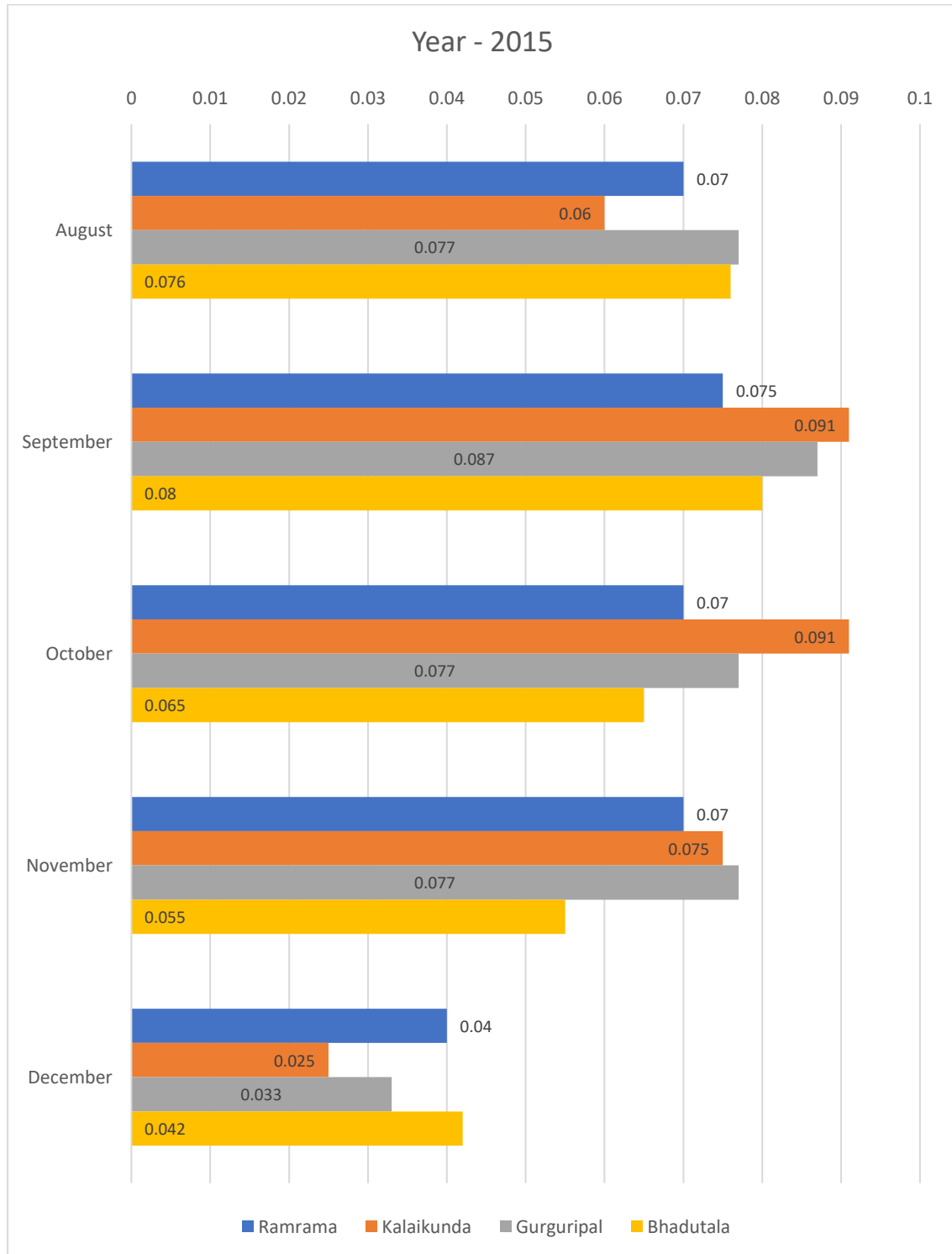


Fig 6.7: Graphical representation of population density (Plants / sq. Mt) of *Crotalaria pallida* Ait. (Year- 2016).

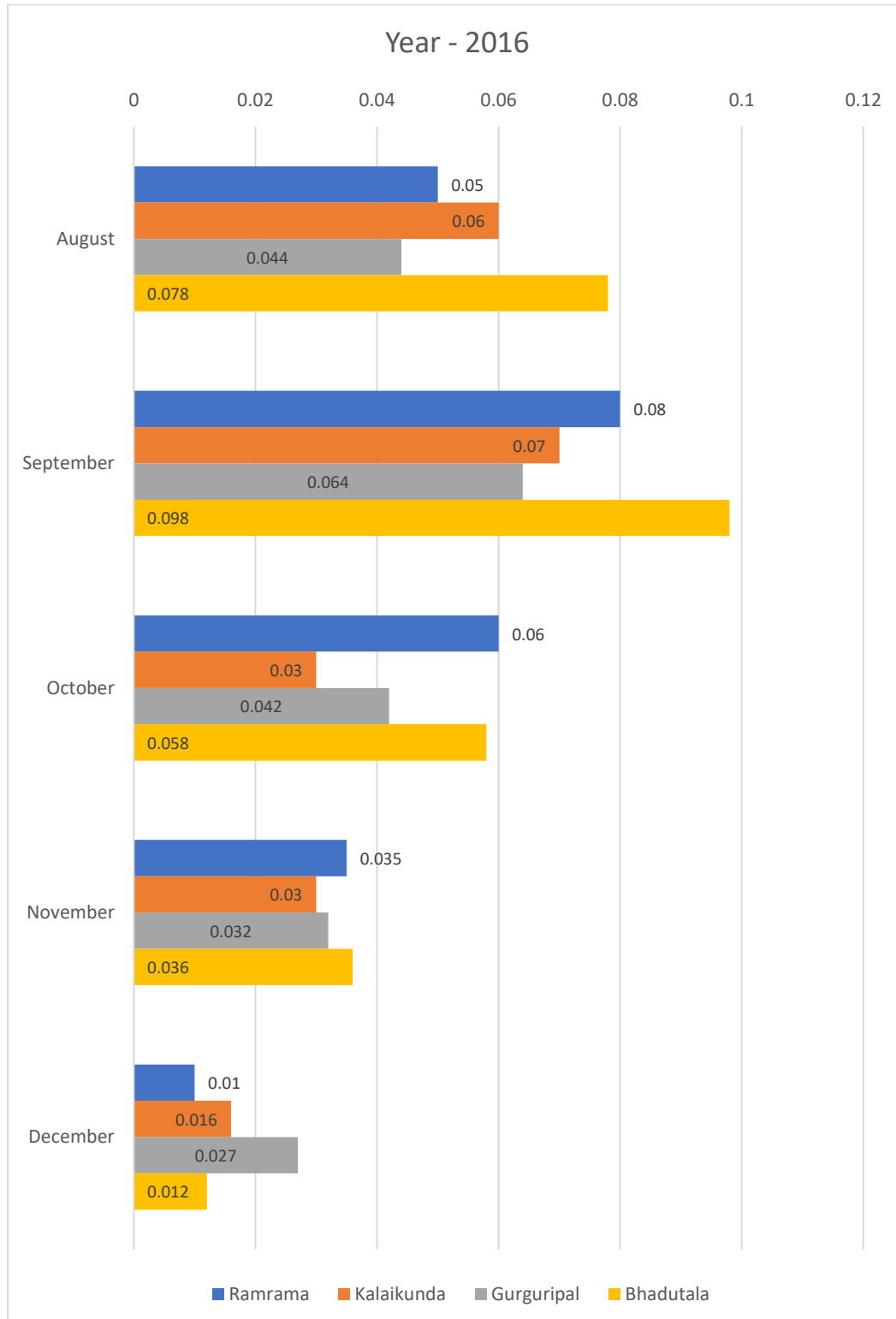


Fig 6.8: Graphical representation of population density (Plants / sq. Mt) of *Ocimum canum* Sims (Year- 2014).

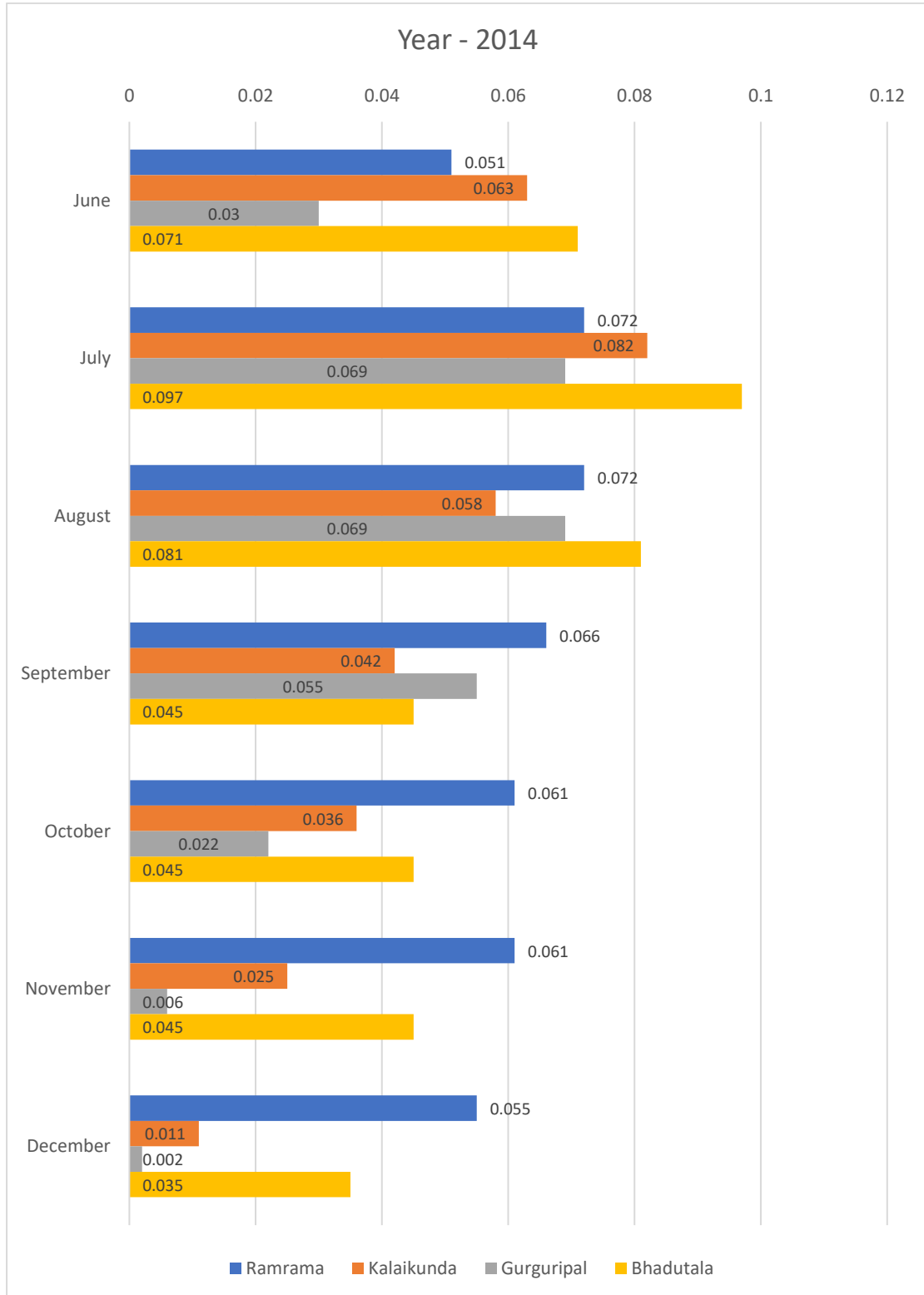


Fig 6.9: Graphical representation of population density (Plants / sq. Mt) of *Ocimum canum* Sims (Year- 2015).

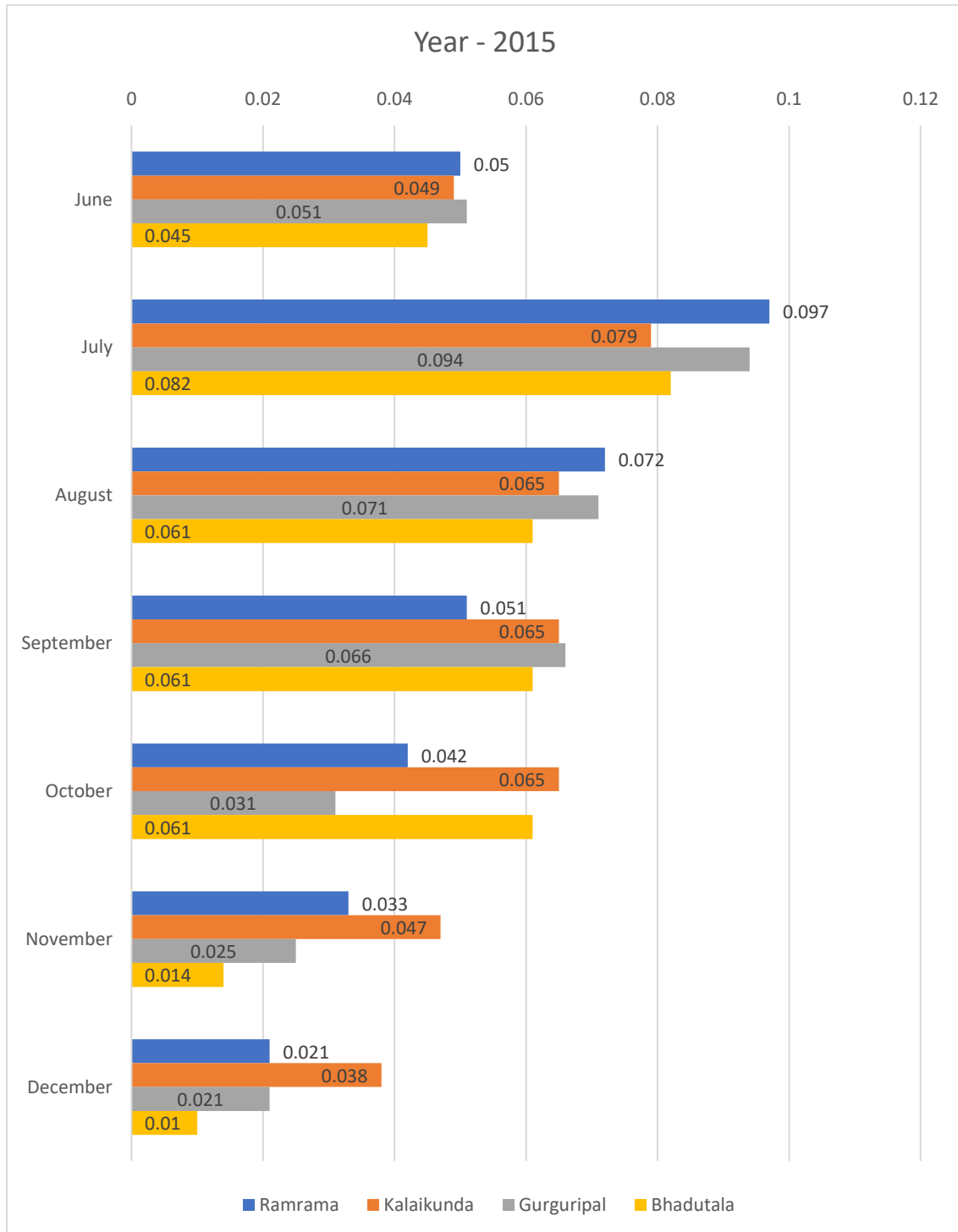


Fig 6.10: Graphical representation of population density (Plants / sq. Mt) of *Ocimum canum* Sims (Year- 2016).

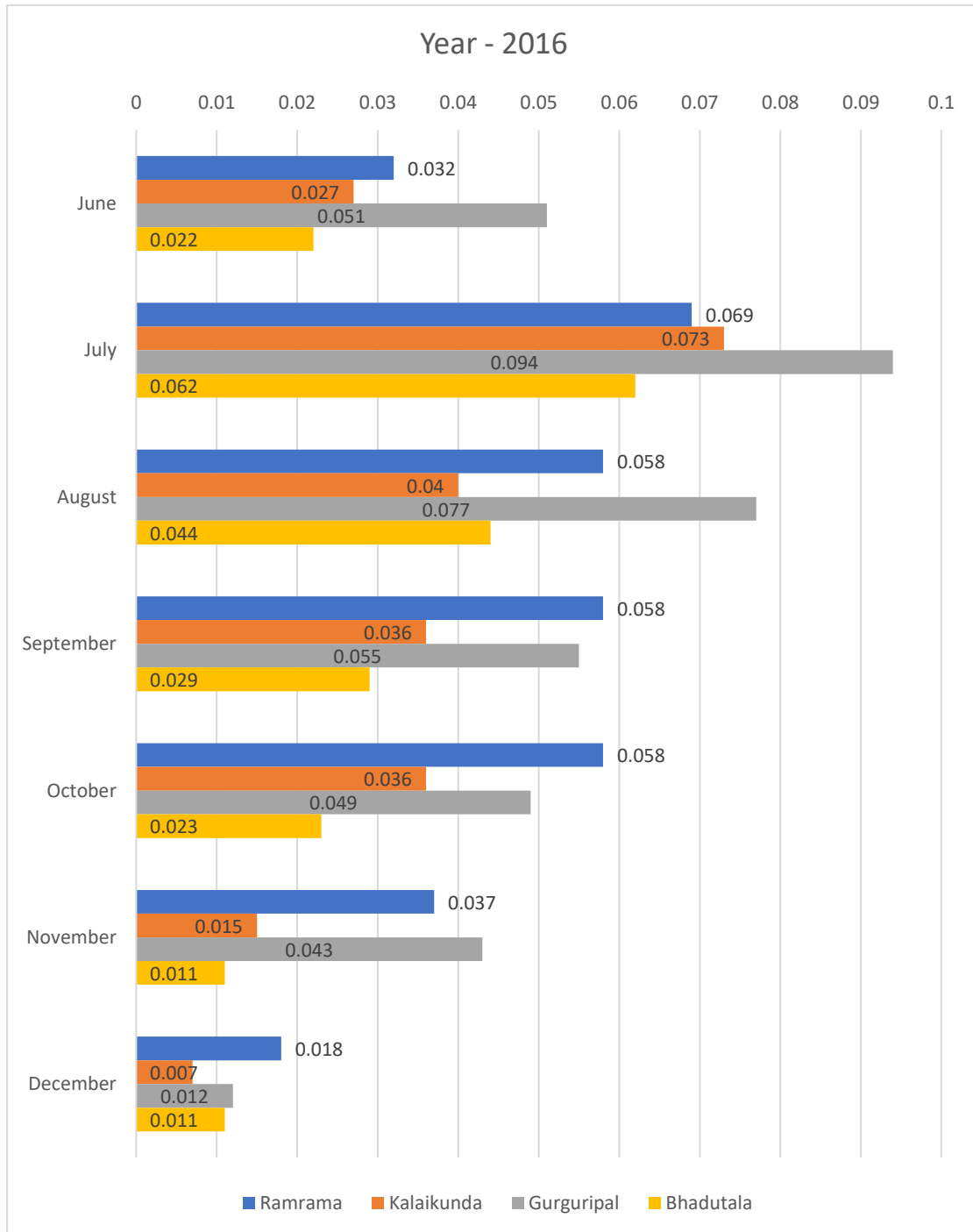


Fig 6.11: Graphical representation of population density (Plants / sq. Mt) of *Tephrosia purpurea* Linn (Year- 2014).

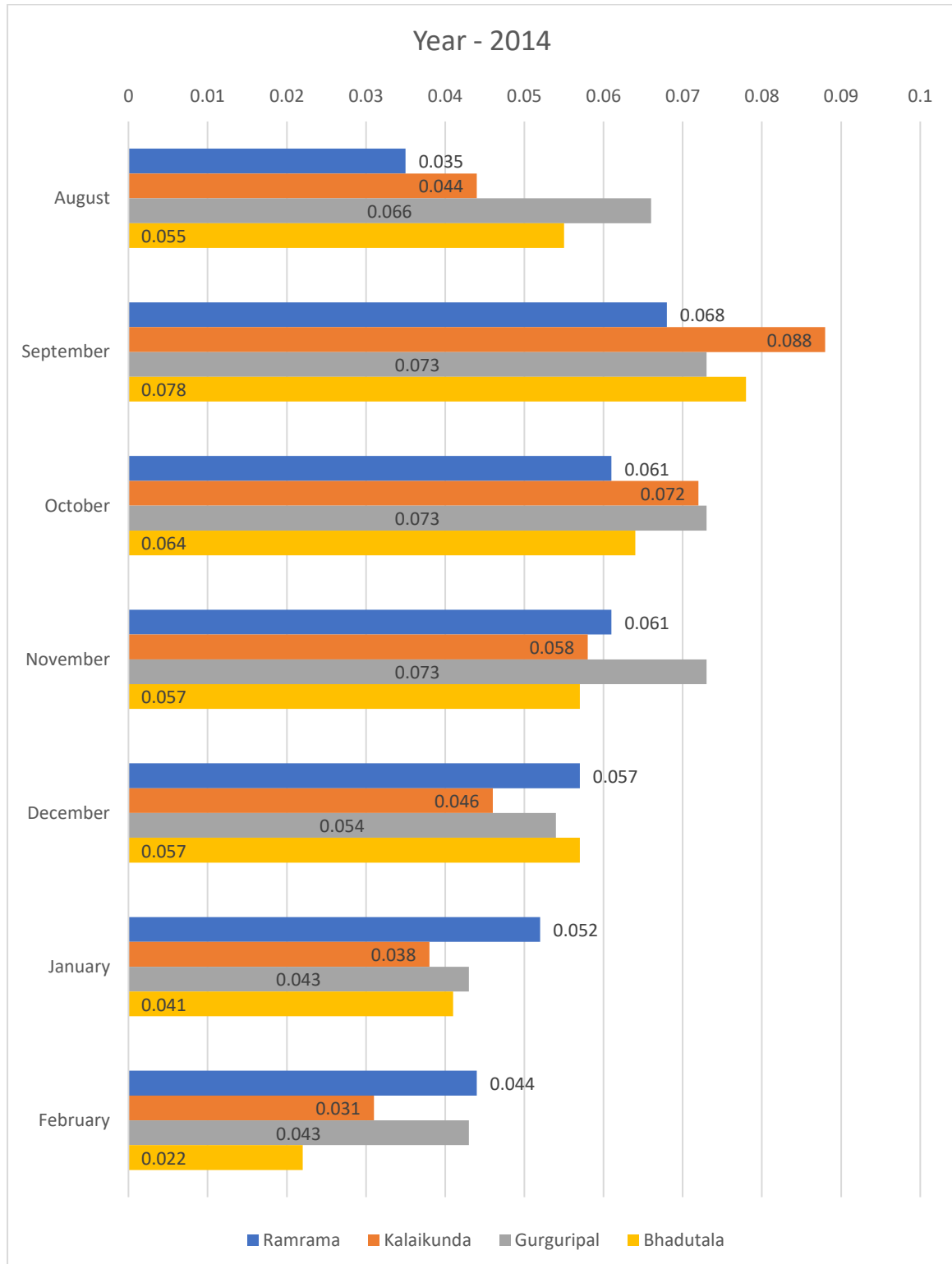


Fig 6.12: Graphical representation of population density (Plants / sq. Mt) of *Tephrosia purpurea* Linn (Year- 2015).

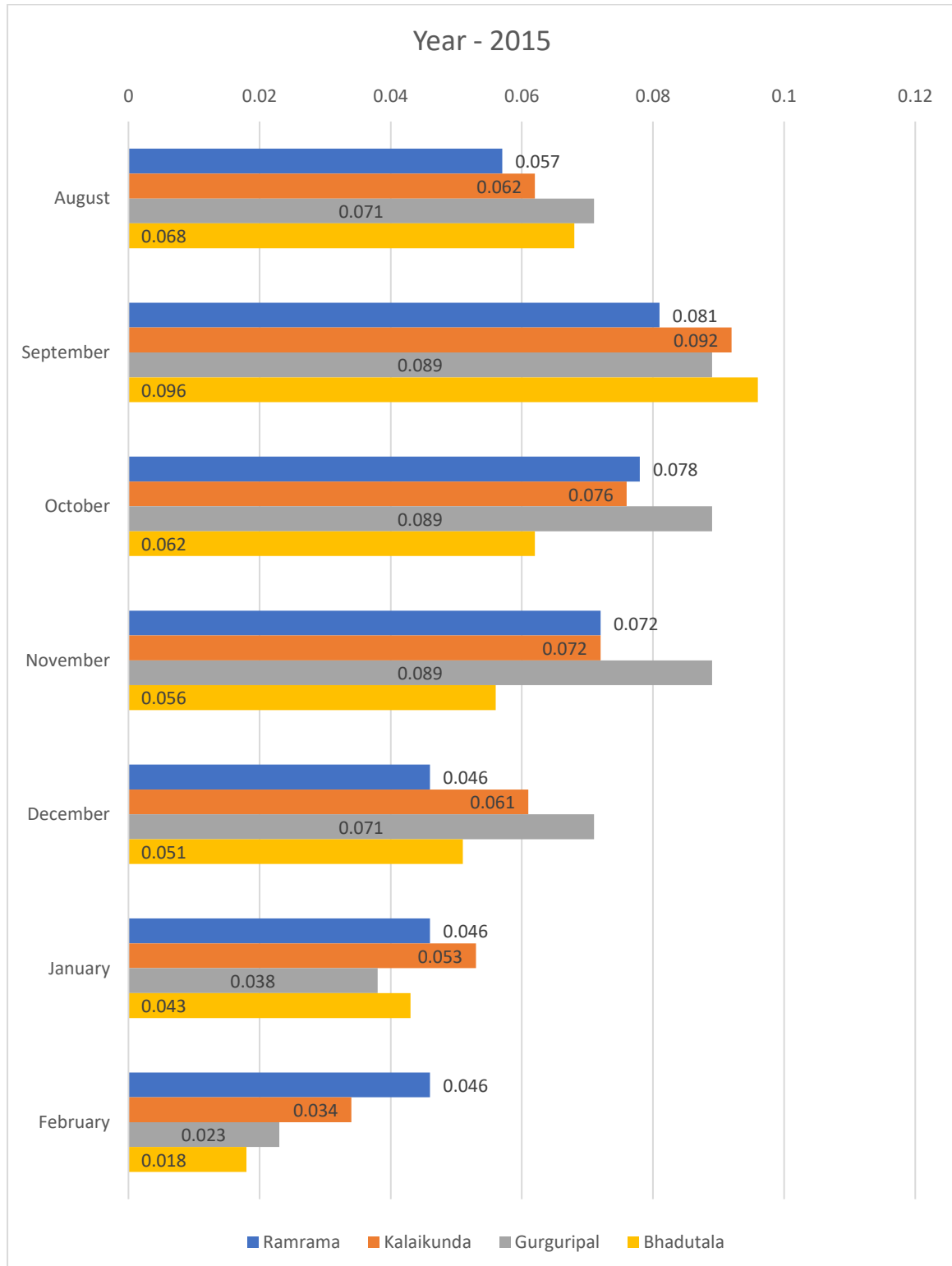


Fig 6.13: Graphical representation of population density (Plants / sq. Mt) of *Tephrosia purpurea* Linn (Year- 2016).

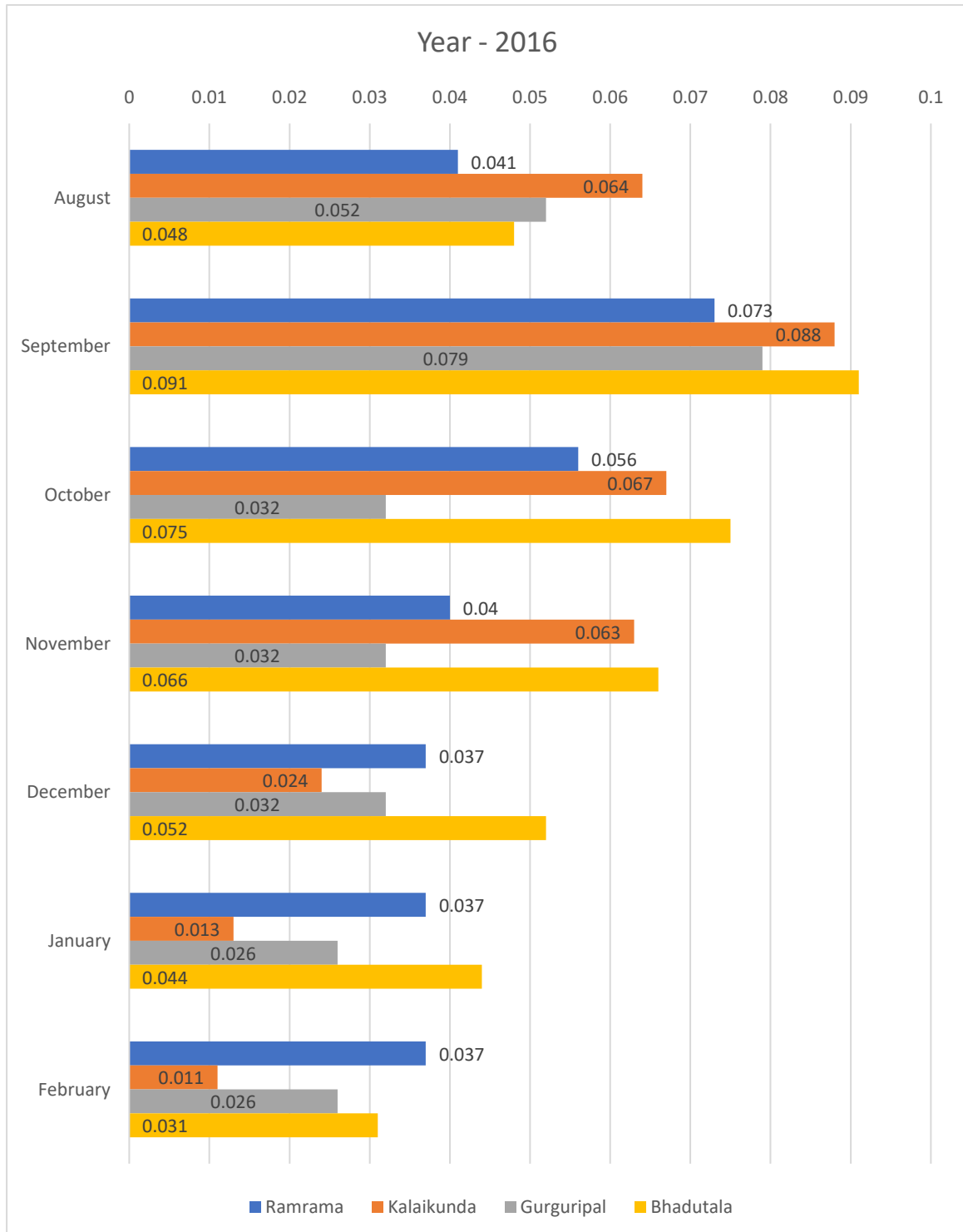




Fig 6.14: Grazing By Cattle in forest adjoining area.

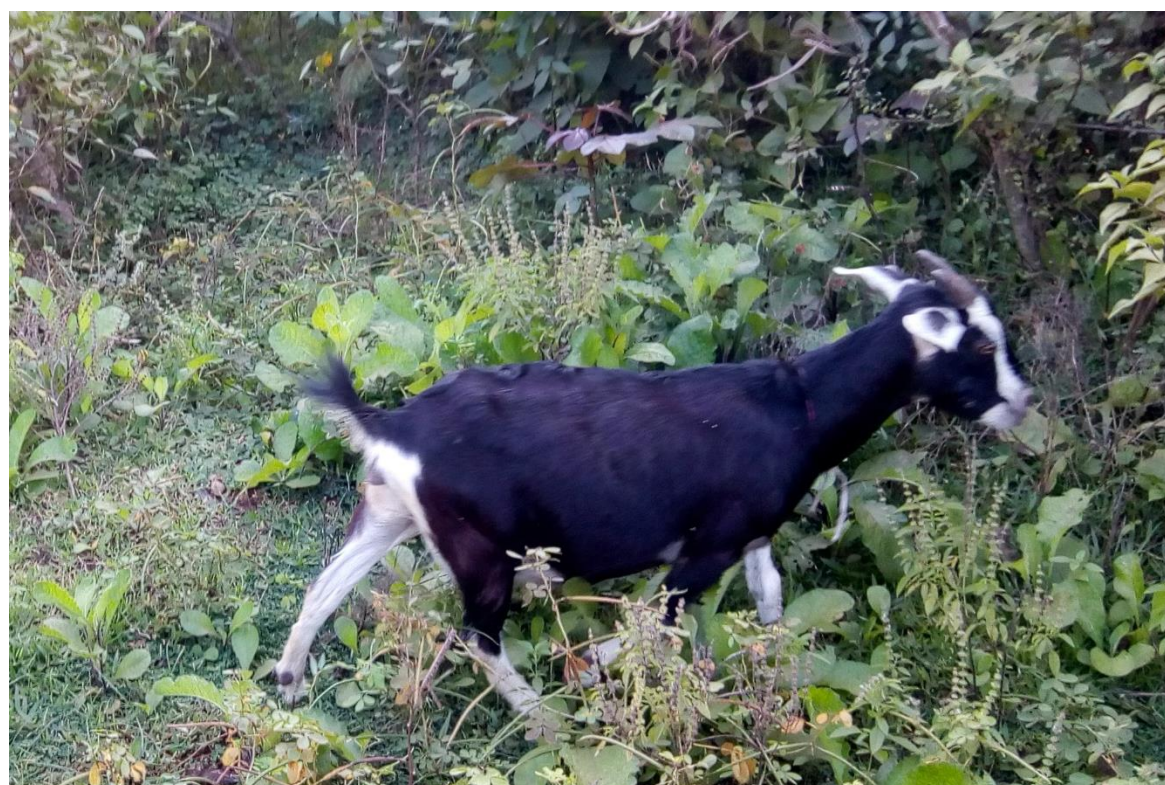


Fig 6.15: Browsing by Goat in forest adjacent area..

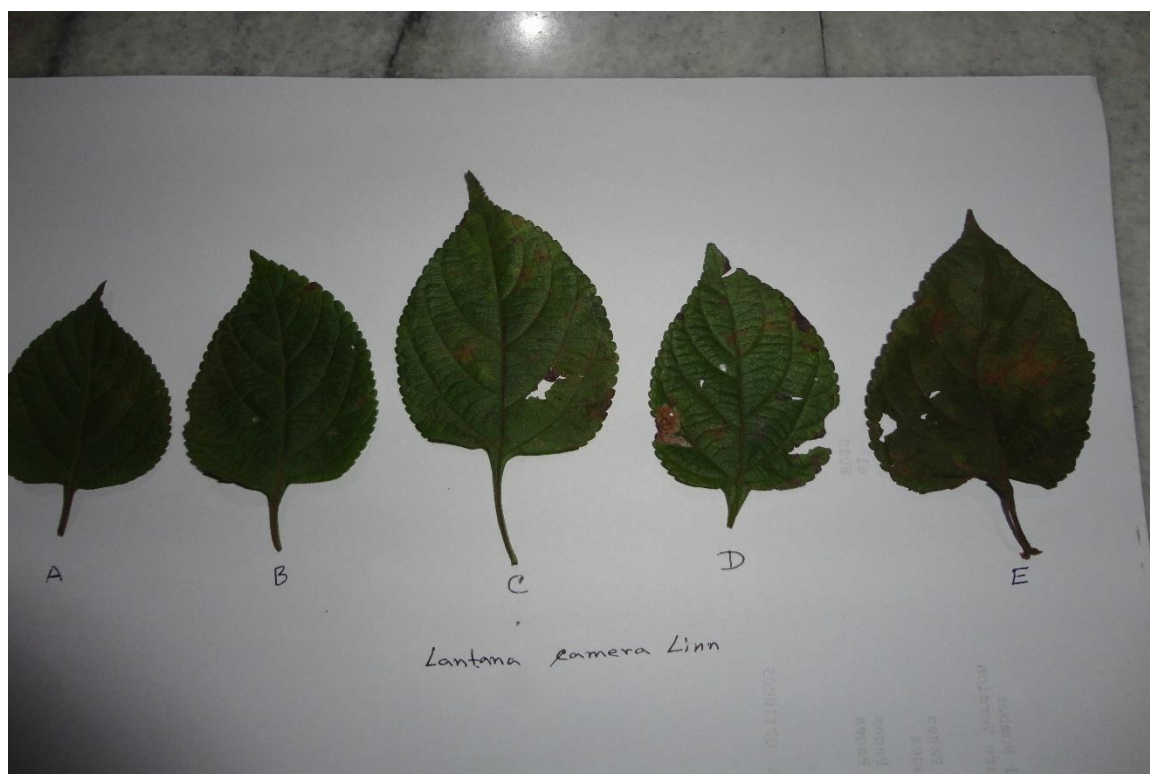


Fig 6.16: Various infected leaf of *Lantana camara* Linn.



Fig 6.17: Penetration of insect in Fruit of *Crotalaria pallida* Ait.



Fig 6.18: Insect that destroy fruit of *Crotalaria pallida* Ait.



Fig 6.19: 'Tephrosia Beetle' causes damage to plant.