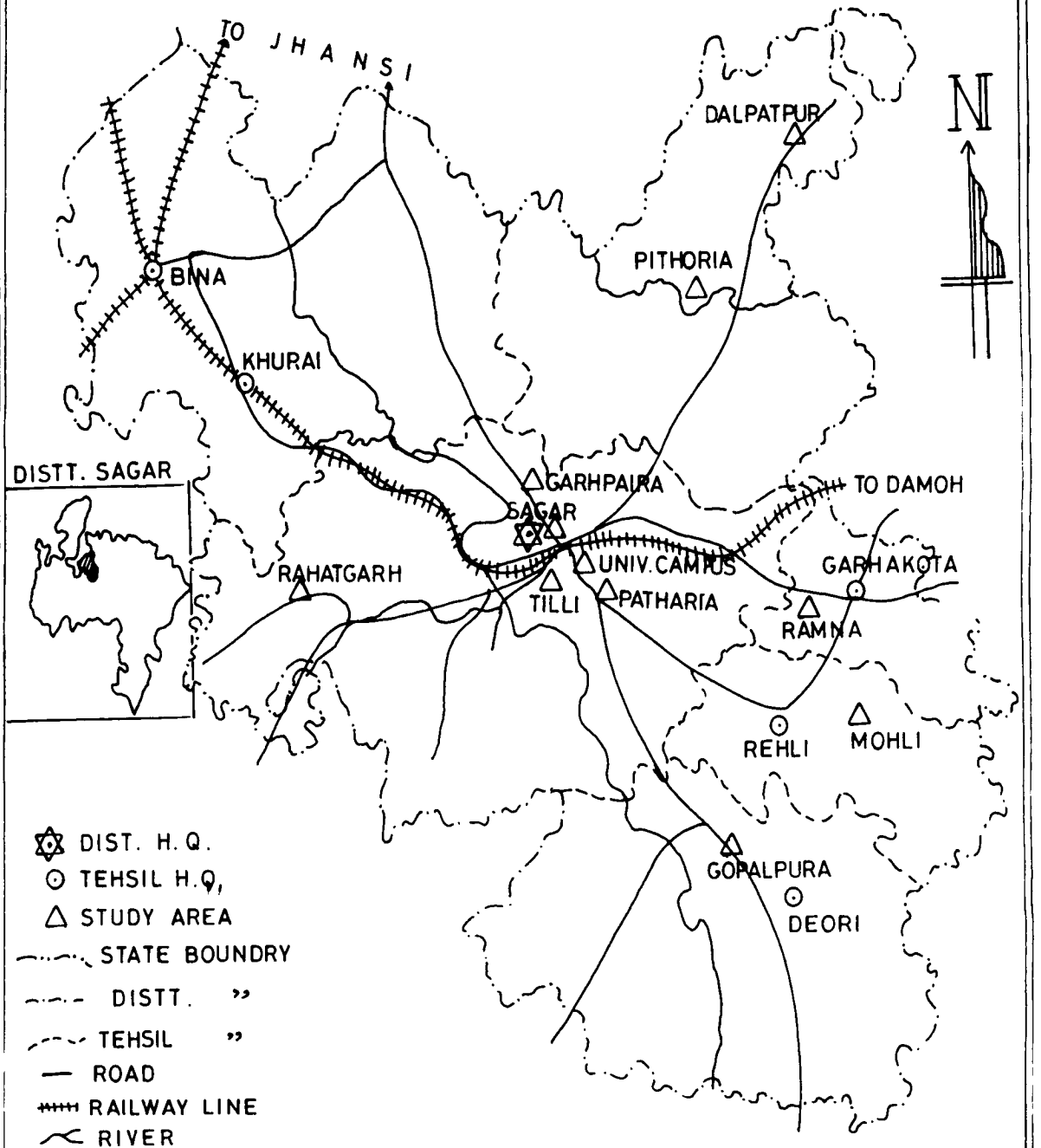


CHAPTER-2

STUDY-AREA

MAP OF STUDY SITE FOR PHENOLOGY & SEEDCOLLECTION.

(Fig-1.)



4 0 4 8 12 16 Kms

M A P NO. 1

Location :

Present studies have been made in Sagar district of Madhya Pradesh, which is located centrally in India. Geographically, Sagar district is situated in the extreme north west corner of Madhya Pradesh and is almost centrally located in the country. The district lies between $23^{\circ}10'$ & $24^{\circ}10'N$ latitudes and $78^{\circ}40'$ and $79^{\circ}21'E$ longitudes. It stands over a hilly tract at an average height of 583 meters above mean sea level. The total geographical area of the district is 10246 sq.km. out of which about one third is covered by forests of tropical dry deciduous type (Fig-1)

Physiography : Topography and Geology :

According to topographical and geographical studies, Madhya Pradesh has been divided into many parts. Sagar district has undulating topography with low rising hills scattered all around. The maximum height is shown by southern hills (683 meters) while the minimum (350 meters) is towards the North. The rocks are mostly Vindhyan sandstones and Basalt. The Vindhyan rock fragments detached from the precipitous slopes as outcrops, due to the gravitational force of wind, chemical weathering and roots of trees which are carried down through slopes to form taluses. Basalt rocks are deposits of lava flow which are igneous in nature (Wadia, 1948). They are comparatively more susceptible to physical as well as chemical weathering as compared to Vindhyan rocks. The characteristics spheroidal weathering of basalt rocks lead to occurrence of rounded boulders of various sizes. These boulders can be seen on slopes due to removal of soil on account of destruction

of forest vegetation or by over grazing and subsequent soil erosion. In those areas where soil erosion is not conspicuous, soil remains accumulated upto a depth of few centimeters to half-meter or two-meter.

Soil :

The colour, texture and thickness of soil depend on the vegetational cover as well as the topography of the stand. The topography is undulating, so there is a great variation in physical as well as chemical properties of soil. The soil lying at the foot of the hill is black in colour and clayey. Because it is non-porous it remains water logged throughout the rainy season. During this time rain washes down silica, alkalies and clay fragments. The soil from plateau and hilly slopes get deposited in various thickness on plateau and slopes. On slopes and plateau, the soil undergoes the process of laterization resulting in the development of red colour. This is due to the removal of silica and alkali metals and accumulation of hydrated oxides of iron and aluminium on the slopes, physical weathering of sandstones brings about the formation of taluses, leaving some sandy soil between the stone pieces, whereas basalt rocks weather chemically depending upon the availability of water, temperature, carbon dioxide concentration and various organic acids formed during the decay of plant residue. Bases of hills form extensive plains which have a thin mantle of soil. Soil derived from the basalt hills are slightly alkaline with more of organic matter, phosphorous, potassium and calcium, however soil derived from sandstones are mildly acidic with more of nitrogen (Rathore, 1968).

Vegetational Composition :

Forest vegetation of Sagar can be classified as "Tropical Dry Deciduous" type on the basis of classification given by Champion and Seth (1968). The forests are confined mostly to the hilly areas and may be further classified into under mentioned sub-types :

1. Tectona grandis forests
2. Miscellaneous forests
3. Anogeissus pendula forests
4. Acacia catechu forests
5. Butea monosperma forests

These forests are heterogeneous in composition, quality density and physiognomy due to undulating topography, variations in soil depth and intensity of biotic factors.

Climatic conditions :

On the basis of distribution of rainfall, relative humidity and variation in temperature during the course of an entire year, the climate of Sagar is seasonal type with three distinct season viz .- Rainy, Winter and Summer. Each of about four months duration.

Rainy season :

This season in Sagar begins from middle of June and continues upto September. It is strictly confined to about four months. The characteristics of this season are heavy rainfall, high relative humidity, high temperature and least diurnal variations in the climatic conditions.

Winter season :

Winter season starts from the middle of October to end of February. It is characterised by low temperature and moderate relative humidity. Occasional showers are received in the month of December and January which cause a further fall in the temperature.

Summer season :

Period of summer starts from end of February to mid June. It is characterized by high temperature and low humidity and least diurnal variation in temperature.

Rain-fall :

Annual rain fall for Sagar during three years study period was noted respectively. The maximum rainfall occurred in July to September months of the year. Amongst three consecutive years maximum rain fall was observed in (1997) given in Table (1) and Fig.(2).

Temperature :

Variation in temperature during summer and winter are of high magnitude. On the basis of the past three years temperature records, it is moderate with average minimum and maximum temperature of 9.83°C and 48.00°C. In summer the temperature goes upto 47.00°C and in winter it comes down to 9.23°C. Monthly mean maximum and minimum temperature are given in Table (2) and Fig.(3).

Relative Humidity :

Humidity is an important factor which is related to the growth of herbaceous layer. In general, minimum average value of relative humidity is obtained. It is

higher in summer season, moderate in winter and least in summer season. Mean monthly records of relative humidity in morning and evening are given in Table (3) and Fig. (4)

Ombrothermic expression :

It is a better way to understand climatic conditions like rainfall and temperature in terms of wet and dry period. (Gausson, 1960). Thermal and ombrothermic curves are drawn together to express the dry and/or wet periods. The period is considered as dry when the mean rainfall lags behind twice the values exhibited by the mean temperature. Ombrothermic diagram (Fig-5). is showing the average rainfall and temperature of the months of 1995-96, 97, 98 respectively.

Boundaries :

Sagar is surrounded by Lalitpur and Chhatarpur district in north, Damoh in east, Narsingapur in south, Raisen in south-west, Vidisha in west and Guna district in west-north.

Population :

The district has total population of 16,46,198 out of which 8,75,064 are males 7,71,134 are females. The district has 1,42,903 tribal population, out of which 73,654 are males and 69,249 are females. The 9.67% scheduled tribe population is literate (Census, 1991).

The tribal communities of study area :

In India, tribal population estimated 54 million, is almost equal to the total population of United Kingdom. They formed about 7.76% of the country's total

population, in the world only next to Africa. There are more than 630 tribes, subdivided into groups spread through out the country. Maximum number of tribals is being found in Madhya Pradesh. In Sagar district, about 27 tribal communities were recorded (Rastogi 1993). Gond, Kol, Kanwar, Sahariya Bharia, Bhil, Bhumia, Sonr, Dhanwar, Arkh, Halba etc. are some principal tribes of Sagar district (Census, 1991).

Sites :

Phenological study and seed collection of two spesies was carried out from the adjoining areas of the Sagar . The selected sites are Patharia, Pithoria, Gopalpura, Dalpatpur, Tili, Makronia, Rahatgarh, University Campus and Villages situated 5 to 50 km around Sagar city ,in different directions. The villages are situated in the extensive shallow valleyes in between low rising hills. *Calotropis* (Linn) R .Br is being found on the road sides and on the agricultural lands on the boundaries or in open waste land. and avoid competition with other plants.

Table-1 : Average monthly rainfall (mm) at Sagar during study period.

Months	Years				Average
	95	96	97	98	
January	-	0.00	12.23	10.39	11.31
February	-	0.46	11.48	8.87	6.93
March	-	0.00	9.45	0.00	9.45
April	-	0.00	20.75	28.44	24.59
May	50.85	61.01	110.00	-	73.95
June	11.03	9.80	68.38	-	29.73
July	263.00	218.00	327.00	-	269.33
August	520.50	499.80	658.00	-	559.26
September	63.00	323.00	310.00	-	232.00
October	0.00	4.00	28.00	-	16.00
November	9.89	0.00	20.00	-	14.94
December	0.00	0.00	0.00	-	0.00
Total	918.27	1116.07	1575.29	47.7	1247.49

Fig.2 : Average monthly rainfall (mm) at Sagar during study period

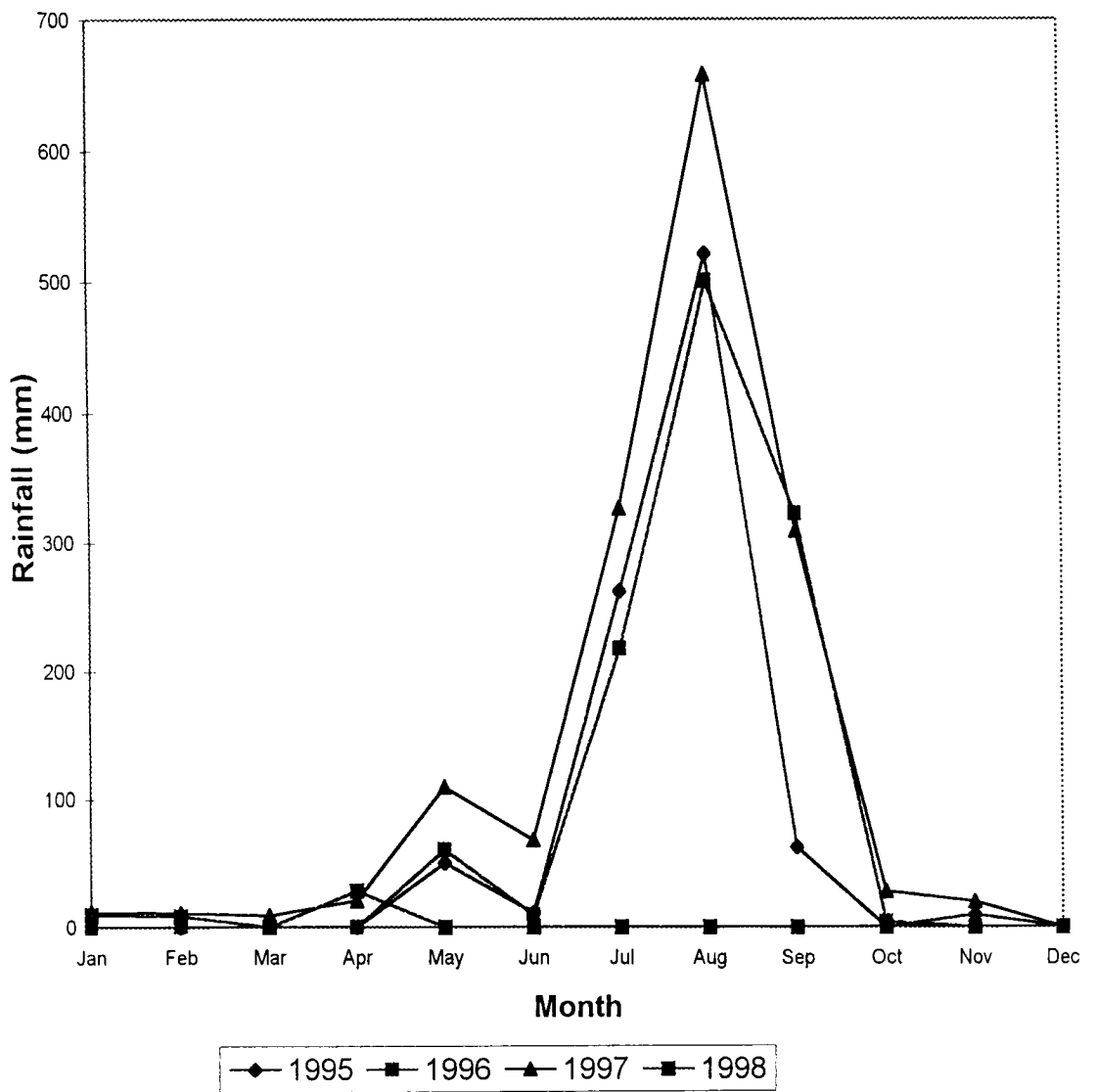


Table 2: Average temperature in (°C) at Sagar during study period.

Tyear Months	Monthly Average													
	95			96			97			98			Average	
	Min.	Max.		Min.	Max.		Min.	Max.		Min.	Max.		Min.	Max.
January	-	-		11.95	24.00		9.35	25.00		9.23	23.45		10.17	24.15
February	-	-		13.11	28.98		10.35	23.08		11.90	25.00		11.78	25.68
March	-	-		14.84	30.33		15.08	34.32		13.33	34.95		14.41	33.2
April	-	-		22.39	36.61		18.81	35.36		20.84	35.00		20.69	35.65
May	26.32	41.26		26.65	43.39		24.00	40.00		-	-		25.72	41.71
June	29.94	43.20		25.55	39.00		23.40	47.00		-	-		26.94	43.06
July	24.47	33.38		24.84	32.56		18.49	35.97		-	-		22.60	33.97
August	22.84	29.69		23.23	28.85		20.89	28.00		-	-		22.32	28.84
September	21.63	28.77		21.86	31.54		21.00	35.44		-	-		21.49	31.91
October	19.96	32.32		18.77	30.22		20.23	31.00		-	-		19.65	31.18
November	16.00	29.00		16.69	27.17		16.00	27.69		-	-		16.23	27.95
December	13.04	25.94		13.19	24.60		12.45	25.48		-	-		12.89	25.34

Fig.3 : Average monthly temperature (°C) at Sagar during study period

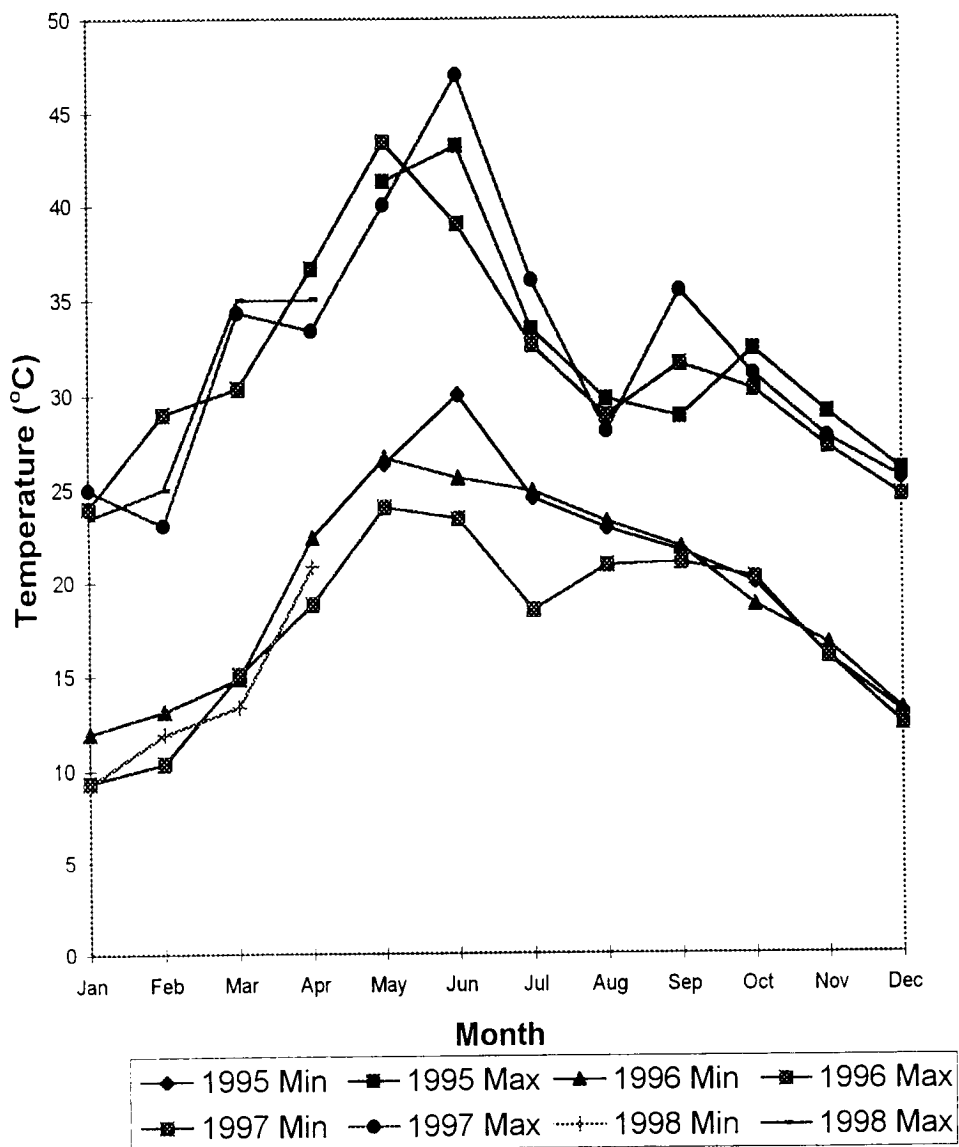


Table 3: Average relative humidity at Sagar during study period.

Tyear Months	Monthly Average														
	95			96			97			98			Average		
	Mor.	Eve.	Mor.	Eve.	Mor.	Eve.	Mor.	Eve.	Mor.	Eve.	Mor.	Eve.	Mor.	Eve.	
January			53.12	36.54	55.33	35.22	55.00	30.00	54.48	33.92					
February			50.34	33.88	51.39	30.33	50.72	32.45	50.81	32.22					
March			48.84	25.59	53.99	28.59	40.00	22.00	47.61	25.39					
April			30.09	28.98	35.09	29.00	27.46	20.55	30.88	26.17					
May	28.77	20.63	29.00	20.00	29.28	20.32			29.01	20.31					
June	66.56	45.00	67.58	57.32	63.68	50.60			65.94	50.97					
July	82.36	63.32	91.00	73.00	92.12	78.00			88.49	71.44					
August	92.00	83.32	93.00	83.00	95.00	83.00			93.33	83.10					
September	98.11	70.21	95.11	79.45	97.35	77.89			96.85	75.85					
October	50.89	36.00	67.38	29.55	82.00	55.00			66.75	40.18					
November	47.24	35.00	54.38	30.21	77.00	45.23			59.54	36.81					
December	59.55	40.98	55.55	37.08	60.05	40.05			58.38	39.37					

Fig. 4: Percentage relative humidity at Sagar during Study period

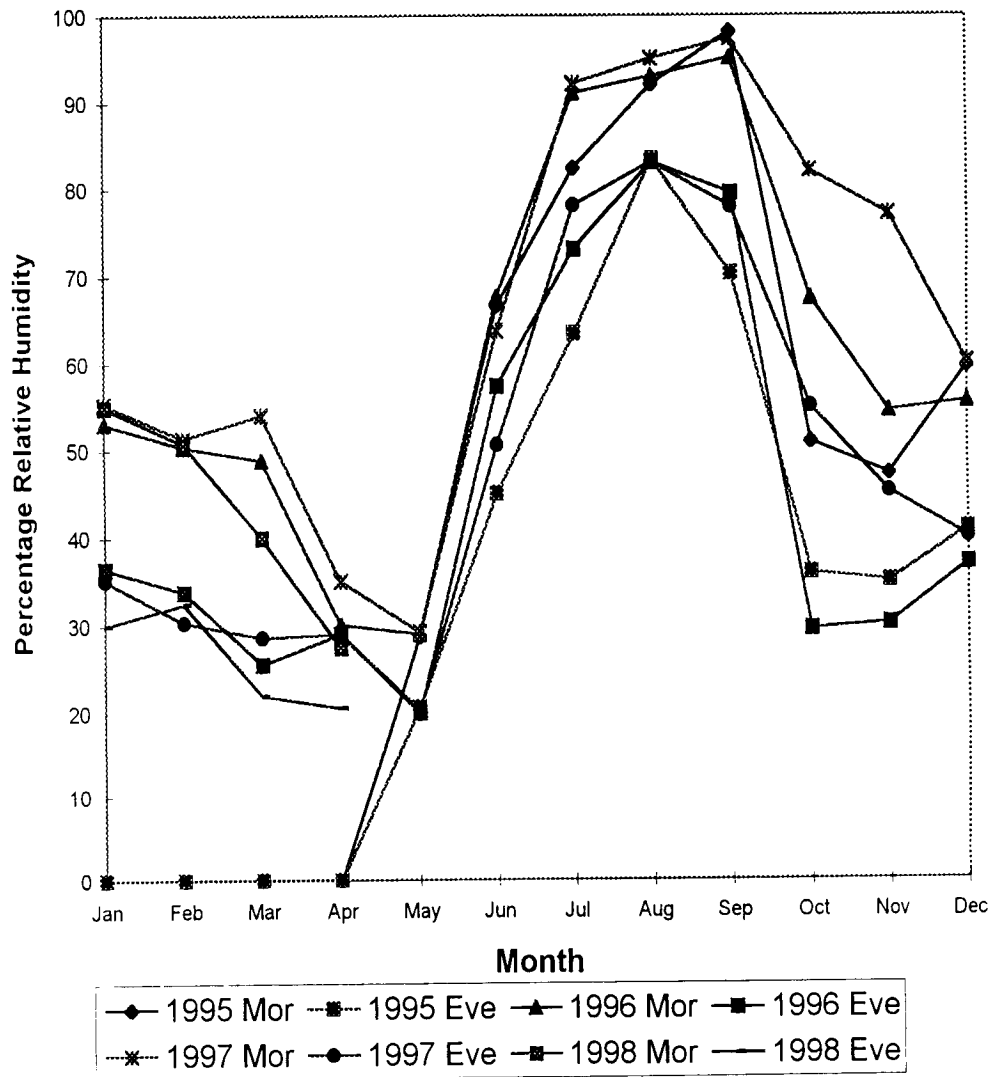


Fig.5: Ombrothermic expression of study area during study period

