



SUITABILITY OF CLIMATIC CONDITIONS FOR EUPHORBIACEAE PLANTS IN SOLAPUR DISTRICT

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ABSTRACT:

The district of Solapur lies entirely in the Bhima-Sina-Man basins, just before the Bhima River leaves Maharashtra State to enter into Karnataka State (17010' north and 180 32' north latitudes and 74042' east and 76015' east longitudes). The district is named after its town headquarter 'Solapur' the name is believed to be derived from two words 'sola' meaning sixteen and 'pur' meaning village. The area, which now constitutes Solapur district, was originally a part of Ahmednagar, Pune and Satara districts. The district is fairly well defined to its west as well as east by the inward-looking scarps of Phaltan Range and the Osmanabad Plateau respectively. The adjoining districts are Sangli to its south to its south-west, Satara to its west, Pune to its north-west, Ahmednagar to its north, Beed and Osmanabad to its east and the Bijapur and Gulbarga districts of Karnataka State to its south (Map-1). Though of an irregular shape, the district is roughly square, 200 km east-west and 150 km north-south. The district has a total area of 14,844.6 km² and its divided into eleven-revenue tahsils viz. Akkalkot, Barshi, Karmala, Malshiras, Madha, Mohol, Mangalwedha, North Solapur, Pandharpur, Sangola and South Solapur. A population of the district is 43,17,756 (As per 2011 census), which constitute 3.84% of the State figures.

The district of Solapur is situated at about 550 m above mean sea level except Northern and Eastern Barshi, Central Madha, Central Karmala, Western Malshiras and Southern Sangola, which are hilly. Solapur district, in relief is flat or waving. Most of the surface comprises long, low uplands separated by hollows or shallow basins with an occasional level. The shallow-soil-covered uplands are suited for pastures and deep-soiled lowlands for cropping. In Karmala and Madha, a tableland and a dotting of individual residual knolls mark the watershed between the Bhima and the Sina. Except this, the Solapur uplands are generally rounded swellings of traps.



KEYWORDS: hills, Drainage system, Climate and Rainfall.

INTRODUCTION:

In Barshi, Karmala, Malshiras and Sangola tahsils, the district has few hills and even these are isolated residual resistant remnants. The chief knolls are Vadshinghat in Barshi tahsil, Waghoba and Bodki in Karmala, Chinchgaon in Madha, Gurvad in Malshiras, Phaltan range in Malshiras and the Khanapur-Jath hills of Sangola.

Barshi hills: In the eastern and northern parts of Barshi taluka, the western flanks of Balaghat hills outcrop rise to the elevations of over 600m with occasional scrap edges.

Karmala hills: A broken hill range forming a low tableland and a water-shed between the drainages of the Bhima and the Sina runs in a northwest-southeasterly direction to the east of Daund-Kurduwadi railway line, particularly between Jeur and Kem and later is crossing it to develop a southerly trend just south of Kem. It raises bare hills to a 600m above

mean sea level and about 50-60m above the level of the adjoining valley floor.

Madha hills: The Karmala hills continue further South of Kem, with a southerly trend and extend into Madha taluka, approaching somewhat closer the Bhima River and having a number of broken spurs extending to the river valley in the neighborhood of Chinchgaon. The hills, here rise to about 90m above the level of the plains and are fairly steep-sloped and flat-topped.



1.1 Map of Maharashtra showing location of Solapur District



1.2 Map of Solapur District showing 11 Tehsil

Malshiras hills: The western boundary of the Malshiras taluka forms hills known as the Phaltan range, rising to over 700m and falling through a steel scarp face to the north and to the east, overlooking the Malshiras plain at an elevation of about 550m which are drained both to the north and the east by the tributaries of the Nira and Bhima rivers. The bleak and barren hills have developed excellent pediments under the semi-arid climatic conditions.

Sangola hill: In the extreme south-west and south of Sangola, the eastern flanks of the Mahadev range from scarp edge descending from an average height of more than 600m through a steep pediment and diluvial silt to the Man basin. This entire area is hilly and rocky with a considerable amount of stony wastes and broken ground.

Apart from the peripheral scarp, faces and the dotting or residual knolls all over, the district as a whole form a waving plateau at an average elevation 500 to 600m with road depressions in a north-south direction occupied by the valleys of the Bhima and Sina rivers. The plateau underlain by trappean lava floors develops rock exposures, and outcrops in patches and nowhere the plateau regur is quite deep; locally the stream-banks and immediate sides have comparatively fine textured, loamy agriculturally more productive soil.

Soil:

The entire region has the rock type composed of basaltic lava-flows, which erupted in the Cretaceous – Eocene age and a popularly known as Deccan traps. These lava-flows are sometimes associated with inter-trappean beds such as limestones, sandstones, clay shales, red bole-beds and coriaceous beds. The presence of thin mantle of black cotton soil almost everywhere on basalt, river alluvium, sands, gravels, slits and clays represent the recent deposits. Calcareous concretions and nodules commonly found in the soil area concentrated near stream courses.

The soils of the district can be divided into three classes namely light soils locally known as Malran land, medium black soil and black cotton soil. The Malrans are shallow, coarse and contain partially decomposed parent material. They occur on hill slopes and are severally eroded. The depth of such soils is up to 23cm. It is slightly acidic with pH ranges from 6 to 6.5. Area under medium black soils is comparatively more in the district. The depth of such soils varies from 34 to 45 cm. The texture of medium black soils varies from slit loam to clay loam and they contain a fairly large amount of line nodules. The clay content increases with depth. The depth of black soil exceeds 45 cm. It is normal to alkaline in reaction. The pH of black soil ranges from 6.5 to 8.5.

Drainage system:

The chief rivers of the district are the Bhima, its left-bank feeder the Sina and its right-bank feeders the Nira and the Man. The Bhima and the Sina flow with a roughly south-easterly trend while the Nira run easterly and the Man north-easterly. During the summer season, all these rivers remain dry. Even the main river Bhima trickles into a number of stagnant pools with water just ankle-deep. However, during the peak of south-west monsoon season, not only the main streams but also the seasonal feeder streams are flooded, though for a short span of time, they bring hug volumes of coarse material inclusive of gravels and cobbles from the barren uplands and cover the shallow beds of the streams quite extensively.

Bhima River: The Bhima river arises at Bhimashankar in the Western Ghats and drains the central part of Solapur district comprising part of Karmala, Madha, Malshiras, Pandharpur, Mangalwedha, South Solapur and Akkalkot tahsils.

Nira River: The Nira is the chief right-bank feeder of the Bhima river, rises in the Bhore taluka of Pune district on one of the spurs of Sahyadri crowned by the Torna fort. It runs southeast and east along the borders of Pune, Satara and Solapur districts before emptying its drainage into the Bhima river.

Man River: The Man is a right bank feeder of the Bhima river rises in the Phaltan range, a spur of the Mahadev range in the Man subdivision of Satara district, west of Dahiwadi and run through eastern part of Satara district and winds through Sangola and Pandharpur tahsil of Solapur before joining the Bhima near Sarkoli about 17 km south-east of Pandharpur.

Sina River: The Sina is one of the large left-bank feeders of the Bhima, rises 22 km west of Torna in Ahmadnagar district and runs southeast through Ahmadnagar and Solapur to falls into the Bhima near Kudal about 25 km south of Solapur.

Bhogawati River: The Bhogawati is large tributary of the Sina it rises in the south-facing scarps of the Balaghat range in the north-eastern part of Barshi taluka and after a south-westerly course of about 65 km. through Barshi and Madha, falls into the Sina, about 7 km north of Mohol.

Dams:

There are about 40 tank depressions within the district some of which are used for irrigating farmlands. An important one is Ujani, on the Bhima river is an earth fill cum Masonry gravity dam located near Ujani village of Madha Taluka. The catchment area of Ujani dam is 14, 858 km². The reservoir created by the 56.4m high earth cum concrete gravity dam on the Bhima River has a gross storage capacity of 3,320 km². The annual utilization is 2,410 km³. The project provides multipurpose benefits such as drinking and industrial water supply, irrigation to agriculture land, fisheries development etc. Water supplied from the reservoir to irrigate agriculture areas primarily aims to reduce incidence of famines and scarcity during drought conditions. An irrigation facility has changed agriculture scenario of the district, as enhanced cultivation of fruit crops, flower crops, vegetables, Banana, sugarcane, wheat and cotton.

Climate and Rainfall:

The climate of Solapur district is overall agreeable and characterized by general dryness in the major part of the year. The cold season begins from December to about the middle of February is followed by the hot season which lasts up to the end of May. June to September is the south-west monsoon season. October and November constitute the post monsoon or retreating monsoon season. Thunder-storms occur from March to October, the highest incidence is being from June to September. Dust-storms occur occasionally during the hot season.

Table No. 1 Month wise rainfall for the years 2011-2014.

Year Month	2011		2012		2013		2014	
	R.F. (mm)	% DEP.	R.F. (mm)	% DEP.	R.F. (mm)	% DEP.	R.F. (mm)	% DEP.
January	0.0	- 100	21.4	478	0.0	- 100	0.0	- 100
February	0.0	- 100	1.4	-18	0.0	- 100	0.0	- 100
March	0.0	- 100	0.0	-100	0.0	- 100	0.0	- 100
April	0.0	- 100	5.1	-46	27.4	198	31.4	241
May	0.0	- 100	3.6	-86	18.9	- 37	28.7	- 4
June	75.6	- 27	146.1	40	39.4	- 62	54.7	- 47
July	122.0	14	182.3	75	142.6	43	87.8	- 12
August	127.3	37	258.2	139	174.8	72	47.9	- 53
September	123	- 21	138.2	-24	43.3	- 75	94.2	- 45
October	73.4	8	86.2	4	52.9	- 44	105.3	11
November	127.6	362	36.6	40	0.0	- 100	4.6	- 81
December	2.9	- 60	2.8	-55	0.0	- 100	0.0	- 100

R.F. (mm): Rainfall in millimeter.

% Dep.: are the departures of rainfall from the long period averages of rainfall for the district.

(Source: <http://www.imd.gov.in/>)

The rainfall in the district varies from 448.8mm. at Akluj near the western border to 689.2mm at Akkalkot near the south-eastern border of the district. Some rainfall in the form of thunder-showers occurs in the months of April and May. The rainfall during the south-west monsoon from June to September amount to about 74% of the total annual rainfall. September is the rainiest month (Table -1). About 17% of the normal annual rainfall in the district is received in the post-monsoon season during October and November. The variation in the annual rainfall from year to year is large.

TEMPERATURE:

The whole district experience extremes of climate with minimum temperature 5°C in winter and maximum 45°C in summer (Table-2). The winter season starts by about the end of November when temperature, especially night temperature begins to fall rapidly. December is the coldest month with the mean daily maximum temperature 29.39°C and the mean daily minimum temperature 14.8°C. The minimum temperature may occasionally drop down to 4°C. There is continuous increase in temperature from the middle of February to the end of May. May is the hottest month with the mean daily maximum temperature at 39.9°C and the mean daily minimum at 25.1°C. The heat during the summer season is intense and maximum at 25.1°C. The heat during the summer season is intense and the maximum temperature may sometimes goes up to about 45°C. The onset of the south-west monsoon by about the first week of June brings down the temperature appreciably. After the withdrawal of the south-west monsoon in early October day temperature increase slightly but the night temperature steadily decreases. After middle of November both day and night, temperature begins to drop rapidly.

Table No. 2
Average and absolute temperature, snow days and fog days, 2015

Month	Temperature °C				Average snow days	Average fog days
	Average		Absolute			
	Max	Min	Max	Min		
January	31.3	16.3	38.1	9.4	0	0
February	34.1	18.1	38.8	6.6	0	0
March	37.5	21.8	42.7	14.8	0	0
April	39.9	24.6	44.1	15.5	0	0
May	39.8	25	45.1	18.3	0	0
June	34.4	23.4	44.3	17.8	0	0
July	31.8	22.6	37.8	16.7	0	0
August	31.1	21.9	37.1	13	0	0
September	31.9	21.8	37.1	14.8	0	0
October	32.6	20.6	38.7	12.4	0	0
November	31.9	18.2	36.4	10	0	0
December	30.7	15.6	34.9	7.7	0	0

Data source: <http://www.meowweather.com/>

i. Humidity:

The air is highly humid in monsoon season and mostly dry during the rest of the year. The driest part of the year is the summer season when the humidity goes down to 20% - 25%. During the south-west monsoon season, the sky is usually heavily clouded or overcast and humidity ranges between 50%-95%. Generally, skies clear or lightly clouded from November to March. Cloudiness increases progressively from May to October and the afternoons comparatively cloudier than the mornings.

ii. Winds:

Winds are light to moderate in force with some strengthening from May to August. In the south-west monsoon season wind is mainly from directions between south-west and north-west. From October to December wind blows from directions between north-west and south-east in the mornings and between north and east in the afternoons. In the next four months winds are variable in direction. In May winds are mostly from direction between west and north.

CONCLUSION

The Karmala hills continue further South of Kem, with a southerly trend and extend into Madha taluka, approaching somewhat closer the Bhima River and having a number of broken spurs extending to the river valley in the neighborhood of Chinchgaon.

The western boundary of the Malshiras taluka forms hills known as the Phaltan range, rising to over 700m and falling through a steel scarp face to the north and to the east, overlooking the Malshiras plain at an elevation of about 550m which are drained both to the north and the east by the tributaries of the Nira and Bhima rivers.

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