

THE STUDY OF DRY SCRUB VEGETATION UNDER FOREST MANAGEMENT AT DHOND, POONA

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Intense and continuous biotic interference in the Poona district has destroyed vast stretches of tree vegetation replacing it with scrubby growth or at places to stages of even poorer vegetation where only grasses grow in autumn. These degraded stretches of vegetation are still subject to continuous or even increasing pressure of grazing and are, therefore, fast heading towards denudation and destruction. If patches of such areas can be closed from grazing and other biotic interference, they can develop into dense scrub jungles where abundance of dicotyledonous plants along with grasses will serve to stabilise soil and in the conservation of water, soil and plant wealth.

During our survey of the vegetation of the Poona district we came across a large piece of land, which has been recently protected by forest department from the biotic interferences.

This land is situated on the left bank of river Bhima at Dhond (18°32' N ; 74°40' E), 50 miles east of Poona. It is two miles from Dhond Station between the villages of Gar and Kauthe and has an average elevation of 500 meters above sea level.

Topographically, the area is a plain country formed of traprock, greatly weathered to form a dry, coarse, sticky, hard soil on the top of which there is a layer of alluvial clay and sand deposited by river Bhima (Fig. 1).

It is situated within the flood level of the river and appears to get flooded during rains. It slopes gently towards the river and is cut up by shallow or deep gullies, some of which are even 3-4 meters deep. Along the gullies the soil of black colour is compacted.

The river Bhima in recent years seems to have been cutting its right bank and receding from its left bank on which this forest is situated. The left bank therefore has broad strip of alluvial sands and the right bank has sharply and variously cut basaltic rocks.

The area studied has been closed to grazing for the last seven years and planting of *Acacia* species has been taken up by the State Forest Department. (It is named Blank Block Nos. 9 to 13). Plantation of *Acacia* has been done in rows at about 6 meters apart. Apart from this, there does not seem to be any biotic interference at present.

The vegetation of this area is, therefore, natural and is important in the respect that it gives an indication of the succession that can come in such over-grazed areas after they are protected from interference.

The vegetation was studied in quadrats of one meter square by the method suggested by Misra and Puri (1956). In one study the quadrats were taken at random and in another two transects were laid one in north-south direction and the other in east-west direction. The shrubs and tall herbs were counted and their actual number recorded, but the ground flora species of prostrate herbs or grasses were recorded as 'abundant', 'frequent' or 'rare'. The symbols used denote the following features :

Abundant :—More than five plants in a quadrat or forming a conspicuous covering in the quadrat.

Frequent :—Plants more than three in a quadrat and their presence is conveniently noticeable.

Rare :—Less than three plants in a quadrat, or presence not noticeable.

A summary of the data is presented in Table I.

TABLE I

Dry scrub vegetation under the forest management

Area :	Garkauthe Blank Block Nos. 9-13.
Rock and Geology :	Greatly weathered trap basaltic rock.
Soil :	Soil is formed of weathered basaltic rock on which alluvial clay and sand is deposited. Soil dry, coarse, sticky and black in colour.
Biota :	The area has been recently closed and is now practically well protected from lopping, felling or grazing.

Particulars of quadrats	During September, 40 quadrats of one meter square taken at random in %	During November, 11 quadrats of one meter square laid in a transect running east-west in %	During November, 12 quadrats of one meter square laid in a transect running north-south in %
Shrubs :—			
<i>Abutilon muticum</i> G. Don.	10	18	16
<i>Acacia arabica</i> Willd.	38	27	85
<i>Acacia</i> sp.	10	—	—
<i>Calotropis procera</i> Br.	—	18	10
<i>Capparis decidua</i> Pax.	5	—	—
<i>Corchorus trilocularis</i> L.	68	90	100
<i>Goniocaulon glabrum</i> Cass.	—	81	66
Herbs :—			
<i>Acalypha malabarica</i> Muell.	35	9	8
<i>Achyranthes aspera</i> Linn.	—	36	40
<i>Alysicarpus longifolius</i> W. & A.	13	18	8
<i>Aristida funiculata</i> Trin. & Rupr.	—	45	28
<i>Brachiaria isachne</i> Stapf.	53	18	—
<i>Chloris virgata</i> Sw.	—	9	—
<i>Commelina forskalii</i> Vahl.	28	—	—
<i>Digera arvensis</i> Forssk.	13	—	—
<i>Dinebra retroflexa</i> Panzer.	5	—	—
<i>Euphorbia hirta</i> Linn.	—	9	8
<i>Guizotia abyssinica</i> Cass.	38	—	—
<i>Indigofera cordifolia</i> Roth.	60	—	—
<i>Indigofera linifolia</i> Retz.	10	9	—
<i>Indigofera</i>	18	—	—
<i>Isachne</i>	—	63	50
<i>Justicia quinqueangularis</i> Koen.	60	90	75
<i>Leucas urticaefolia</i> Br.	8	—	—
<i>Merremia emarginata</i> Hall.f.	60	54	85

TABLE I—Contd.

Particulars of quadrats	During September, 40 quadrats of one meter square taken at random in %	During November, 11 quadrats of one meter square laid in a transect running east-west in %	During November, 12 quadrats of one meter square laid in a transect running north-south in %
<i>Nazia racemosa</i> Ktze.	8	—	—
<i>Paspalidium flavidum</i> Camus.	10	—	—
<i>Phyllanthus maderaspatensis</i> Linn.	23	72	35
<i>Rhynchosia minima</i> DC.	53	9	35
<i>Ruellia patula</i> Jacq.	15	—	8
<i>Rungia elegans</i> D. & G.	—	—	50
<i>Solanum nigrum</i> Linn.	—	—	8
<i>Sporobolus</i> sp.	18	18	8
<i>Tribulus terrestris</i> Linn.	33	—	—
<i>Tridax procumbens</i> Linn.	8	18	18
<i>Tripogon jacquemontii</i> Stapf.	10	—	—
<i>Triumfetta rotundifolia</i> Lamk.	8	—	—
<i>Urena lobata</i> Linn.	—	—	8
<i>Urochloa helopus</i> Stapf.	15	—	—

The community is of low stature in which only a few plants grow above one meter high. The planted *Acacia arabica* shrubs sometimes grow upto 2 or 2.5 meters high. The general physiognomy of the vegetation is, however, scrubby. The plants do not have on their branches any mosses or lichens or any epiphytic ferns. Climbers are also absent emphasizing the dry nature of the locality.

The tallest plants in photograph 1 are of *Acacia arabica*. They are of different ages, varying from three to six years. *Goniocaulon glabrum*, *Achyranthes aspera* and *Abutilon* sp. are the commonest plants in the next height group i.e., 0.75 meters to 2 meters. *Achyranthes aspera*, *Goniocaulon glabrum*, and *Rungia elegans* form a mixed community. *Goniocaulon glabrum* is a tall bushy plant with light purple glaucous inflorescence and is abundant in the whole area (Fig. 2). *Abutilon muticum* is a shrub with yellow or orange flowers and is 1-1.5 meters tall. The plant is densely pubescent and has large leaves.

In the next height group i.e., between 0.5 meters and 1 meter, the following plants are common:—

Corchorus trilocularis, *Calotropis procera*, *Urena lobata*, *Triumfetta rotundifolia*, *Chloris barbata*. Of these *Corchorus trilocularis* is the most abundant. *Hibiscus punctatus* is also in this height group, but incidentally did not fall in any of the quadrats studied.

Occurrence of *Hibiscus punctatus* is interesting. The distribution of *Hibiscus punctatus* has been recorded by Cooke (1908) as "Gujerat: Broach collectorate (rare), Dalzell and Gibson; Surat, Dalzell! Sind; Stocks; Karachi, Woodrow! Cooke! Jemadar ka Landa, near Karachi, Stocks!".

It has not been recorded by Razi (1952) in his account of vegetation of Poona District. It appears that the plant is spreading eastwards and is a new record for this area.

The next class of plants is between height 0.1 meter and 0.5 meter. To this class belong the following plants:

Justicia quinqueangularis, *Rungia elegans*, *Acalypha malabarica*, *Tridax procumbens*, *Phyllanthus maderaspatensis*, *Commelina forskalii*, *Brachiaria isachne*, *Sporobolus* species, *Eclipta alba*, *Flaveria repanda*.

Among these *Justicia quinqueangularis* and *Rungia elegans* are a conspicuous feature of the vegetation. Fig. 3 shows a community of *Rungia elegans* which is more common in the river side belt between the closed and grazed areas and is frequently present on slightly raised mounds of soil. *Flaveria repanda* forms dense colonies here and there.

The last class is of plants which are prostrate or decumbent. To this class belong the following :

Merremia emarginata, *Phaseolus trilobatus*, *Rhynchosia minima*, *Aristida adscensionis*, *Aristida funiculata*, *Brachiaria isachne*, *Ruellia patula*, *Indigofera linifolia*, *Alternanthera echinatus*, *Indigofera cordifolia*.

Sometimes almost a pure community is seen formed of *Merremia emarginata* in the centre with *Corchorus trilocularis*, *Goniocaulon glabrum* and *Urena lobata*.

The spreading and rooting branches of *Merremia emarginata* form dense covering on the ground almost at every alternate step and are a very remarkable feature in the ground vegetation.

Fig. 4 shows a profusely branched and spreading colony of *Aristida funiculata* amidst *Merremia* and *Justicia*.

There are about ten species of grasses in the area of which *Brachiaria isachne* is the most abundant. Other more common ones are *Urochloa helopus*, *Aristida adscensionis*, *Aristida funiculata*, *Tripogon jacquemontii*, *Nazia recemosa* and *Sporobolus diander*. Since most of the grasses are small in size they are not conspicuous and are hidden in clumps of *Corchorus*, *Achyranthes*, *Flaveria* and *Abutilon*. The general appearance of the forest is not of grassland but of scrub jungle.

The following plants were also collected from this area. These incidentally did not fall within any of the quadrats studied:—*Arundinella gigantea* Dalz., *Atylosia sericea* Benth., *Caesulia axillaris* Roxb., *Capparis zeylanica* Linn., *Cardiospermum halicacabum* Linn., *Chloris montana* Roxb., *Crotalaria retusa* Linn., *Cynodon dactylon* Pers., *Desmodium diffusum* DC., *Dichanthium annulatum* Stapf., *Dicliptera roxburghiana* Nees, *Eragrostis ciliaris* Link., *Eragrostis gangetica* Steud., *Flaveria repanda* Lag., *Launea nudicaulis* Linn., *Phaseolus trilobatus* Ait., *Polygala chinensis* Linn., *Salvia plebeia* Br., *Sesbania aculeata* Poir., *Urochloa reptans* Stapf., *Uvaria lagopoides*, *Verbascum coromandelianus* Ktze, *Zizyphus jujuba* Lam.

It is significant that many of the dicotyledonous species are prostrate or decumbent herbs such as *Merremia emarginata*, *Euphorbia* sp., *Tribulus terrestris* and *Rhynchosia minima*. This feature of the vegetation also indicates the dry nature of the soil and intense grazing in the past. It will be interesting to note in the course of time, how the frequency of prostrate and erect herbs changes under conditions of protection to the forest.

The area is almost devoid of any tree seedlings although trees of *Acacia*, *Capparis decidua* and *Capparis zeylanica* grow in the neighbourhood of this closed forest. Just adjacent to the closed forest are fields open to grazing. They not only lack in any tree vegetation but the shrubs also are represented by merely two or three species such as *Cassia tora* Linn., *Zizyphus jujuba* Lam. and *Capparis decidua* Pax. The few grasses and dicotyledonous plants growing in this open area are interesting as they are quite different from those growing in the closed area. Plants of *Eclipta alba*, *Setaria intermedia*, *Paspalidium flavidum* and *Digitaria marginata* are common.

The *Acacia* forest between the reserve plot and the river bank has only small *Acacia* and *Capparis* trees and shrubs but being open to grazing there are no other shrubs or any noteworthy ground flora. Fig. 5 shows scattered small trees of *Acacia arabica* and *Capparis decidua*. The ground is barren except for a few

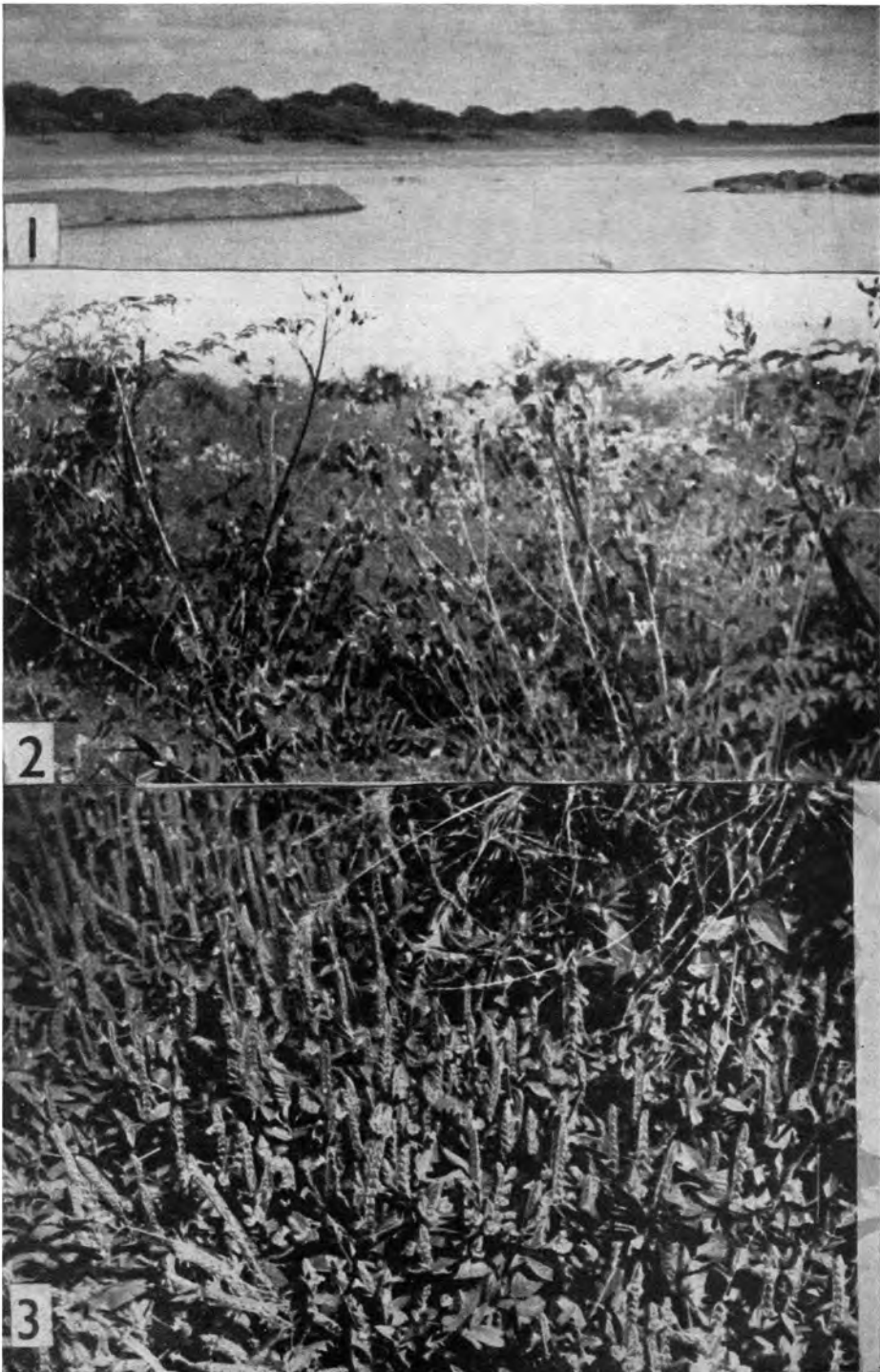


Fig. 1. A general view of the Garkauthe forest from Dhond town. The river Bhima is seen with islands of hard basaltic rock in the centre.

Fig. 2. A community of *Goniocaulon glabrum*.

Fig. 3. A pure community of *Rungia elegans*.

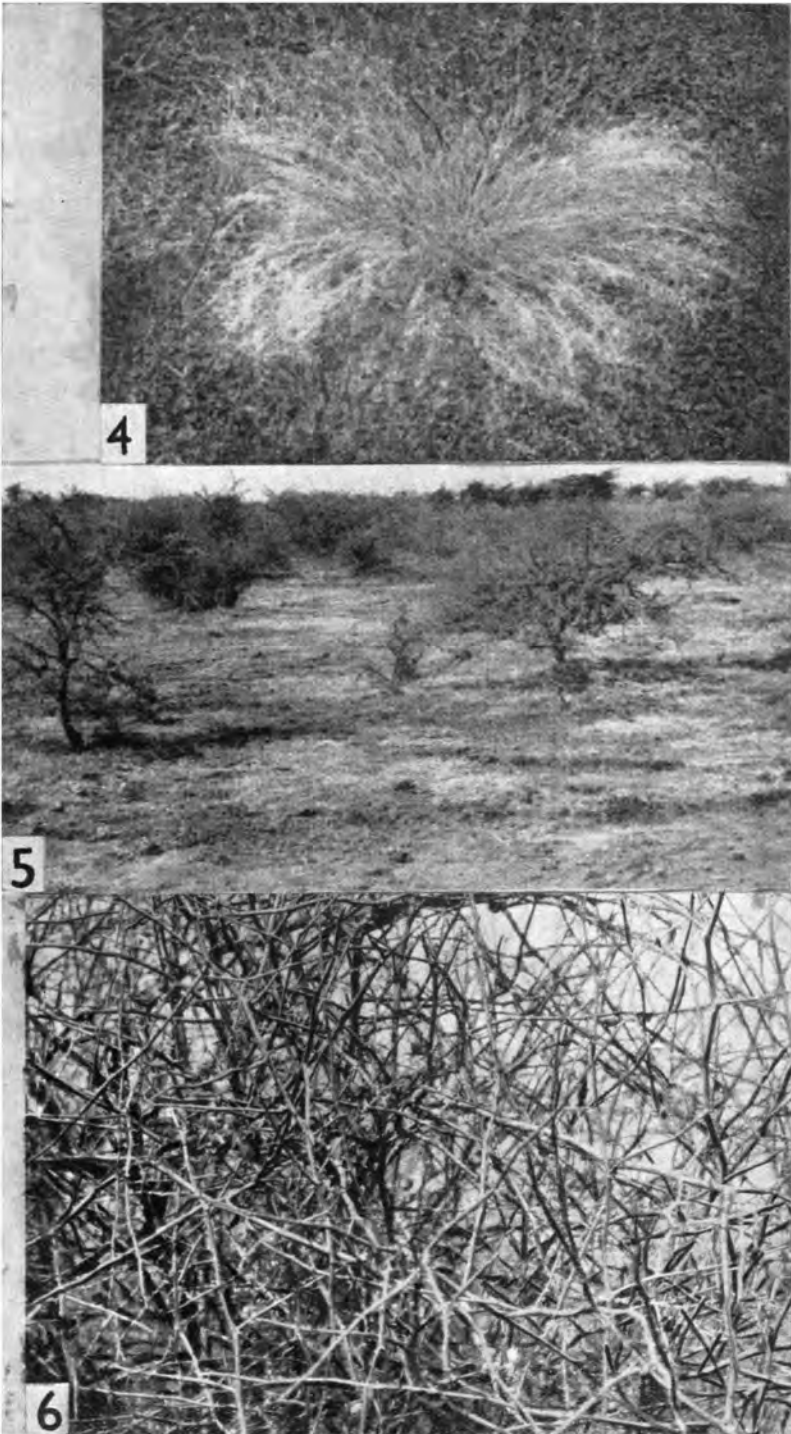


Fig. 4. A profusely spreading colony of *Aristida funiculata*.

Fig. 5. A view of the open *Acacia* forest. The ground is devoid of any noteworthy vegetation except browsed stumps of grasses, *Corchorus* etc.

Fig. 6. A bushy branched shrub of *Capparis decidua* in flower.

scattered distant patches of browsed shrubs and small stumps of *Corchorus*, *Xanthium* and grasses. Fig. 6 is of a bush of *Capparis decidua* bearing orange flowers.

It is not possible at present to give any successional trend in the development of vegetation under closed or open conditions. The observations are of interest, because they describe the two contrasting types of vegetation under open and closed conditions of forest.

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