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FRANCESCO MARIA RAIMONDO and AHMED MUMIN WARFA

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Preliminary phytosociological research on synanthropical vegetation in southern Somalia*

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Introduction

The general trend towards urbanization, combined with the policy to settle the nomad population in a new socio-economic organization of the country has led to the abnormal expansion of built-up areas in Somalia, especially on the south coast and along the two great rivers, Juba and Schebelle.

It has been calculated that Mogadishu, the capital, has a population today of 400,000 compared with barely 50,000 in 1935 and 12,000 in 1913, according to Stefanini (1922). Thus in less than 70 years the population has increased thirty three fold. The area covered by permanent or temporary dwellings was about 1,500 hectares in 1970.

The demographic data given is the result not only of the natural population increase but more particularly may be attributed to the strong tendency to immigrate. The phenomenon affects not only Mogadishu, but also Buloburdi, Merca, Brava, Gelib, Chisimaio, Afmadu, Bardera, etc., though here obviously to a lesser extent than the capital.

The transformation of very extensive areas of natural vegetation — although already disturbed — into urban areas is the direct consequence of this. The previous balance has been upset and new environmental conditions established which have selected out and assisted the development and considerable stability of some types of secondary vegetation largely unknown until that time, at least in Somalia, and dependent on the change in man's activities. These aspects are fairly common along the roadsides in towns, in squares which aren't asphalted, in deserted or uncultivated spaces and in places where livestock graze. The vegetation characteristic of these places is sometimes striking but more often is of a transient nature with an annual or perennial cycle. The plant communities which establish themselves, however, form the dominant note of the countryside around built-up area or stopping places along the main roads. This vegetation is obviously similar to that of a ruderal nature which is familiar and has been studied elsewhere.

Parallel to the process of urbanization there is a new trend evident among the traditionally nomadic people of Somalia to exploit the land for agricultural

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ends in the modern sense, involving the cultivation of new land and an increase in the agricultural efforts of the country. This happens mainly along the two rivers as well as in the mesopotamic areas.

In these new environments and even more in the areas of classical colonial agriculture there is a distinct rich infesting vegetation. Study of this vegetation even for geobotanic ends may prove to have wide agronomic application and thus to have practical consequences. In the hot, arid conditions which are among the most thankless in East Equatorial Africa, where there is a scarcity of irriguous areas suitable for cultivation, the aim is to achieve a better yield both in quantity and quality from agricultural activity.

The data reported in this present paper of a phytosociological nature don't provide unities of vegetation already organized in a hierarchy. This in fact would require a more thorough examination of the area, a vast study of the bibliography referring to the phytosociological problem under examination in other African territories around Somalia. There are no references of this kind in the literature with the exception of studies by Ciferri (1939, 1946).

An extension of the subject dealt with here would require a better knowledge of the flora in the area, something which we feel unable to take on at the moment.

The data reported here represent, therefore, an initial attempt towards reaching a more thorough phytosociological study of a territory which is still of great interest for its phytotaxonomy. The data, however, present a picture of those aspects of vegetation which particularly catch the observer's attention and which together make up a very characteristic anthropical landscape.

Geo-environmental characteristics

The territory under examination for its vegetation corresponds to the ex-region of Benadir, which occupies a fair part of Southern Somalia and borders on the Indian Ocean, 1-2 degrees of latitude north of Equator.

This area which was previously under Italian colonialism, is one of the most densely populated. The country's greatest production is in this part; the sectors of agriculture, light industry, fishing and trade are particularly well developed.

From the geomorphological point of view the territory consists mainly of a very wide coastal strip with dunes of both old and recent date, movable and semi-consolidated; of note is the development of the alluvial clay plain along both sides of the Schebelle.

The climate is hot and humid and subject to monsoon which alternately bring periods of drought (North-east monsoon) and wet, cooler periods (South-west monsoon).

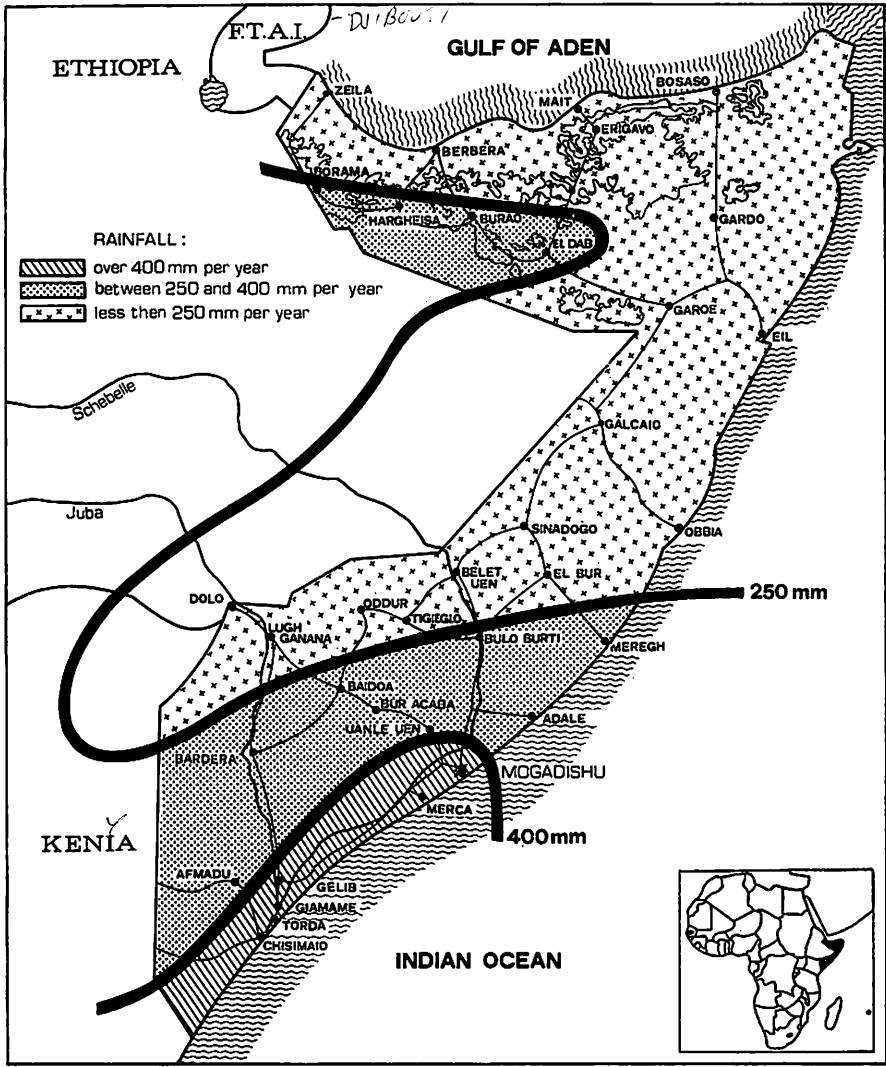


Fig. 1 - The distribution of the rainfall in Somalia (re-designed from Commission of the European Communities, 1975).

Compared to the rest of Southern Somalia ex-Benadir is one of the wetter region. Average rainfall exceeds 400 mm a year (Fig. 1), most of it falling in April and May and to a lesser extent in July and August. Between December and April there is usually no rain at all.

The average annual temperature is around 26°C, with a minimum in July of around 24°C. Variations are thus fairly limited during the year (Fig. 2) as is the daily temperature range.

Atmospheric humidity is always very high. The annual average is around 85% with a maximum of 90% in October-January and minimum of 80% in February-March (readings for Mogadishu).

For further details consult Preto (1976).

Information about the natural vegetation

Several authors have dealt with the vegetation of Somalia, mainly as regards the physiognomy. Information was already available in geographical and biogeographical works at the end of the last century. Studies became more specific, concerned often with single region, due to the numerous Italian and English expedition. Interesting references may in fact be found in almost all the reports illustrating the environmental characteristics of the then Italian colony, and in the results of scientific missions with this aim (Paoli, 1916, 1919; Chiovenda, 1916; Stefanini & Paoli, 1916). Even works about the flora always begin with notable references to the vegetation (Chiovenda, 1929; Glover, 1947; Moggi, 1960, 1967). More specific contributions were made by Senni (1935), Beguinot (1918), Ciferri (1939) and more recently by Gillet (1941), Ciferri (1946), Gilliland (1952), Pichi-Sermolli (1957), Rattray (1960) and Moggi (in press) on more general problems of geobotanical and vegetational nature. Phytosociological information is hardly touched on. A phytosociological attempt may be glimpsed in the works mentioned above by Ciferri and Gillet. The former deals particularly with the coastal vegetation in the part of Somalia which concerns us and the rural aspects of Benadir. The latter contributions have helped us a great deal both in appreciating the role of certain species in the various aspects of the vegetation we have studied and in understanding the possible dynamic links between them.

Negri (1937) spoke about the repercussions of the anthropical activity on the vegetation of East Africa.

The majority of authors, Preto being the last, distinguish few physiognomical types in Somalia. The most significant formation consists in xerophilous open woodland, more or less closed which gives a distinctive mark to the landscape. Pichi-Sermolli sees in it a broken type from the point of view of the flora and structure.

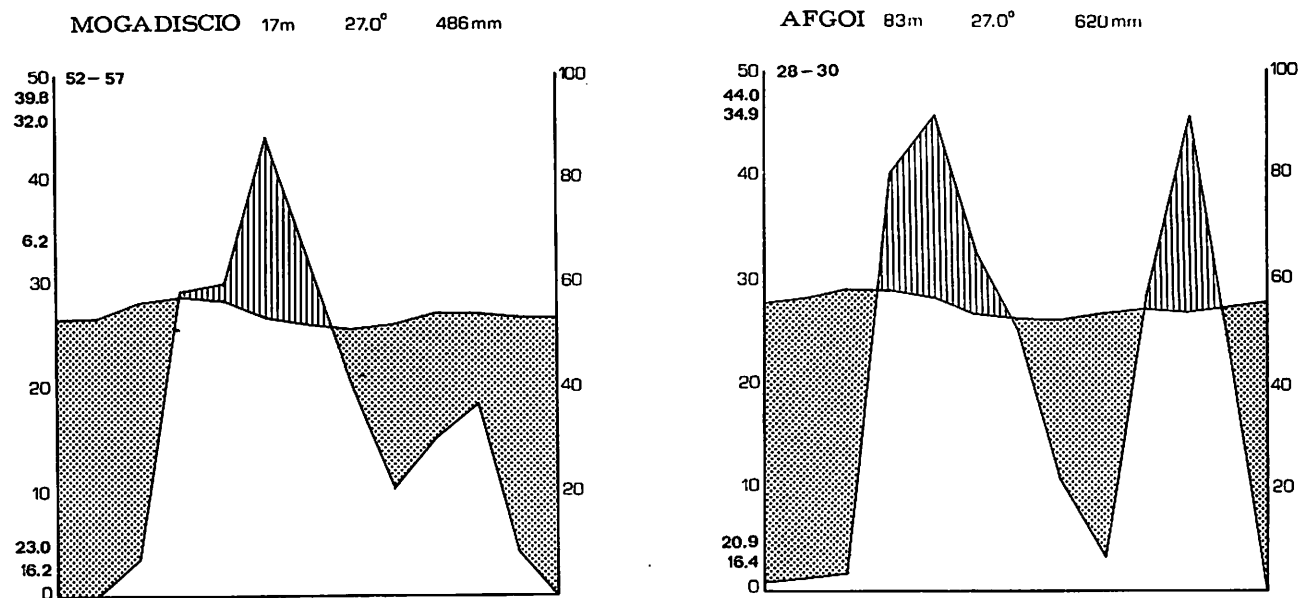


Fig. 2 - Climatic diagram of Mogadishu and Afgoye (from Preto, 1976).

In the territory which we explored there were different formation; apart from the open woodland mentioned, others have dynamic relation with the environment where man has settled and works. These come under grass and sub-shrub steppe, savana and riparian formations. Together with the xerophilous open woodland, these represent the types of vegetation most disturbed by anthropic influence and cultivation. There are also other coastal formation, the *Cyperetum chordorrhizum* of Ciferri (1939), *Panicetum pinifolium*, *Blepharetum edules* and other communities distinguished by the same Author which today are affected by the considerable anthropical strain.

For the floristic constitution and for details about the physi^onomical types and mentioned above phytocoenoses reference should be made to the works cited in the bibliography.

Synanthropical vegetation

Methods

The study which is at present under discussion was carried out on the basis of 95 surveys of the vegetation following the phytosociological method of the Zürich-Montpellier school.

At the beginning of the rainy season in 1976 we made observations in the trampled areas (squares, lanes, the edges of main roads which are not asphalted) near Mogadishu and in the surrounding areas of the city. Others were made in deserted areas with ruderal characteristics in the outskirts of the capital, where the climax open woodland has been destroyed. It was apparent that there was contact between environments in the areas which are in a sense urbanized or subject to a strong anthropic action and the woodland of canopy Acacias, in the stretches where there were signs of certain evolutionary processes tending to the climax.
succession?

Previously one of us (Warfà) had carried out an examination of the flora infesting the cultivations in the region of the Lower and Middle Schebelle.

In January-March 1977 phytosociological observations were made in the alluvial plains of Afgoi in the territory where maize, cotton, peanuts and sesame are grown (photo 1). The harvest had taken place two months earlier and the ground had yet to be prepared for a new cycle of the same crops, which are very common in the region.

Yet other observations were made in the same environments as those of the previous year to complete the data then collected. A considerable amount of floristic material was also collected and dried. Consequently comparisons were carried out in the *Herbaria* of Palermo (PAL), Florence (FI) and Kew (K) and the doubtful material was mostly identified. The observations were tabled and

only now have been elaborated. The elaboration of the raw tables was carried out following the procedure laid down by Pignatti & Mengarda (1962). This enabled us to eliminate from each of the four prepared tables the observations which differed greatly from the average index of homogeneity, calculated using the well known formula of Sorensen. In the end we obtained tables with respectively 20, 22, 23 and 10 surveys, each ordered according to the index of decreasing similarity.

Given at the top of each table is the species considered differential of the aspect of vegetation represented, in as much as they play a significant role which is not only physiognomical with respect to other species. Their choice is based on values of cover and sociability, on degree of frequency, on biological and ecological characteristics and, finally, on the same indications as Ciferri (1939, 1946).

Even though many other species have a high index cover and considerable classes of presence, in this initial phase they have been neglected with the aim of giving a complete characterization of the synanthropical vegetation studied. The species concerned are for the most part ubiquitous; others may result from contact between the four aspects we examined and with similar aspects already described elsewhere. Others, finally, could reinforce the number of differential of the communities singled out. These are provisionally marked out with the name of the species which is already seen to have a differential role.

A synoptic picture is given in Table 5 showing the frequency of each species by table. The works of Chiovenda (1929, 1932, 1936) and the comparison with *Herbaria* of PAL, FI and K proved of assistance in determining the large amount of material. The nomenclature adopted for the entities in the tables is taken from Cufodontis (1953-1972) except for a few instances when we followed « Flora of Tropical East Africa », prepared at the Herbarium Royal Botanic Gardens, Kew, and Townsend (1979).

Results

a) *Post-cultivation vegetation* (the *Sesbania sesban* - *Psoralea corylifolia* community), Tab. 1.

This aspect of vegetation develops on alluvial ground, having a texture mainly of clay, or muddy clay with alkaline tendency often subject to turn into swamp due to exceptional rains or flooding of the Schebelle in the period of maximum flow.

It was found in the vast plain of Afgoi which for some time has been used for agriculture partly because it is near Mogadishu (20-35 Km) where the continual demographic development has made the demand for agricultural products more and more pressing.

The vegetation is apparent only a month after the harvest and continues unchanged — except when used for grazing — even the best part of the dry season when there is no irrigation; this is due to the particular nature of the ground and the presence of a layer of water near the surface.

Thus this aspect follows the infesting plants of the cultivation which has been removed; it may also be considered as a further stage of maturation which manages to assert itself when the competition for space and nutrition ceases.

Our vegetation in all but a few instances reaches values of cover of around 80%. The average height remains below 100 cm. The number of species in an area of 200 m varies between 25-35.

The flora consist of a reduced number of species, for the most part therophytes with a continuous cycle, or annual or perennial sub-shrubs. The majority of its elements belong to the *Papilionaceae*, *Graminaceae*, *Malvaceae*, *Amaranthaceae*, *Compositae*, *Euphorbiaceae*, *Cucurbitaceae*, *Acanthaceae*, *Boraginaceae*, a few *Cyperaceae* and *Caesalpinaceae*, and other members of strictly tropical families (Tab. 6).

The species most typical of the aspect under examination are *Sesbania sesban* and *Psoralea corylifolia*. *Erlangea somalensis*, *Amaranthus caudatus*, *Heliotropium aegyptiacum*, *Abutilon fruticosum*, *A. hirsutum* and others also play a considerable role; together with the first species they contribute to the phisionomical mark of the vegetation.

Among the species which reach high levels of abundance-dominance and sociability and which appear in almost all the observations we find *Cynodon dactylon*, *Brachyaria reptans* and many others which may be found easily in Tab. 1. There are also others which appear only occasionally but in the few instances where they are present reach indices of cover worthy of consideration (cf. *Heliotropium* sp.pl.). Originally the territory taken up by cultivation was occupied by riparian formations which are now limited to broken bands concentrated on both sides of the longest river in Somalia. Among the species still present which are recognizable at a distance is the characteristic *Ficus sycomorus*. Further from the river bed the original vegetation gives way to a form of low undergrowth with various species of acacia and other evergreens, often scrubs corresponding to the physiological type of the « broken xerophilous open woodland » of Pichi-Sermolli, then there is the savanna and grass or sub-shrub steppe.

In the middle of the areas which today are cultivated there are often isolated trees: *Dobera glabra* and *D.g.* var. *macalusoi*.

When abandoned the vegetation becomes richer in shrubs which in a short time manage to cover the ground, establishing a return to evolutional aspects which has been briefly mentioned.

Successional

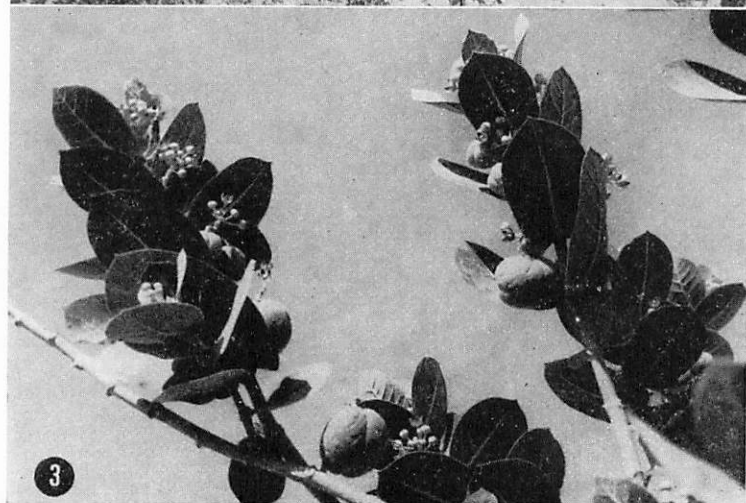
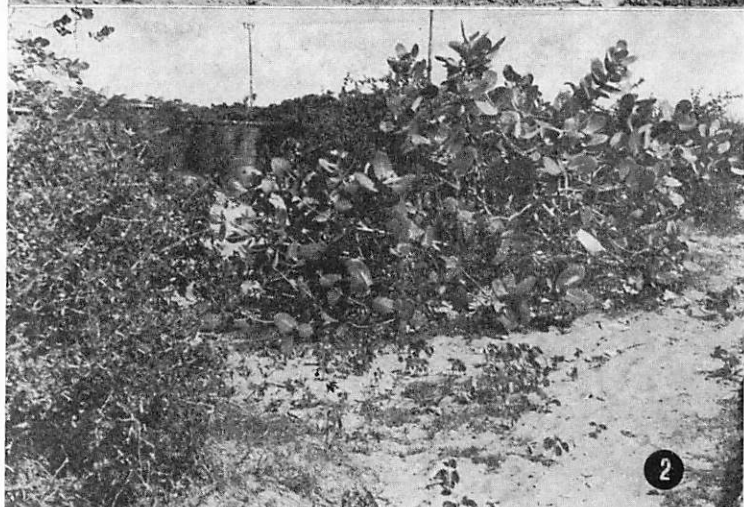


Photo 1 - Characteristic sheaves of sesame (*Sesamum indicum* L.) which are becoming dry, near Afgoye.

Photo 2 - Appearance of the *Calotropis procera* community; the species mentioned above, *Solanum arundo* and *Cassia occidentalis* are evident.

Photo 3 - Detail of *Calotropis procera* in full vegetative activity.



Photo 4 - Limit between the climax Acacias community and the anthropic area near Gesira.

Photo 5 - A canopy Acacia (*A. spirocarpa* Hochst. ex Benth.) residue of the climax open woodland, on the outskirts of Mogadishu.

Photo 6 - A dune semifixed by *Aristolochia rigida*.

b) *Vegetation on trampled soils* (the *Euphorbia hirta*-*Alternanthera repens* community), Tab. 2 .

An aspect of vegetation which is fairly widespread in the small areas of trampled soil and which has been found mainly in Mogadishu but also in Genale, Johar and Afgoye. It is characterized above all by therophytes, almost all behaving like creeping and a few perennial species adapted in the same way. Various *Euphorbiaceae* and *Aizoaceae* dominate the phytocoenose. The cover is almost always below 50%. It increases with the rains and is notably reduced during the dry season when only a few species such as *Trianthema pentandra*, *T. portulacastrum*, *Alternanthera repens*, *Boerhavia diffusa* s.l., *Tribulus terrestris* e *Cynodon dactylon* survive.

The substrata on which the *Euphorbia hirta*-*Alternanthera repens* community establishes itself are often heterogeneous. They consist almost always of weak calcareous broken stones, carried artificially into the open spaces and lanes, or used as the base for asphalted roads. They are also placed at the sides of the latter, mixed with sand on the spot and are trodden into a compact form. ?

The community is also found on mixed sands and scoriae of different kinds and in muddy clay or simply clayey places, always trampled. The species most often associated with this anthropogenic aspect, besides *Euphorbia hirta* and *Alternanthera repens*, are numerous.

Of these *Boerhavia diffusa*, *Tribulus terrestris*, *Euphorbia granulata*, *E. hypericifolia*, *Trianthema pentandra*, *T. portulacastrum* e *Phyllanthus rotundifolius* are fairly specialized. A role of at least a physionomic kind is played also by *Cynodon dactylon*, *Dactyloctenium* sp.pl., *Euphorbia prostrata*, *Cyperus rotundus* var. *tuberosus*, *Portulaca oleracea*, *Cenchrus mitis* and *Launaea cornuta*.

Probable differentials of halophyllous and wet facies might turn out to be respectively *Zygophyllum simplex* and *Flaveria trinervia* together with *Euphorbia geniculata*.

The species included in the table amount to about 90. *Graminaceae*, *Papilionaceae*, *Euphorbiaceae*, *Malvaceae*, *Amaranthaceae*, *Aizoaceae* and *Compositae* are well represented.

The vegetation considered is fairly stable and could ~~evolve~~ ^{succeed} if it were no longer trampled — towards the ruderal aspect *Calotropis procera*; so, too, on account of the aeolian heap of sand eroded from the surrounding dunes it could be buried and in the absence of other disturbing activity could become the centre of the pioneering *Aristolochia rigida* community.

The original environment has obviously been completely substituted and we find the climax area of xerophilous open woodland of coastal and supporting coastal formations.

c) *Ruderal Vegetation* (the *Calotropis procera* community), Tab. 3.

This constitutes the clearest aspect so far examined with a physi³onomy mainly of *Calotropis procera*, a fairly luxuriant scrub with large silvery leaves most characteristic of the fruit-bearing period (photo 3). This species is amongst other things common in almost the whole of Africa and tropical America and is particularly rustic and tolerant. It is almost always present near dwellings and caravans and is spread by man, too, as it is used for a large number of medicinal purposes. Perhaps it is rare for it to succeed in forming large vegetable communities as it does in Somalia, while it is commonly found growing individually or in small groups in many other environments, even in the desert. As Ciferri (1939) stated, however, this species in Southern Somalia seems to have a preference to settle around built-up areas.

In the Antilles and central America it is common in the xerophyte region on sandy ground and there it is also most usual along the roadsides, together with *Datura stramonium*, another ruderal anthropocoral species also present in our surveys.

In Somalia it is almost always associated with another species which is widespread in tropical Africa: *Cassia occidentalis*, which is present in other synanthropical communities and probably has a connecting role.

The *Calotropis procera* community is found almost exclusively in Mogadishu and covers large areas especially of sandy or calcareous substrates. These are often used as grazing areas for animals (zebu, goats, sheep and camels) which are raised on the outskirts of the city (photo 2).

Ciferri (1939) for the region of Merca, further south than Mogadishu, considers *Calotropis procera* the most interesting characteristic of the «ruderal anthropocoral subseries», which is present also in Brava and still further south in Chisimaio.

The cover achieved by this community is very variable. In the observations in the table the cover ranges from 35% to 80%. The average height is around one metre, while scrub and sub-shrubs including *Calotropis* reach as much as 2.5 — 3 metres.

Even the number of observed species is rather variable (23-49). In the rainy season the cover of the grasses increases considerably as do the number of species. Some of these are ephemeral and may, with their high presence and cover, characterize seasonal facies. It is among the most significant species, besides *Cassia occidentalis*, *Pedaliu murex*, *Momordica balsamina*, *Heliotropium benadirens*, *Leptadenia arborea* and *Limeu viscosu*, *Solanu arundo*, a species not always present but which is, however, reasonably tied to the nitrophylous environment. It has particular tendency to form populations in which it assumes a role of

absolute dominance. This species often forms long hedges along tracks and roads which are now asphalted.

The winding species are different: *Leptadenia arborea*, *Momordica balsamina*, *Pergularia daemia*.

The flora consists mainly of *Graminaceae*, *Papilionaceae*, *Malvaceae*, *Euphorbiaceae* and *Solanaceae*. Numerous families are also represented (cf. Tab. 6). *Euphorbia tirucalli* and *Opuntia capensis* are often found, species used in the work of fixing the dunes.

Many species of the xerophilous open woodland are also found. This would be the tendency if development were not affected by anthropic activity and the present characteristic environment is mainly derived from this.

The species included in the table are fewer than one hundred; many are woody.

d) *Vegetation of transition to the Acacias community* (the *Aristolochia rigida* community), Tab. 4.

This represents a very characteristic and particular aspect of pioneer vegetation on sand (photo 6). We may consider it to be the first step in a process of fixing a dune. In fact the environment where it settles derives from the final stage of degeneration of the climax vegetation due to human and then aeolian activity and is reduced to movable dune of limited extent which is easily controlled. The major role of reconstruction is carried out by *Aristolochia rigida*, a perennial species with thick tap roots and of creeping behavior. Ciferri (1939) sees in this a very important role in the vegetation of the fixed eroded dunes. Its action may be likened to something midway between *Agropyrum mediterraneum* and *Ammophila arenaria* in the psammophilous mediterranean vegetation. *Aristolochia* has long, thick, heavy branches which extend like rays in all directions and is perfectly in contact with the soil. A small hillock rises continually around *Aristolochia* and is excellently controlled by the plant. Among its creeping branches other species settle firmly — among these are *Blepharis maderaspatensis*, *Pleuroptera undulatifolia*, *Ipomea garckeana*, these latter being also creeping. They are therefore among the most significant species of the phytocoenose. This even settles on semi-movable substrates of old dunes consolidated previously by the xerophilous open woodland (the Acacias community) or by *Cyperetum chordorrhizum*, then greatly degenerated and eroded by the intense aeolian activity.

The cover of this vegetation is also quite variable; values range from 30% to 60%. In the table scarcely 80 species are present and these belong mainly to the *Graminaceae*, *Papilionaceae*, *Amaranthaceae*, *Boraginaceae*, *Caesalpinaceae*, *Aizoaceae*, *Euphorbiaceae*, *Malvaceae*, *Acanthaceae*, ecc. (cf. Tab. 6).

The number of species varies in observation from 36 to 45. The average height of the vegetation falls between 15 and 30 cm.

After the rains of April-May the number of species always increases considerably as does the cover. Many entities have an ephemeral life.

The development of this aspect in some cases leads to a scrub with some dominant *Capparidaceae*. Then there are the aspects of *Cordia somaliensis* and finally the climax Acacias community (xerophilous open woodland).

Discussion

The aspects of vegetation examined above form four good associations with some of their species being distinct and others connected (cf. Tab. 5).

The first three communities have some ecological characteristics in common, excluding many species (*Solanum arundo*, *Cynodon dactylon*, *Brachyaria reptans*, *Launaea cornuta*, *Blepharis maderaspatensis*, *Portulaca oleracea*, *Ricinus communis*, *Dactyloctenium* sp.pl., *Alternanthera repens*, ecc.). They are essentially nitrophilous and dynamically linked.

The last community *Aristolochia rigida*, tends to be distinct from the others as it is able to play a constructive role in the absence of anthropical pressure. It has some species in common with the former communities (*Alternanthera repens*, *Heliotropium aegyptiacum*, *Cassia occidentalis*, *Tephrosia uniflora*, *Commelina forskalei*, *Clitoria ternatea*, *Digera alternifolia*, *Aerva persica*, *Rhynchosia sublobata*, *Crotalaria comanestiana*, *Indigofera schimperi*) and so there is a certain affinity of flora but there is no ecological similarity whatsoever. It would be better linked with the vegetation behind the dunes: *Cyperetum chordorrhizum* and *Blepharetum edules* of Ciferri (1939) communities which are of a different nature but tend however, towards climax open woodland.

On the other hand the space left free due to the elimination of the *Calotropis procera* community and the further consequent erosion of the substrate, under conditions of limited disturbance, would, it is said, favour the settlement of the *Aristolochia rigida* community, which is characterized by its outstanding pioneering role.

Relationships of superimposition sometimes occur between the *Aristolochia* community and the *Euphorbia hirta*-*Alternanthera repens* community. When the latter is buried by the aeolian accumulation of nearby sands, *Aristolochia rigida* wins the higher space and if anthropical conditions permit, succeeds in building the community which it mainly characterizes, starting off the formation of a *Cyperetum chordorrhizum*, then *Cordia somaliensis* scrub and finally open woodland of thorny Acacias (photo 4).

In the latter case the aeolian factor is decisive; in a certain sense it cancels out any stage of development of the *Euphorbia hirta*-*Alternanthera repens* community and thus any possibility of dynamic contact with the *Calotropis procera* com-

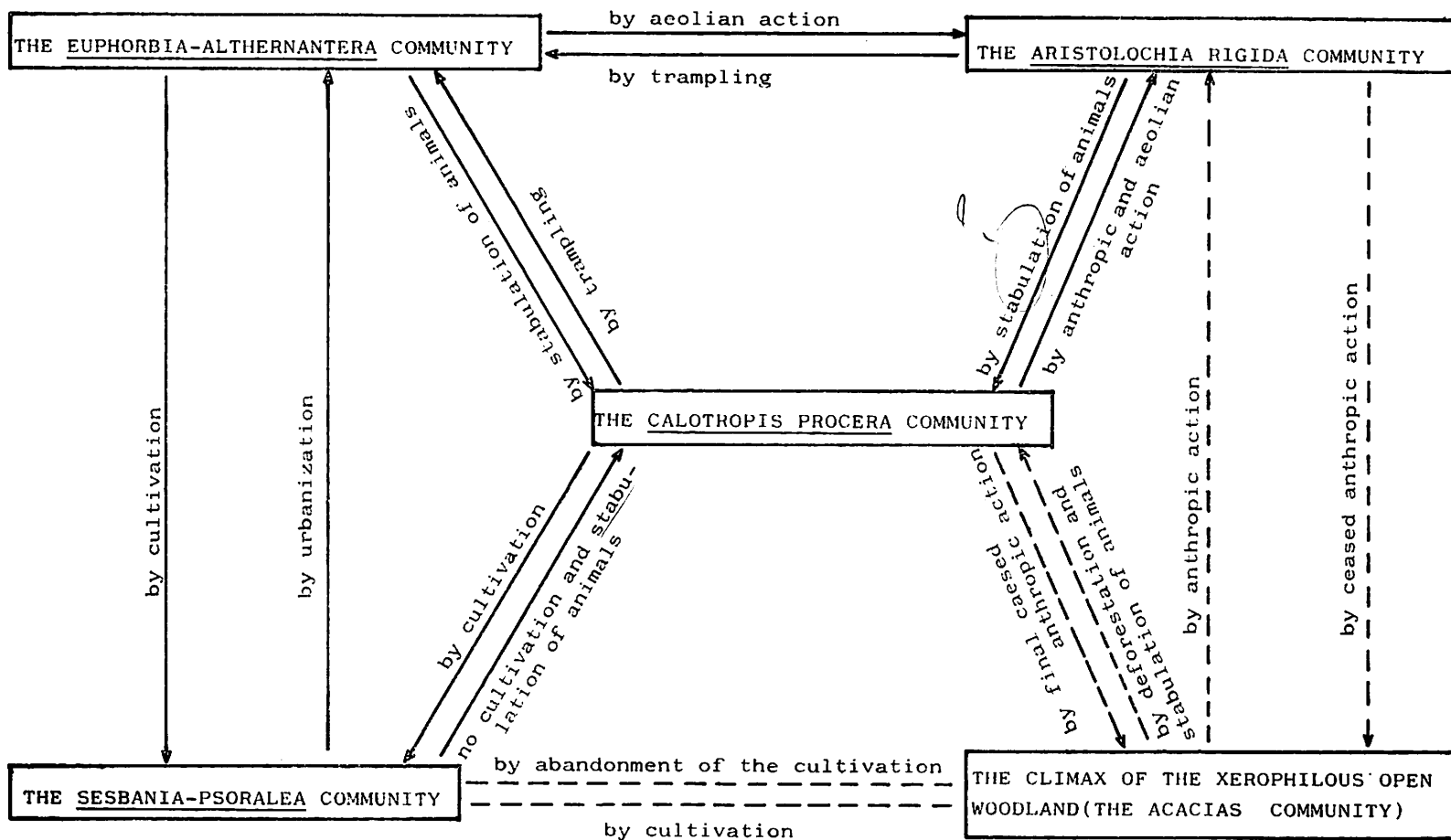


Fig. 3 - A dynamic interpretation of the examined synanthropical communities.

munity. The opposite is true of the *Sesbania sesban*-*Psoralea corylifolia* community: in fact it has an affinity of flora and to some extent of ecology with all the other communities except the *Aristolochia rigida* community with which it shares only some connecting species. It behaves, however, like a pioneer in the same way as the *Aristolochia* community. Only following a process of urbanization of the cultivations could it be followed by the *Euphorbia-Alternanthera* and *Calotropis procera* communities. If, on the other hand, the cultivations were abandoned, scrub formation would soon be formed and then climax vegetation.

In the Fig. 3, we give a synthetic, possible, dynamic interpretation of the synanthropical examined vegetation.

References

- Beguinet A., 1918 - *Sulla costituzione dei boschi di Mangrovie nella Somalia Italiana*. Boll. R. Soc. Geogr. Ital. ser. 5, 7 (3-4): 295-306.
- Chiovenda E., 1916 - *Risultati scientifici della Missione Scientifica Stefanini-Paoli nella Somalia Italiana*. 1. Le Collezioni Botaniche. Firenze.
- Chiovenda E., 1962 - *Flora Somalia*. 1. Roma.
- Chiovenda E., 1932 - *Flora Somalia*. 2. Forlì.
- Chiovenda E., 1936 - *Flora Somalia*. 3. Atti Ist. Bot. Univ. Pavia, s. 4, 7: 117-160.
- Ciferri R., 1939 - *Le associazioni del litorale marino della Somalia meridionale*. Riv. Biol. Col., 2(1): 5-42.
- Ciferri R., 1946 - *Saggio d'emerecologia sulle comunità agrestali delle regioni irrigue della Repubblica Domenicana (Antille) e del Benadir (Somalia Italiana)*. Atti Ist. Bot. Univ. Lab. Crittog. Pavia s. 5, 7(1): 35-92.
- Commission of the European communities, 1975 - *European development fund Somalia 1960-1975*. p. 38. Bruxelles.
- Cufodontis G., 1953-1972 - *Enumeratio plantarum Aethiopiae Spermatophyta*. Jardin Botanique National de Belgique 1-2, pp. 1657.
- Franchet M.A., 1882 - *Sertulum Somalense*. In: Revoil G., *Faune et Flore des Pays Somali* (*Afrique Orientale*). Paris (Challamel).
- Gillett J.B., 1941 - *The plant formations of Western British Somaliland and the Harar Province of Abyssinia*. Kew Bull. 1941 (2): 37-199.
- Gilliland H.B., 1952 - *The vegetation of Eastern British Somaliland*. Journ. of Ecol., 40(1): 91-124.
- Glover P.E., 1947 - *A provisional check-list of British and Italian Somaliland trees, shrubs and herbs*. London.
- Moggi G., 1960 - *Dieci anni di esplorazioni e di ricerche botaniche in Somalia*. Riv. Agr. Subtrop. Trop., 54(4-9): 252-263.
- Moggi G., 1960 - *Missione Botanica in Somalia. Relazione itineraria e risultati principali*. Ric. Scient., 30: 955-966.
- Moggi G. - *Researches on the Coast of Somalia. The shore and the dune of Sar Uanle: Vegetation of the sandy shore*. Monitore Zool. Ital. (N.S.) Suppl. (in press).

- Negri G., 1938 - *Sul valore dell'influenza esercitata dall'uomo sulle fitocenosi dell'Africa Orientale Italiana*. Compt. Rend. Congr. Intern. Geogr. Amsterdam sez. 7.2: 34-38.
- Paoli G., 1916 - *Risultati Botanici della Missione Stefanini-Paoli nella Somalia Italiana Meridionale*. Mem. R. Accad. Lincei ser. 5, 11(10): 621-630.
- Paoli G., 1919 - *Sulle risorse naturali della Somalia Italiana*. Atti Con. Naz. Col. per il dopoguerra delle Colonie. Ist. Col. Ital. Roma.
- Pichi-Sermolli R.E., 1952 - *Una carta geobotanica dell'Africa Orientale (Eritrea, Etiopia, Somalia)*. Webbia, 13(1): 15-132.
- Pignatti S., Mengarda F., 1962 - *Un nuovo procedimento per l'elaborazione delle tabelle fitosociologiche*. Rendic. Acc. Naz. Lincei, s. 3, 32(2): 215-221.
- Preto G., 1976 - *Situazione e prospettive forestali della Somalia*. Annali Ist. Sper. Selv. Arezzo, 7: 123-201.
- Rattray J.M., 1960 - *The grass cover of Africa*. FAO Agricultural Studies, n. 49: 1-168. Roma.
- Senni L., 1935 - *Gli alberi e le formazioni legnose della Somalia*. Ist. Agric. Col. Ital. Firenze, pp. 305.
- Stefanini G., Paoli G., 1916 - *Missione Stefanini-Paoli. Ricerche idrologiche, botaniche ed entomologiche fatte nella Somalia Meridionale (1913)*. Ist. Agr. Col. Ital., Relaz. Monogr. Agr. Col., n. 7.
- Stefanini G., 1922 - *In Somalia, note ed impressioni di viaggio*. Le Monnier, Firenze.
- Townsend C.C., 1979 - *The genera dasyphaera and Volkensinia. Notes on Amaranthaceae: IV*. Kew Bull., 33(3): 417-419.
- Warfà A.M., ined. - *La conoscenza delle infestanti nelle regioni Basso e Medio Scebeli*. Tesi di laurea, Univ. Naz. Somala, Mogadiscio.

Abstract

On the basis of about 100 phytosociological surveying^s, effectuated during 1976 and 1977, the principle aspects of synanthropical vegetation, observed in the district of Mogadishu and Afgoi, have been taken into consideration. The consideration regards the environment of the cultivation, the places trampled along the streets and open spaces of the peopled area, the half-abandoned internal area of Mogadishu with ruderal characteristics, the ambient of transition between climax vegetation to thorny Acacias and the environment mostly influenced by the anthropics.

A table for each of the four aspects of vegetation is presented. It constitutes respectively of 20, 22, 23 and 10 surveys, effectuated with the phytosociological method and selected according to Pignatti & Mengarda (1952). At the head of each table, differential species of the vegetable community are evident. For each one of them, structural and floristical characters, in addition to ecological and syndynamical, are given.

Riassunto

Ricerche fitosociologiche preliminari sulla vegetazione sinantropica della Somalia meridionale.

Sulla base di circa cento rilevamenti fitosociologici, effettuati nel 1976 e 1977, vengono esaminati e principali aspetti di vegetazione sinantropica osservati nei distretti di Mogadiscio e di Afgoi. Sono stati presi in considerazione l'ambiente delle colture, i luoghi calpestati lungo le vie e gli spiazzati degli abitati, le aree semiabbandonate, all'interno di Mogadiscio, con caratteristiche

ruderali; infine gli ambienti di transizione tra la boscaglia climacica xerofila ad acacie spinose e l'ambiente particolarmente influenzato dalla presenza antropica. Per ciascuno dei quattro aspetti di vegetazione viene presentata una tabella, costituita rispettivamente di 20, 22, 23 e 10 rilevamenti effettuati con metodo fitosociologico e selezionati secondo Pignatti e Mengarda (1952). In testa a ciascuna tabella vengono evidenziate le specie ritenute possibili differenziali di comunità sinantropiche. Di ciascuna si danno i caratteri strutturali e floristici in aggiunta a considerazioni ecologiche e sindinamiche.

Koobid

Tijaabada fitosociologikeedka ee ugu horeeysay dhanka dhirta sintrobikada Soomaaliyada-dhexe

Tijaabada waxaa gun-dhig u ah ku dhawaan 100 jeer kambione fitosociologica la soo aruurshay 1976 iyo 1977dii, marka la dersay astaamaha a'asaasiga ee dhirta sintrobikada. Dhirtaa oo laga soo qaaday Degmada Muqdisho iyo Afgoye. Waxaan ka soo qaaday ayadoon loo tix galin deegaanta la tabada, meelaha ay cagtu ku badantahay dhinacyada wadooyinka, meelaha gegooyinka, iyo meelaha la-dayacay, meelaha oo ka mid ah gudaha Magaalada Muqdisho, dhirtaa oo jaadkeedana ah kuwa iskooda uga baxa meelaha gabowga ah, ugu dambeeyntii waa marxalad ka gudub keeyn geed-adeeg asalkeedu yahay u gudbid geed qurac-dhirtaa waxay u dhaxaysaa meesha keeynta ah iyo meesha uu qofka deggenyahaydeegaanka waxaa rogay jirista antrobikada. Mid walow ka mid ah affarta qebood oo dhirta waxaa ka meel jooga hal shax-tusaale, sida ay isugu xigaanna ay tahay 20, 22, 23, iyo 10, ayadooloo qaada'ay hab ahaanta fitosociologikada ee ah door-door-rimaadka sida ay latahay Pignatti iyo Mengarda (1952dii). Shaxwaliba madaxeeda waxaa lagu kor qo'aay inta jibsin (specie) oo laga helay lagana sooci karay, ay ku kala soocnaayeen Urur-ahaantooda sinantrobikeedka mid waliba waxaa la siiyay qecyxidda sida ay u sameecy-snaayeen iyo u abtirintooda dhireed. Ayadoo la raxshay mudnaanta jawi-direetka iyo sindinami-keedka.

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Address of the authors: Dr. Francesco M. Raimondo, Istituto ed Orto Botanico dell'Università, Via Archirafi 38, 90123 Palermo (Italia); Dr. Ahmed Mumin Warfa, Faculty of Agriculture of National University, P.O. Box 801 Mogadishu (Somalia).

Tab.1 - Post-cultural vegetation on alluvional soils. (The *Sesbania sesban* (L.) Merril - *Psoralea corylifolia* L. community).

Number of the relevé	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Presences	Classes of frequency
Quadrat size (m ²)	200	200	200	200	200	200	180	200	200	200	200	200	200	200	200	200	200	200	200	200		
Total cover (%)	80	85	85	90	95	80	75	70	80	75	90	75	85	75	75	75	65	60	70	70		
Height of vegetation (cm)	110	70	50	50	50	80	60	60	90	80	100	70	110	70	80	75	100	75	60	80		
Species number	34	27	28	28	25	26	29	25	30	23	23	27	27	26	25	23	23	29	23	29		
Sorensen's index	75,4	70,4	63,0	61,8	61,5	60,4	59,3	57,6	56,1	52,0	52,0	51,9	51,9	49,1	47,1	44,0	44,0	42,9	40,0	32,1		
<u>Diff. sp. of community</u>																						
Sesbania sesban	2.3	.	.	3.3	2.2	2.2	+	.	2.2	+	2.2	2.2	.	2.2	2.3	2.3	+	2.2	1.2	2.2	16	IV
Psoralea corylifolia	+	2.2	+2	+	2.2	2.2	2.3	+2	.	2.3	2.2	.	1.2	2.3	2.2	+2	.	.	2.2	.	15	IV
<u>Other species</u>																						
Erlangea somalensis	.	2.3	2.3	2.2	2.3	.	.	2.2	.	.	2.3	.	2.2	2.3	2.2	2.2	.	2.3	2.3	2.2	13	IV
Amaranthus caudatus	1.2	+	1.2	1.2	2.2	2.2	1.2	1.2	.	1.1	1.1	.	.	.	1.1	+2	.	.	.	+	13	IV
Cynodon dactylon	.	1.2	2.3	.	.	+	2.2	1.2	1.2	.	+	.	+	+2	1.2	1.2	1.1	.	.	1.2	13	IV
Brachiaria reptans	1.2	1.2	1.2	+	.	.	.	.	1.1	.	+	.	1.2	.	2.2	+	.	1.2	1.2	1.1	13	IV
Heliotropium aegyptiacum	2.2	2.2	3.3	2.3	2.3	.	2.3	3.3	.	.	.	3.3	.	2.3	2.3	.	2.3	.	2.3	.	12	III
Abutilon fruticosum	2.3	.	2.2	2.2	2.2	.	2.2	2.2	.	+	2.3	2.2	2.3	.	.	.	2.2	.	.	.	12	III
Cissus digitata	+	+	+	+2	.	+	+	.	+	.	+	+	+	+	.	.	.	.	.	.	12	III
Acalypha indica	+	1.2	+	+	+	+2	+2	+2	.	+	.	+	.	.	.	+	.	+	.	.	12	III
Alternanthera repens	+2	+2	1.2	+	+	1.2	1.2	+2	.	1.2	.	.	+2	.	.	.	.	.	+2	.	11	III
Achyranthes aspera	+2	1.2	+2	+	+2	1.2	.	1.2	.	1.1	.	.	+2	.	.	.	+2	.	+2	.	11	III
Glycine javanica	+2	+	.	.	.	.	.	.	+	+2	+	.	.	.	+2	+	1.1	+	+	.	11	III
Cassia occidentalis	+	+	1.1	+	.	.	+	+	+	.	.	.	.	+	.	.	+	+	+	+	11	III
Momordica trifoliata	+2	+	.	.	.	.	.	.	+2	.	+2	.	+2	+2	.	+	+	+	+	+	11	III
Abutilon hirtum	2.2	.	.	.	2.2	1.2	2.2	1.2	1.2	.	.	2.2	1.2	.	.	.	1.2	.	.	.	9	III
Rhynchosia minima	.	.	.	.	+	+	.	.	+2	+	.	.	.	.	+	.	+	1.2	.	.	9	III
Tephrosia uniflora	+2	.	.	.	.	+2	.	.	+2	+2	.	.	.	.	.	+2	.	.	.	.	9	III
Ricinus communis	+2	+	+2	+2	+2	.	.	.	+2	.	.	+	+	+	.	.	.	.	.	.	9	III
Cyperus longus	.	.	1.2	.	.	.	.	.	+	.	1.1	.	.	.	+	1.2	1.2	1.2	.	1.1	9	III
Solanum arundo	+2	1.1	.	+	.	.	1.2	+	.	.	.	+	+2	.	.	.	.	+2	.	+	9	III
Justicia flava	+2	+	.	+	.	.	+	+	+2	.	.	1.2	+	.	.	.	.	.	.	.	9	III
Ruellia patula	+	+	.	+	.	.	+	+	.	.	.	+	.	+	.	.	.	+	.	+	9	III
Aristolochia bracteata	+	.	.	.	+	+	.	.	+	.	.	.	.	.	.	.	.	.	.	.	8	III
Tephrosia quartiniiana	.	.	.	.	1.1	+2	.	.	+	.	1.2	.	+	.	+2	+2	+	.	.	.	8	II
Aerva persica	1.2	1.2	.	+	.	1.2	.	2.2	.	2.2	+2	.	1.2	.	.	.	.	.	.	.	8	II
Urochloa panicoides	1.1	.	.	1.1	.	+	.	.	1.2	.	.	.	.	.	+	.	1.1	1.1	.	+2	8	II
Tregia galabatensis	+	.	+	.	+2	.	.	.	1.2	+	.	1.1	.	1.2	.	.	.	.	.	.	8	II
Commicarpus verticillatus	+	+	+	+	+	.	.	.	.	2.2	+	.	.	.	.	.	.	1.2	.	.	8	II
Momordica balsamina	.	.	.	.	.	.	+2	.	.	.	+	.	+	+2	.	+	+	+2	.	+2	8	II
Pavonia arabica	.	.	.	.	.	+	.	1.2	1.2	.	.	1.1	1.1	+	.	.	.	.	.	+	7	II
Crotalaria pycnostachya	+2	.	.	.	+	.	1.2	.	.	1.2	.	.	.	.	+2	+2	.	.	1.2	.	7	II
Sida ovata	1.1	.	.	.	.	1.2	+	.	1.1	.	.	+	+	.	.	.	.	.	+	+	7	II
Commelina forskalaëi	.	.	1.1	.	.	.	.	.	.	.	.	.	+	+2	+	.	+	+	+	2.2	7	II
Vernonia cinerea	.	+	.	+	.	.	.	+	.	.	.	.	.	1.1	+	.	+	+	+	+	7	II
Clitoria ternatea	.	+	+2	.	.	.	.	.	.	+2	.	+2	.	.	.	+	+	+	+	.	7	II
Dactyloctenium aegyptiacum	.	1.1	.	.	1.2	1.1	.	.	1.2	.	1.2	.	.	.	.	1.1	+	.	.	.	7	II
Coccinia grandis	.	1.2	.	.	.	1.1	.	.	+	.	.	.	.	1.2	+	.	.	+	+	+	7	II
Trianthema triquetra	+	.	+2	.	+	+	.	.	.	2.3	.	.	.	.	.	.	.	.	+	.	7	II
Serra incana	+2	.	+	.	.	.	+	.	+	.	.	.	1.2	.	.	.	.	.	.	+	7	II
Ocimum basilicum	.	.	.	+	.	.	+2	+	.	.	.	+	+	.	.	.	.	+	.	+	7	II
Priva cordifolia	+	+	.	+	.	.	.	+	.	.	.	+	+	.	.	.	.	+	.	.	7	II
Typha angustifolia	.	.	.	.	.	.	+	.	+	.	+	+	+	.	.	+	.	+	.	.	7	II
Eragrostis ciliaris var.ciliaris	.	.	2.2	.	.	.	1.2	.	.	.	1.2	.	.	.	+	+	.	.	.	+	6	II
Indigofera arrecta	.	.	.	.	.	.	.	.	.	.	.	1.1	.	.	+2	+	.	+	+	+	6	II
Monechma debile	.	+	.	+	.	.	+	.	.	.	.	.	+	.	.	.	.	+	.	+	6	II
Heliotropium zeylanicum	.	2.2	.	1.2	.	.	2.2	1.2	.	.	+	.	.	.	.	.	.	.	.	1.2	5	II
Heliotropium steudneri	.	2.2	.	2.2	.	.	.	.	.	.	.	1.2	2.2	.	+	.	1.1	.	.	.	5	II
Launaea cornuta	.	.	.	.	.	.	1.2	.	.	.	.	.	.	1.2	1.2	.	.	+2	1.1	.	5	II
Tephrosia graminifolia	.	.	.	.	.	.	.	.	+2	2.2	1.1	.	.	.	.	+	.	.	1.2	.	5	II
Crotalaria comanestiana	.	.	.	.	+	.	.	.	+2	2.2	.	.	.	.	.	.	1.2	.	.	+2	5	II
Hibiscus micranthus	+2	.	.	.	.	.	.	+	1.1	.	.	+	1.2	.	.	.	.	.	.	.	5	II
Portulaca oleracea	+	.	.	.	+	+	.	.	+	.	.	.	.	.	.	.	.	.	.	.	4	II
Digitaria scalarum	.	.	.	.	.	.	.	.	.	.	.	.	.	+2	.	.	.	+	+	1.2	4	I
Launaea taraxacifolia	.	.	.	.	.	.	.	.	.	.	.	.	+	.	1.1	1.1	.	.	.	1.1	4	I
Portulaca quadrifida	.	.	+	.	2.2	.	.	.	.	1.1	.	.	.	.	.	.	.	.	+	+	4	I
Indigofera schimperi	.	.	.	.	.	.	.	.	.	.	.	1.2	.	.	.	.	.	+	+	+	4	I
Phragmites mauritianus	.	.	.	.	.	+	.	.	.	.	.	.	.	1.2	.	.	.	+	.	+	4	I
Ipomoea pes-caprae	+	.	.	.	.	.	1.2	.	.	.	.	+	.	.	.	.	.	1.1	+	.	4	I
Sorghum arundinaceum	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	+	.	.	.	3	I
Setaria verticillata	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	+	.	.	.	.	3	I
Pavonia propinqua	1.2	.	.	.	.	.	.	+	1.2	.	.	.	.	.	.	.	.	.	.	.	3	I
Rhynchosia sublobata	.	.	.	.	.	.	.	.	.	+2	.	.	.	.	.	.	1.2	1.1	.	.	3	I
Polycarpaea somalensis	.	.	1.1	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	+	.	3	I
Cucumis dipsaceus	.	.	.	.	.	.	.	.	.	.	+	.	+2	+2	.	.	.	.	.	.	3	I
Commelina benghalensis	.	.	.	.	.	.	.	.	.	.	+	.	+	.	+	.	.	.	.	.	3	I
Clerodendron hildebrandtii	2.2	.	1.1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	I
Echinochloa crus-pavonis	.	.	2.2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	I
Cyperus exaltatus	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	1.1	.	.	.	.	2	I
Canthema stefaninii	.	.	+	.	.	.	.	.	.	+2	.											

Tab.2 - Community on trampled soils. (The *Euphorbia hirta* L. - *Alternanthera repens* (L.) O. Kuntze community).

Number of the relevé	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	Presences	Classes of frequency
Quadrat size (m ²)	45	30	35	30	40	35	35	45	35	30	30	40	35	35	40	40	30	30	35	30	35	30	20	V
Total cover (%)	55	60	55	60	40	50	35	50	55	40	35	55	45	50	45	50	60	30	40	50	30	50	20	V
Height of vegetation (cm)	8	8	8	8	10	5	5	8	10	8	5	8	10	8	8	10	10	5	5	10	5	8	20	V
Species number	28	27	20	20	27	39	21	27	21	28	25	31	36	39	29	30	17	22	19	31	21	22	20	V
Sorensen's	77,8	74,1	74,0	74,0	73,1	72,7	72,3	71,7	68,1	67,9	66,7	66,7	64,5	63,6	61,8	57,1	55,8	54,2	53,3	52,6	51,1	49,0	20	V
Diff. sp. of community																								
Euphorbia hirta	+	+2	+2	1,2	+	+2	+	1,1	+	.	+2	+	.	+	+	+	+	+	+2	1,1	+	1,1	20	V
Alternanthera repens	2,2	+	2,2	1,1	1,2	1,2	+2	+	1,1	1,2	1,1	+2	2,2	1,2	1,2	1,1	.	1,1	+	+	+2	.	20	V
Other species																								
Boerhaavia diffusa	+	+2	.	1,2	+	+2	+	+	2,2	1,2	+2	2,1	+2	+2	+	.	3,5	2,1	2,2	+	+2	+	20	V
Tribulus terrestris	1,2	+	1,1	2,2	1,1	2,3	+2	1,1	+	1,2	+2	+2	2,2	1,1	+2	2,3	+	.	+2	.	+	+	20	V
Dactyloctenium scindicum	+	+2	+2	+	+2	+	+	+	+	+	+	+	+	+	+	1,1	1,2	.	1,1	2,2	+2	2,2	20	V
Cenchrus mitis	+	2,2	+	+	+	+	+	+	+	1,1	+	+	+	+	+2	+2	+	+	+	1,1	.	1,1	20	V
Cynodon dactylon	2,3	1,2	1,3	1,2	1,2	1,2	+2	2,3	1,3	1,2	1,2	+2	1,2	1,2	1,2	1,2	+2	+	+	1,1	.	1,1	19	V
Launaea cornuta	+	1,1	+	.	+	+	.	1,3	+	.	+	+	+	+	+	+	+	+	+	1,1	+	1,1	18	V
Portulaca oleracea	+	+	+	+	+	+	+	+	+	+	+	+	+	1,1	+	+	+	+	+	.	.	.	17	V
Euphorbia granulata	+	+	.	.	+	+2	+2	+	+	+	+	+	+2	.	.	+2	+	+	+	1,2	.	.	16	IV
Brachiaria reptans	+	1,1	+2	+	+	+2	+	+	.	+2	+	+	+2	+2	+2	+2	+	+	+	.	.	2,2	16	IV
Vernonia cinerea	+	+	+	+	+	+	+	1,1	+	+	+	+	+	+	+2	+	+	+	+	+	+	.	16	IV
Indigofera colutea var. somalensis	+	+	.	+	+	+	+	+	+	+	+	+	.	.	.	+	+	+	+	+	+	+	16	IV
Euphorbia hypericifolia	+	1,1	+	+	.	+	+	+2	+	+	+	+	+	+	+	+2	.	.	.	2,2	.	1,1	15	IV
Trianthema pentandra	.	+	+	+	+	+2	+2	+	+	+	+	2,3	+2	+	+	+2	.	+	+	.	.	.	15	III
Phyllanthus rotundifolius	+	.	1,1	+2	+	+	+	+	+	+2	+2	.	.	+	+	.	.	.	.	.	.	.	13	III
Commelina forskolaei	+	+2	+2	.	.	.	.	+	+	+	+	+	+2	+	+	+2	+	+	.	.	.	.	13	III
Euphorbia prostrata	+2	+	.	1,2	+2	+	.	.	.	.	1,2	+	.	+	+	1,2	.	.	.	+	+	1,1	12	III
Cyperus rotundus L. ssp. tuberosus	+	+2	.	+	.	1,2	.	+	+	+	+	.	.	.	+	+2	.	.	+	+	+	+2	11	III
Heliotropium aegyptiacum	+	.	.	.	.	+	.	+	+	+	+	.	.	+	+	+	+	1,1	1,1	.	1,1	.	10	III
Trianthema portulacastrum	+3	.	.	.	+	1,2	.	.	+	+	+	+	+2	+	+	+2	+	.	.	.	.	.	10	III
Monachma cecile	.	+	+	.	.	.	.	1,1	+	+	+	.	+	+	+	+	.	.	.	+	.	.	10	III
Clitoria ternatea	.	+	.	.	.	.	+	+2	.	+	+	+	+	+	+	.	.	.	.	+	.	.	10	III
Datura metel	+	.	+	+	.	.	+	.	.	+	+	+	+	+	+	+	+	+	+	+	+	.	10	III
Amaranthus sylvestris	.	.	+	.	1,1	.	.	.	.	.	+	+2	+	1,1	.	+	+	+	.	+	+	.	9	III
Lochnera rosea	+	+	.	.	+	+	+	.	.	.	.	.	+	+	+2	.	.	.	.	+	+	+	9	III
Cenchrus ciliaris	.	.	.	.	.	+	.	.	+	+	.	.	.	+	+	.	.	.	.	.	+	+	8	II
Abutilon pannosum	.	.	.	.	.	+	.	+	+	+	+	.	.	+	+	+	.	.	.	.	.	.	8	II
Cassia occidentalis	.	.	.	.	.	+	+	+	+	+	+	+	+	+	+	+	.	.	.	.	+	.	8	II
Trianthema triquetra	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	+	+	1,1	7	II
Calotropis procera	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	+	+	+	.	7	II
Flaveria trinervia	.	2,1	.	.	+	.	.	.	1,2	.	+	+	.	2,1	.	.	.	.	.	.	.	.	6	II
Tetragodon cenchroides	.	.	.	.	+	.	+	+	+	.	.	.	+	+	.	1,1	.	.	.	+	+	+	6	II
Solanum arundo	.	.	.	.	.	+	.	.	.	+	.	.	+	+	+	+	.	.	.	+	.	.	6	II
Euphorbia geniculata	.	1,1	.	.	.	+	.	.	+	+	.	.	.	+	+	.	.	.	.	.	.	.	5	II
Eragrostis ciliaris	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	+	5	II
Crotalaria pycnostachya	.	+	.	.	.	+	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	5	II
Phyllanthus maderaspatensis	.	.	.	.	.	.	.	.	.	.	.	+	+	+	.	.	.	.	.	.	.	.	5	II
Rhynchosia sublobata	+	.	.	.	.	+	.	+	.	.	.	.	+	.	.	.	.	.	.	.	.	.	5	II
Leptadenia arborea	+	.	+	.	+	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	5	II
Zygophyllum simplex	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	2,1	1,2	.	2,1	.	.	4	I
Tephrosia uniflora	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	+	.	4	I
Atriplex griffithii	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+2	+2	.	1,2	4	I
Hibiscus dongolensis	.	.	.	+	.	+2	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	4	I
Amaranthus dubius	.	.	.	.	+	+	.	.	.	.	.	+	.	.	.	.	.	.	.	.	+	.	4	I
Indigofera ambelacensis	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4	I
Cucumis melo	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	4	I
Heliotropium ovalifolium	.	.	.	.	.	.	.	+	.	.	+	.	.	.	.	.	.	.	.	.	.	.	3	I
Aristida adscensionis	.	.	.	.	+2	+	.	.	.	.	.	1,2	.	.	.	.	.	.	.	.	.	.	3	I
Digera alternifolia	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	+	.	.	.	3	I
Gisekia africana	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	.	3	I
Ocimum basilicum	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	3	I
Aerva persica	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	3	I
Heliotropium graminifolium	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	I
Priva adhaerens	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	3	I
Abutilon rotundifolium	+	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	3	I
Pedaliu murex	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	3	I
Indigofera schimperii	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	3	I
Crotalaria comanestiana	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	3	I
Psoralea corylifolia	.	.	.	.	+	.	.	+	.	.	.	.	.	.	+	.	.	.	.	.	.	.	3	I
Launaea taraxacifolia	.	.	.	.	.	.	.	+	.	.	.	.	.	+	.	.	.	.	.	.	.	.	3	I
Dactyloctenium aegyptiacum	.	.	.	.	1,2	.	.	.	.	.	.	.	1,2	.	.	.	.	.	.	.	.	.	3	I
Oldenlandia richardsonioides	.	.	.	.	2,1	1,1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	I
Tephrosia graminifolia	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	I
Latipes senegalensis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	2	I
Lantana sp.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	I
Panicum coloratum	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	I
Brachyaria deflex																								

Tab.3 - Auderal community. (The Calotropis procera (Willd.) A.Br. community).

Number of the relevé	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Presence	C. frequency
Quadrat size (m2)	200	150	200	100	200	150	100	200	100	200	150	150	200	120	200	100	200	120	200	200	160	200	100		
Total cover (%)	55	85	80	50	75	45	40	40	40	85	40	65	80	40	75	50	50	35	45	45	85	65	35		
Height of vegetation (cm)	120	100	120	80	80	70	70	100	100	150	80	150	100	100	100	80	90	70	100	80	120	40	70		
Species number	39	49	31	30	31	29	29	30	33	29	27	39	29	29	41	32	44	23	31	30	30	44	30		
Sørensen's index	77,8	75,6	75,0	73,0	71,9	71,0	71,0	69,8	69,7	67,7	66,7	66,7	64,5	64,5	62,2	61,5	61,0	60,7	60,3	59,4	57,1	53,8	50,8		
Diff. sp. of community																									
Calotropis procera	2,3	2,1	1,1	1,1	1,1	1,1	2,1	1,1	2,1	1,1	+	3,2	2,2	2,2	+	1,2	2,3	2,1	2,1	2,2	1,1	+	+	23	V
Other species																									
Cassia occidentalis	1,1	1,1	1,1	+	3,3	2,2	+2	2,3	2,2	+2	2,2	1,1	2,3	+2	1,2	1,1	1,2	1,1	1,2	1,2	+	3,3	1,1	23	V
Dactyloctenium aegyptiacum	+	+	+	+2	+	+	+2	+	+2	+2	+	+	+2	+2	+	+	1,2	+	+	+	+	+	1,2	22	V
Linum viscosum	1,1	1,1	+2	+	+	+	+	+	+2	+	+	+	+2	+	+	+	+	+	+	+	+	+	+	21	V
Lepidostegia arborea	2,1	2,1	1,2	1,2	+2	+	+2	+2	+2	1,2	+	+	+	+	+	+	+	+	+	+	+	+	+	20	V
Pedalius nurex	+	1,2	+	+	+	1,1	+	+	1,1	+	+	+	+	+	+	+2	+	+2	1,1	+2	+	+	+	20	V
Tribulus terrestris	+	+	+	+	+	+	1,1	+	+	+	1,1	+2	+	+	1,2	+	+	+	1,1	+	+	+	+	20	V
Mossardia balsamifera	1,1	1,1	+	+	+	+	1,1	+	1,2	2,2	+	2,1	+2	+2	2,2	1,2	1,1	+2	1,2	+	+	+	+2	20	V
Tephrosia uniflora	+	2,2	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	2,1	19	V
Pavonia pinnatifida	+	+	+	+	1,1	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	19	V
Solanum arundo	+	2,1	3,3	2,2	+2	+	+2	+2	+2	3,3	+	+	+	3,3	1,2	+	+	+	+2	1,1	+	+	+	19	V
Heliotropium aegyptiacum	1,1	2,1	2,1	1,2	+2	+	+	1,1	1,1	+	+	+	+	+	+	+	+	+	+	2,1	+	+	+	16	IV
Boerhaavia verticillata	+	+	+	+	+	+	+	+	+	+	+	+	+	1,1	+	+	+	+	+	+	+	+	+	16	IV
Cenchrus ciliaris	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	16	IV
Cynodon dactylon	+	+2	1,2	+2	+	+	+2	+2	+	+2	+	+	2,3	+2	+2	+	+	+	+	+	+	+	+	16	IV
Heliotropium benedictense	+	+2	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	16	IV
Heliotropium ovalifolium	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	1,1	1,1	+2	+	+	15	IV
Heliotropium cinerascens	+	2,1	1,1	+	+	+	1,2	+	+	+2	+	+	+	+	+	+	+	1,1	1,1	+	+	+	+	15	IV
Blapharis andersoniana	+	+	+	+	+	+	+	+	+	+2	+	+	+	+	+	+	+	+	+	+	+	+	+	14	III
Datura stramonium	+	+	+	+	+	+	+	+	+	+2	1,1	+	+	+	+	+	+	+	+	+	+	+	1,1	13	III
Ipomoea incana	+	+2	+	+	+	+	+	+	+	+	+	+2	+2	+	+	+	+	+	+	+	+	+	+	13	III
Pergularia daemia	+	+	+	+2	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	13	III
Euphorbia hirta	+	+	+	+	+	+	+2	+	+	+	+	+	2,1	+	+	+2	+	+	+	+2	+	+	+	12	III
Digera altermifolia	+	+	1,1	+	+	+	+	+	+	+	+	+	1,1	+	+	+	+	+	+	+	+	+	+	12	III
Aristolochia rigida	+2	+	+	+	+2	+2	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	12	III
Gisekia africana	+	+2	+	+	+	+	+	+	+	+	+	+	+	+2	+	+	+	+	+	+	+	+2	+	12	III
Indigofera colutea var. somaliensis	+	+	1,1	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	12	III
Portulaca oleracea	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	11	III
Abutilon pannosum	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+2	+	11	III
Leunesea cornuta	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	11	III
Ricinus communis	+	+	+	+	+	+	+	+	+	+	+	+	1,2	+	+	+	+	+	+	+	+	+	+	11	III
Bracharia raptens	+	+2	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	10	III
Camelina forskalaesi	+	+	+2	+	+	+	+	+	+2	+	+	+2	+	+	+	+	+	+	+	+	+	+	+	10	III
Boerhaavia diffusa var. viscosa	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+2	+	+	+	10	III
Aerva perita	+	+	+	+	+	+	+2	+	+	+	+	+	+2	+2	+	+	+	1,1	1,2	+	+	+	+	10	II
Rhynchosia sublobata	+	+	+	1,1	+	+	+	+	+2	+	+	+2	+	+	+	+	+	+	+	+	+	+	+	9	II
Euphorbia granulata	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	8	II
Acacia tortilis	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	8	II
Ipomoea sinensis	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	8	II
Asteranthea rapana	+	+	+	+	+	1,2	+	+	+	+	1,1	+	+2	+	+	+	+	+	+	+	+	+	+	8	II
Clitoria ternatea	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+2	+	7	II
Solanum perpendini	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+2	+	+	+	+	7	II
Grewia villosa	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	7	II
Scilla somaliensis	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	6	II
Capparis somaliensis	+	+	+	+	+	+	+	+	+	+	+2	+	+	+	+	+	+	+	+	+	+	+	+	6	II
Withania somnifera	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	1,1	+	+	+	2,1	6	II
Cassia longiracemosa	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+2	+	+	+	+	6	II
Grewia tenax	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	6	II
Ipomoea stanophyton	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	6	II
Solanum depressum	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	6	II
Euphorbia prostrata	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	6	II
Pavonia propinqua	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	6	II
Ocimum basilicum	+	1,1	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	6	II
Latipes senegalensis	+2	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	5	II
Euphorbia tirucalli	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	5	II
Courbonia nummularifolia	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	5	II
Indigofera erecta	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+2	5	II
Uvaria denhardtiana	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+2	5	II
Boscia somaliensis	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	5	II
Phyllanthus rotundifolius	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	5	II
Cordia somaliensis	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	5	II
Cenchrus ciliaris	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	4	I
Euphorbia hypericifolia	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	4	I
Crotalaria comanestiana	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+								

Feb. 4 - Vegetation of transition to the mesophilous Acacies community. (The *Aristolochia rigida* Duch. ex. DC. community).

Number of the island	1	2	3	4	5	6	7	8	9	10	Listed of Priority
Quadrat size (m ²)	150	150	150	200	150	150	150	150	200	100	
Total cover (%)	70	65	60	75	75	70	70	70	100	60	
Height of vegetation (cm)	60	30	30	50	45	45	35	50	35	100	
Species number	45	39	37	41	48	38	39	36	37	37	
Community's index	83.3	72.7	71.0	70.0	69.0	66.9	66.1	58.7	57.9	52.6	Fireweed

diff. so. of community

[illegible]

Tab. 5 - Synoptical table of the frequencies relative to the present species in the studied communities.

[illegible]

Tab.6 - Taxonomic spectrum relative to vegetation (v) and flora (f) of the synantropical described communities. The data are in %.

Families	Tab.1		Tab.2		Tab.3		Tab.4	
	v	f	v	f	v	f	v	f
Gramineae	12,48	13,09	4,23	15,29	5,00	10,99	7,95	7,79
Papilionaceae	20,05	16,66	6,89	12,94	4,21	9,85	6,41	7,79
Euphorbiaceae	5,67	4,77	10,05	10,58	5,26	7,69	3,59	5,19
Amaranthaceae	9,27	8,34	7,58	5,88	2,50	3,30	2,31	7,79
Haricynaceae	4,35	3,57	3,30	3,53	8,30	4,39	7,96	6,44
Malvaceae	9,64	9,52	18,88	8,24	2,463	8,29	2,31	5,19
Compositae	5,86	7,14	13,41	4,70	7,25	2,20	2,56	1,30
Aizaceae	1,32	1,19	6,17	4,70	6,45	4,39	7,70	6,49
Solanaceae	1,70	1,19	1,59	2,35	3,68	6,60	2,82	2,60
Acanthaceae	4,53	3,57	1,94	2,35	3,81	3,30	1,79	5,19
Cucurbitaceae	5,48	4,77	1,96	2,35	3,55	1,10	5,64	3,90
Caesalpiniaceae	2,27	2,38	3,53	1,18	10,93	4,39	8,98	6,49
Nyctaginaceae	1,51	1,19	2,82	1,18	2,24	3,30	1,79	1,30
Portulacaceae	1,51	2,38	1,70	1,18	1,31	1,10	2,56	1,30
Convolvulaceae	0,76	1,19	0,06	3,53	2,36	3,30	1,54	2,60
Commelinaceae	1,89	2,38	3,70	1,18	1,58	1,10	3,85	1,30
Aristolochiaceae	1,70	2,38	2,29	1,18	7,90	1,10	3,85	1,30
Cyperaceae	2,45	4,77	2,82	1,18	6,71	1,10	4,10	1,30
Asclepiadaceae	-	-	0,52	2,35	0,92	3,30	1,54	5,19
Zygophyllaceae	-	-	0,88	2,35	1,71	2,20	5,39	2,60
Pedaliaceae	-	-	0,35	1,18	2,63	1,10	2,56	1,30
Labiatae	1,32	1,19	1,41	2,35	1,45	1,10	-	-
Verbenaceae	1,70	2,38	2,12	2,35	1,71	1,10	-	-
Capparidaceae	-	-	-	-	0,53	4,39	1,02	2,60
Mimosaceae	-	-	-	-	0,66	5,49	1,28	2,60
Vitaceae	2,27	1,19	-	-	-	-	2,05	1,30
Tiliaceae	0,19	1,19	-	-	2,89	2,20	-	-
Anonaceae	-	-	-	-	0,39	1,10	1,02	1,30
Liliaceae	-	-	-	-	0,66	1,10	1,28	1,30
Apocynaceae	0,19	1,19	0,70	1,18	-	-	-	-
Oleaceae	-	-	-	-	0,26	1,10	2,05	1,30
Polygalaceae	-	-	0,53	1,18	-	-	1,28	1,30
Salvadoraceae	-	-	-	-	0,28	1,10	0,77	1,30
Thymaceae	1,32	1,19	-	-	-	-	-	-
Polygonaceae	-	-	-	-	-	-	0,77	1,30
Agavaceae	-	-	-	-	-	-	0,77	1,30
Agalidaceae	-	-	-	-	0,26	1,10	-	-
Chenopodiaceae	-	-	0,35	1,18	-	-	-	-
Caryophyllaceae	0,57	1,19	-	-	-	-	-	-
Sterculiaceae	-	-	-	-	-	-	0,51	1,30
Rubiaceae	-	-	0,35	1,18	-	-	-	-
Orbanchaceae	-	-	0,18	1,18	-	-	-	-