A CONSPECTUS OF THE GENUS ALLOPHYLUS (SAPINDACEAE)

The problem of the complex species

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> '... there is always a solution to any taxonomic problem at any given time. One has merely to consider and evaluate all of the evidence and make a decision.'
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> H. Lewis, Regnum vegetabile 27 (1963) 38.

SUMMARY

Allophylus, at present with *c.* 255 accepted species, is considered as one of the largest genera of the *Sapindaceae*. It is distributed throughout the tropics of the Old and the New World, and shows a wide ecological range. Although somewhat variable in vegetative characters, there is a striking homogeneity in fertile characters, by which the generic disposition is easily spotted all over the world.

Specific delimitation is renowned difficult in this genus (chapter 2). An analysis of the revision given by Radlkofer in his monograph of the *Sapindaceae* in 'Das Pflanzenreich', Heft 98 (1931—34) reveals that the characters, accepted by him as diagnostic, are all extremely vague, and often grading or overlapping. Of course, the species defined by these characters in most cases appeared to be hardly better (chapter 3).

A revision of the genus brought to light that in all three tropical areas the picture is dominated by one central species against which most of the others can not sharply be delimited. Moreover, these three complexes have much in common and appear to be connected by several pairs of mutually hardly separable species. This made it virtually impossible to divide the complex on the specific level (chapter 4).

In chapter 5 some theoretical considerations have been given on the possible background of such a widely spread and variable complex. A definite conclusion on this background could not be reached. Phenetically, only one species is accepted, which is named *Allophylus cobbe* (L.) Raeusch. (chapter 6).

It is advised to designate the locally recognizable forms as '*races*', defined as '*a population or a group of populations which in a restricted area is morphologically (hence probably genetically), mostly ecologically, and sometimes geographically fully or at least to appreciable degree separable from other such entities*'. These races should preferably be named informally by adding in brackets and parentheses either a specific epithet or some ecological, geographic, or morphological designation.

In chapter 8 an alphabetical enumeration is given of all the names which either have been accepted by Radlkofer, or were mentioned by him but not evaluated, or were overlooked by him, or published later. With every name critical remarks are made as to possible relationships and, if necessary, nomenclature.

I. INTRODUCTION

Basic to any study on a genus of the *Sapindaceae* is at present its treatment in Radlkofer's monograph in 'Das Pflanzenreich', Heft 98 (1931—34) (in the text abbreviated 'Radlk. Mon.'), in which the genus *Allophylus* is treated on pp. 455—604. With 169 accepted species — and several more which only have been mentioned — this was one of the largest genera of the *Sapindaceae*.

The morphological diversity for which this large number of species accounts is paralleled by a wide geographical and ecological range. These 169 species are rather evenly distributed over the tropics (in some places even penetrating the subtropics) of America (53 spp.), Africa (52 spp.), and Asia to Australia and the Pacific (64 spp.). They are as well represented — as usually small trees or exceptionally lianas — in the tropical rain-forests, as — as treelets or shrubs — in the parklands and savannahs of regions subject to periodical drought, and from the seashore — the sandy beach as well as the mangrove belt — up to 2500—3000 m high in some African mountain areas.

The morphological diversity, the wide distribution, and the adaptation to rather diverging ecological conditions make the impression of a rather long history. In how far the characters of the genus and its systematic position might lead to the same conclusion is still difficult to say. In most of its characters *Allophylus* is as specialized as many other genera of the *Sapindaceae*; only the presence of a well developed terminal leaflet can be regarded as a relatively primitive character. Systematically, it belongs to the otherwise American tribe *Thouinieae*. Among the six genera included in that tribe, *Allophylus* and its nearest ally *Thouinia* seem to represent the more primitive group. As a whole, however, *Allophylus* makes neither morphologically, nor systematically the impression of being exceptionally old.

Radlkofer's revision, and the criteria on which it was based, are ever since accepted nearly unanimously, though by some authors hesitatingly [1]). As a consequence of this most of the species described after the appearance of the revision are well comparable with those distinguished by Radlkofer himself. These new species, together with those cited but not evaluated by Radlkofer, brought the numbers for the different regions to 58 for America, 113 for Africa (among these are most of the species mentioned, but not placed by Radlkofer), and 84 for Asia and the Pacific, in all 255. Further addition of *nomina nuda*, overlooked names, and a few corrected names raised this to 270, the number of names summed up and discussed in the last chapter of the present paper.

Allophylus has a reputation of being 'difficult'. (More precise citations showing this can be found in chapter 2.) In many cases 'difficult' means that the systematic basis is either unsound or insufficiently understood. (For theoretical considerations on difficult groups see chapter 5.) Basic to a good system are a clear understanding of natural affinities and, as an expression of this, the selection of the right characters for the characterization and distinction of the taxa. (Radlkofer appears to have paid hardly any attention to the affinities of the species. A provisional and incomplete attempt by the present author can be found in chapter 8. An analysis of the characters apparently accepted as taxonomic by Radlkofer is given in chapter 3.) The understanding of natural affinities and the selection of the right taxonomic characters depend at least in part upon the availability of sufficient material from all over the area of distribution. Radlkofer cited about 1750 collections, among which 680 came from America, 375 from Africa, and 686 from Asia etc. Proportionally, Africa may be somewhat underrepresented, but the number

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[1]) The only notable exceptions I know of are C. A. Backer and E. J. H. Corner, both working on the flora of Malesia, the region where I also found Radlkofer's specific delimitation least satisfactory.

as a whole seems sufficient to gain a good insight into the relative importance of the characters, the more so as in many cases Radlkofer could study some to several duplicates of the same collection.

Historically, our knowledge of the systematics of 'difficult' groups tends to pass through the three following phases:

1. Analytical phase. New species are described from all parts of the range of the group, mostly based upon either single gatherings or locally distinct populations. The greater the number of species and the more scattered their descriptions are, the more difficult it becomes to compare and identify new collections, resulting into less and less correlation in the discrimination of further new species. Radlkofer's revision meant no more than an interruption in this course. He compiled nearly all the work done before, and combined several of the species described by his predecessors. But still he accepted 169 species, several of which described for the first time by himself. No less than 61 (36 %) of these species were known to him from one specimen only, against 41 (25 %) with 10 or more specimens, hence with at least some variation and range. Even more serious than the still great number of in many cases still ill-defined species is that Radlkofer definitely failed in bringing system in the genus. Consequently, soon after the appearance of Radlkofer's work the analytical phase resumed its chaotic course.

2. Synthetical phase. Even in a case like the present one, most botanists are reluctant to deviate from tradition. Some, however, striving after a synthesis — still the ultimate goal of systematics — will try to find system in the chaos. This will nearly always result in the reduction to synonymy of a great many of the taxa described. Even though in a few cases too many taxa may have been lumped together, if the work has been done critically and with sufficient care the gain is a clearer picture of natural affinities and a better insight in the relative taxonomic value of characters. The present paper will be considered a strong attempt of this striving for a synthesis. It even overshoots the mark as the reduction of all species to one, without any subdivision, demonstrates the apparently very close affinities within *Allophylus*, but does not bring any system in it, nor reveals the relative importance of the characters.

3. Looking for a real understanding. This is what I have tried for (see chapter 5) but what goes beyond the bounds of herbarium taxonomy, as it deserves study of populations under natural as well as under controlled conditions, including hybridisation experiments.

The present paper is a conspectus, as the title says, nothing more; a conspectus of all the species more or less accepted today, of the main characters on which their delimitation was based, and of the problems involved. It is no revision as it is not conclusive, even though a provisional taxonomic conclusion had to be drawn. The system of *Allophylus* built up during nearly two centuries is demolished on the supposition that it was a house of cards, but only slight indications have been given as to how to reach a satisfactory alternative. The value of the present paper, if any, may be that it clearly reveals the weak points in the current specific distinction in *Allophylus* and that at least an attempt has been made to work out the mutual relationships of the currently accepted species.

II. RADLKOFER AND HIS CRITICS

Though the species as delimited by Radlkofer, and the characters he considered of taxonomic importance, were accepted nearly unanimously, a closer examination of the literature concerned reveals an almost general discomfort. This will be illustrated by some citations, arranged chronologically.

It is curious that these feelings of discomfort were voiced first, most elaborate, and best by Radlkofer himself already long before the publication of his monograph. This can be found in the introduction to his paper 'Über die Gattung Allophylus und die Ordnung ihrer Arten' (Sitz. Ber. K. Bayer. Ak. Wiss. M.-Ph. Kl. Münch. 38, 1909, p. 201—240). The relevant part is too long to be quoted in full. After having discussed at some length the characters available for the delimitation of species — his main conclusions being that the flowers and fruits provide hardly any diagnostic character apart from slight differences in hairiness and dimensions and that, accordingly, recourse has to be taken to a great number of slight variations in the vegetative parts and in the anatomy, the taxonomic value of which is often unknown or even doubtful — he concluded (p. 204): 'Daraus resultiert auch die schwankende Auffassung der Arten durch verschiedene Autoren. Während die einen sehr weit gehen in der Spaltung der Arten und auf ganz nebensächliche Verhältnisse dabei Gewicht legen, sind andere geneigt, den Gesamtbestand sehr grosser Gebiete, wie das zum Beispiele für die über ein Dutzend betragenden Arten des britisch-indischen Gebietes geschehen ist, lediglich nach der Zusammensetzung des Blattes in höchstens zwei Arten zusammenzufassen. Hier einen gangbaren Mittelweg zu finden, ist, wie bei allen formenreichen Gattungen, deren Arten durch zahlreichen Zwischenformen verknüpft sind, und die darnach als jüngere, in der Ausprägung ihrer Arten noch nicht genügend geklärte Komplexe betrachtet zu werden pflegen, ausserordentlich schwierig.' (Translated: From this also result the differences in delimitation of the species by various authors. Whereas some go very far in splitting the species, setting value on fully accidental characters, others tend to combine the whole population of large areas, as has been done with the more than a dozen species of British India which, on account only of whether the leaves are compound or not, have been combined into at most two species. It is extremely difficult to steer here a satisfactory middle course, as holds true for all multiform genera of which the species are connected by many intermediates and which, accordingly, are often considered young complexes with still insufficiently delimited species.) This lack in essential characters made a primary subdivision of the genus in, say, sections impossible. To Radlkofer only one subdivision remained possible: a geographic one. He found that none of the species distinguished by him occurred in more than one continent, 'wenn auch die Ähnlichkeit zweier Arten aus verschiedene Weltteilen mitunter so weit gehen kann, dass einem nicht genügend geübten Auge die Unterscheidung etwa unter einander gemengter Materialien solcher Arten sehr schwer fallen dürfte' (op. cit. p. 205) (translated: — though two species from different continents are sometimes so closely alike that it may be very difficult to the insufficiently trained eye to separate mixed up specimens of these species).

After Radlkofer nobody has revised the genus as a whole, but some local revisions appeared. The following citations may make clear that even the revision of the material from a restricted area met with great difficulties.

Backer, already in the 'Schoolflora voor Java' (1911) 261, and later in his Flora of Java 2 (1965) 133, recognized only one species, defining this as 'extremely variable, described under many names'.

Corner, Gard. Bull. Str. Settl. 10 (1939) 39, who, when revising the genus for the Malay Peninsula, probably made the most extensive study of it, concluded: 'I wonder if there even are 10 good species in the whole genus'. Among the authors cited here he is the only one who principally not accepted Radlkofer's specific delimitation.

Hauman, Fl. Congo Belge 9 (1960) 288: 'Il résulte de ces faits une insécurité de la systématique spécialement dans certains groupes où se rangent des espèces à vaste distribution, chez lesquelles les formes de transition sont si nombreuses qu'une détermination précise est malaisée si pas impossible.' (Translated: From these facts results an uncertainty as to the taxonomy, especially in certain groups which comprise widely distributed species connected by so many intergrades that a precise identification is very difficult if not impossible.)

Dale & Greenway, Kenya Trees and Shrubs (1961) 503: 'Owing to the variation in many species the taxonomy of the genus is very unsatisfactory.'

F. White, For. Fl. N. Rhodesia (1962) 223: 'The taxonomy of this genus is more confused than that of most; it is likely to be a long time before the unsatisfactory results of earlier workers will be corrected; in the meantime collectors should concentrate on collecting samples which adequately show variation of populations.'

Exell, Fl. Zambesiaca 2 (1966) 497, who only partly accepted Radlkofer's specific delimitation: 'The taxonomy of the species of this genus is unusually difficult as nearly all the species appear to hybridize (though I know of no experimental evidence of this), the leaflets are very variable in shape and indumentum, and the flowers provide few characters of value in classification.' and 'The classification here proposed is still far from satisfactory but only experimental work can disentangle the taxonomy.'

III. AN ANALYSIS OF RADLKOFER'S MONOGRAPH

The reliability and practical value of Radlkofer's diagnostic characters have been tested in four ways, viz.:

1. by analyzing carefully the main characters used in his key;
2. by comparing the key with the descriptions;
3. by comparing the descriptions with the specimens on which they were based; and
4. by identifying specimens with the key.

1. An analysis of the main key characters.

Of course, the total number of characters used by Radlkofer in his key is rather large. Worth analysing, however, are only the most important ones: those used repeatedly as the main character to separate either groups of species or one species from a group. The number of such characters is only small. They will be treated in about the same order in which they have been used in the key.

a. As already mentioned in chapter 2, the prime subdivision is not on morphological characters, but a geographic one: *Species americanae* vs. *Species africanae* vs. *Species asiaticae et oceanicae*. Practical as it may be, this prime subdivision hampers the mutual comparison of species from different regions.

b. The first subdivision in all three geographic groups reads: *Leaves 1(—3)-foliolate* vs. *Leaves 3(—5)-foliolate* vs. *Leaves (3—)5-foliolate*, with the understanding that 5-foliolate leaves are only known from Asian species. The overlap in this first morphological character is caused by its variability in some species: *A. chartaceus, crassinervis,* and *pervillei* may have 1- or 3-foliolate leaves, *A. dimorphus* and *villosus* 3- or 5-foliolate ones. Apart from these variable ones, out of 169 species 24 are strictly 1-foliolate and only 4 strictly 5-foliolate. Apparently, even Radlkofer himself did not set much value on this character as in the species pairs *A. chartaceus — subfalcatus, A. heterophyllus — chrysoneurus, A. hirtellus — conraui, A. leucoclados — leucophloeus,* and *A. melliodorus — africanus* he himself remarked that the first of each pair is probably only a 1-foliolate form of the other. If, moreover, we realize that in several *Sapindaceae*, probably also in

Allophylus, the seedling starts with simple leaves, the unreliability of the segmentation of the leaf as a main character may be clear.

c. Next in importance the rate of branching of the inflorescence is used. This character is grading and vague. Out of some examples one may be cited to elucidate this. On p. 458 seq. of the monograph we find under I.B. the following subdivision:
a. *Thyrsi simplices vel subsimplices* (but with sp. 17: *thyrsi interdum subramosi*);
b. *Thyrsi pauciramosi, plerumque ramis 2 instructi*;
c. *Thyrsi pluriramosi, inferiores certe ramis 3—6 (infimo interdum ramulo aucto) instructi*;
d. *Thyrsi in paniculas transformati, ramis multis, partim iterum ramificatis.*
Comparable examples can be found under II.A, II.B, and III.B. Moreover, variability of this character appears to be accepted in several species.

d. Next in importance comes repeatedly the *size of the leaflets*. Of course, this character is often grading or even overlapping. Moreover, it is unreliable, being sometimes influenced by the age of the plant, often different on fertile and sterile branches, and subject to ecological conditions.

e. The same critical remarks hold true for the *texture of the leaves* which comes next in importance.

f. In many cases the character that comes in the 3rd or the 4th place is the *size of the flowerbud*. In all cases, only the relative size has been given: *Flores parvi, mediocres*, or *majores*. A comparison with the descriptions shows that the same term not always stands for the same absolute size so that, even if one knows what means large and what small in flowerbuds of *Allophylus*, one can not be sure. To cite just a few examples: in most cases *Flores mediocres* means 1½—2 mm, but in the key sub I.A.a.aa., *Flores parvi* means also 2 mm diam., whereas sub II.B.d.aa. *Flores magni* represents the same absolute value, and sub III.A.a. *Flores majusculi* corresponds with 2—2½ mm. In some other cases even the apparent contrast does in reality not exist. Two examples may illustrate this point. Sub I.A.b.aa. *Flores mediocres* is contrasted to cc. *Flores parvi*; the absolute measurements are, according to the descriptions, 1¼—2 and 2 mm resp. And sub I.B.a, where bb. *Flores mediocres* and cc. *Flores minores* are contrasted, both appear to be (1½—)2 mm. Several more of such examples could be given but these may suffice to show the unreliability of this character, apart still from the practical side, for at what stage should the growing flower bud be measured?

g. As to the further characters mention should be made only of the frequent use of the colour of the bark of the branchlets (depending on age!), of the relation in length between the inflorescence and its sustaining leaf, characters of the indumentum, fruit size, colour of dried leaves, and degree of density of the inflorescence. Though leaf anatomy is used in a few cases it plays no great part, and from the descriptions it becomes clear that Radlkofer did not lay much value on it as he accepted in some species a considerable variation.

Two more characters, though each used in one case only, deserve attention:

h. In II.B.a, b, c, and d the *number of inflorescences per axil*, whether 1 or 2, is used. Especially *A. bicruris* is mainly differentiated as it should always have paired inflorescences. When scrutinizing the four leads, however, it becomes clear already that in all cases solitary as well as paired inflorescences may occur. A study of the descriptions revealed that no species is characterized by paired inflorescences, though in some species this may occur more frequently than in others.

i. With *A. occidentalis* (sp. 9) mention is made of *pilose seeds* as its most important character. However, in only 3 species the contrary, glabrous seeds, is mentioned. Probably, glabrous seeds are by far more common — they are the rule in *c.* 35 species checked by me on this point — but the importance of the character is doubtful to me. See the comment on *A. occidentalis* in the last chapter.

The conclusion which can be drawn from the analysis of Radlkofer's most important key characters is that they are all vague and variable, and that even Radlkofer himself doubted the value of some of them. Therefore, it is to be regretted that Radlkofer numbered the species in his monograph in accordance with their sequence in the key, the more so as remarks on resemblance or possible closer relationships are rarely made. This makes it very difficult to get an impression of the mutual relationships within the genus. As it is, duplicates of the same collection may key out 40 numbers apart. This makes the identification of new collections and the inclusion of new species extremely difficult. One of the main objects of the enumeration, given in the last chapter of the present paper, is therefore to provide indications as to the possible relationships of many 'species', whether one accepts them as 'good' or not.

2. A comparison of the key with the descriptions.

A comparison of Radlkofer's key with his descriptions reveals in several cases a distinct contrast. The variability as given in the descriptions is often wider than that permitted by the key. If one tests the key with the descriptions, especially those of the more variable species may lead to some or even several names which seem to be all equally well possible.

3. A comparison of the descriptions with the specimens.

Only incidentally I have compared descriptions with (part of) the material cited. As a whole I found a good agreement, but it was not always complete. In some cases some of the diagnostic characters, like bark colour, texture of the leaves, size of the fruits, turned out to be more variable in the material than they ought to be according to the description. The fact that Radlkofer completed work on this genus mainly before 1909 — the year in which his paper 'Uber die Gattung Allophylus und die Ordnung ihrer Arten' (Sitz. Ber. K. Bayer. Ak. Wiss. M.-Ph. Kl. Münch. 38, pp. 201—240) appeared — whereas the ultimate version was only published in 1932, may account for these discrepancies. The descriptions and key were probably not always brought in accordance with the many new specimens added.

4. Testing the key.

I have tested Radlkofer's key many times, with single specimens as well as with distinct local forms, with new material as well as with specimens named by himself or with duplicates of collections cited by him. After having read the foregoing three sections nobody will be astonished that in many cases even duplicates of cited collections went wrong. Identification of different collections all obviously representing one and the same local race often led to more than one name which all seemed equally well possible. In several cases, new material did not key out under any name; it appeared to differ from all species by the same standards as used by Radlkofer. It is well understandable that this has led many a botanist to the description of new species; from the material available to me I could have added some 50 more along the same lines!

The least that can be concluded from the above is that the main characters used by Radlkofer in his key, and hence apparently assumed by him as diagnostic, are unreliable and almost useless. A careful comparison of his descriptions showed that these were also the characters on which he based the delimitations of his species. Accordingly, it could be expected that at least part of his species would be not better than the characters on which they are based. This aspect will partly be treated in the next and partly in the last chapter.

IV. MATERIAL, METHODS, AND RESULTS

In revising the *Sapindaceae* for the Flora Malesiana I was challenged by the complicated taxonomy of *Allophylus*. Originally, I restricted myself of course to the species from Malesia and adjacent regions. The rich collections from the herbaria at Bogor (BO), Leiden (L), and Singapore (SING), later complemented by material from Florence (FI), Munich (M), and Kuching (SAR) provided the material for this study. As to the region concerned, these collections were by far superior to the material studied by Radlkofer. Gradually, when I met with great difficulties in the delimitation of species, the scope of the work was broadened, at first to continental Asia, next to Africa, finally to America. From these regions far less material was available to me, but this was supplemented by descriptions and figures. Finally, all 255 species either accepted by Radlkofer, or mentioned but not evaluated by him, or described since the publication of his monograph, were included. Of these, about 125 were represented by herbarium material. The number of specimens studied amounts to *c.* 3500 sheets, about 1750 collections, that is about as much as cited by Radlkofer.

This material was mainly studied according to the comparative morphological/geographic method usual in herbarium taxonomy. Use was made of a large set of characters, including those accepted as diagnostic by Radlkofer and his followers. Some further methods tried either with part of the material only, or with material and descriptions combined, will be mentioned in chapter 5, as they had to do with some specified problems only.

In West Malesia the picture appeared to be relatively simple. The Malay Peninsula, Sumatra, and Java are each mainly inhabited by five more or less clearly distinguishable taxa. As to the Malay Peninsula, Corner (Gard. Bull. Str. Settl. 10, 1939, pp. 40—42) already reached the same conclusion. For his region he gave them the rank of varieties as the differences were in rather unimportant, mostly grading characters only; moreover, they were not sharply delimited (see also chapter 8 sub *A. cobbe*). The taxa of these three regions are more or less parallel, and differ not only morphologically but also ecologically (race from the sandy beach, race from the silt beach, lowland race, montane race). The taxa of the different islands are not identical, however. A race from one island rather tends to fill up the morphological gap separating two races from an other island, with an overlap to both sides, so that, when material from the whole of West Malesia is compared, most of the boundaries become vague and local taxa have to be combined. This may be illustrated by one example: *A. javensis* and *A. sumatranus*, both inland forms, are distinctly allied, but different: the former has simple inflorescences and a glabrous ovary, the latter has the inflorescences branched and the ovary hairy. Even in Sumatra, where the former is restricted to the southern part and the latter predominates, nearly every specimen can be identified with certainty. However, in the Malay Peninsula *A. cobbe* var. *glaber* Corner breaks down the distinction. That form shows a rather wide, but continuous variability, and includes as well specimens which are indistinguishable from *A. javensis* as those completely matching *A. sumatranus*. The variability includes both characters mentioned above: the inflorescences may be simple or compound, the ovary glabrous or hairy, both grading from one extreme to the other, and without any mutual correlation.

Turning to East Malesia, the picture becomes more complicated. Several more races which are clearly distinguishable in one part, tend to merge with the same variable population in an other part. Again, this may be illustrated by just one example: *A. timorensis*, the form of the sandy beach, and *A. racemosus*, one of the inland forms, are absolutely distinct in W. Malesia, e. g. in Java. *A. timorensis* is uniform over a great part of Malesia and even in parts of the Pacific. Towards East Malesia, *A. racemosus* merges gradually into *A. ternatus*, also an inland species; the two seem to be members of a geographic cline. In New Guinea, *A. micrococcus* is a widespread and variable species of different habitats: inland, river banks, seashore. Not only ecologically, but also morphologically it can neither be separated from *A. racemosus/ternatus*, nor from *A. timorensis*. And going from New Guinea towards the east, into the Pacific, several island species can just be placed as scarcely distinguishable local forms of the *ternatus/timorensis* complex.

The examples given are representative illustrations, no more; many others have been given in chapter 8. As a consequence of this phenomenon most of the about 35 species described from Malesia appeared to be only locally well delimited. When taking Malesia as a whole they had to be combined, leaving in the first instance only very few still distinguishable forms apart. But if one combines species this means not only that specimens are brought together under one and the same name, but also that the description, that means the range of variability of many characters, is widened. And, even if some local form is not directly connected by intermediates with any race of the complex species, it may fall completely within the description of the complex as a whole. This appeared to be the case with all further Malesian forms. So according to the method used it appeared impossible to distinguish more than one species for the whole of Malesia. This was the same conclusion as already reached by Corner, l. c.

In a case like this one the study of species from some other region may be elucidating. A careful comparison of some 'good' species may give a better idea of the relative taxonomic value of characters. An example, derived from a different group, may illustrate this point. When studying the genus *Geniostoma* (*Loganiaceae*) for the Flora Malesiana, I met with a similar problem. In Malesia about 35 forms could be distinguished on a local scale, but many of these were not sharply delimited, whereas in other cases the characters in which they differed were only very slight. Outside of Malesia, the genus was represented in the Pacific by several species, mostly restricted to one or a few islands each, with the important exception of New Caledonia, where no less than about 12 species should occur. These latter appeared to be distinctly different in several characters, and these characters were on quite an other level than those used in defining the Malesian forms. Compared with New Caledonia, all Malesian material, together with most of the species described from other islands of the Pacific, belonged to only one alliance. This led me to merge most of the Malesian and Pacific forms into one species, as to Malesia keeping separate only 3 populations from New Guinea, which all differed distinctly in some features. See further Flora Malesiana I, 6 (1963) 370.

Starting the comparison of *Allophylus* with continental Asia, it appeared that none of the species described from that part could be kept separate from the one Malesian species. Originally, *A. montanus* and *salinarius* seemed rather distinct, until they appeared to represent only pyrogenic forms. A further broadening of the comparison to Africa and America did not change the picture. In Africa nearly all species are grouped around *A. africanus*, the variability of which was already accepted as wide by Radlkofer, and was recently still more widened by Exell, Fl. Zambesiaca 2 (1966) 506—508. Attached to this complex is a series of ecotypes from drier habitats (an ecocline?) starting in

Ethiopia with *A. rubifolius* and ending with such extreme forms as *A. decipiens* from Natal and *A. decaryi* from Madagascar. In America the central species are *A. edulis* and *cominia*. In both Africa and America there are some extreme types, but even from the relatively small collections available it became clear that they are no more than extremes — often also ecologically — connected with the central group. And in Africa, especially in Madagascar, as well as in America species have been recognized which are hardly distinguishable from some forms of the one variable Asian species, differing only in some minor or grading characters. These African and American species fall on the one hand completely within the wide range of variability of the one Asian species, without, on the other hand, being anything special in their own region. A mutual comparison of the African with the American species also shows pairs which are either hardly distinguishable, or differ only in grading characters. Possibly the most striking example of these intercontinental relationships is that of *A. cominia* from the West Indies with *A. cobbe* from Ceylon: if these two species occurred in the same region hardly anybody would, or even could, keep them separate. An other example is that of *A. acutatus* (Brasil), *A. monophyllus* (S. Africa), and *A. simplicifolius* (Philippines): if these three species were described from the same region they would at least be considered close allies and one would expect that, with additional collections, the differences would further fade away. Other striking examples are: *A. cobbe* (Ceylon) — *A. nigrescens* (Madagascar) — *A. scrobiculatus* (S. America); *A. racemosus* (Malesia) — *A. bojerianus* (Africa); *A. villosus* (Asia) — *A. trichodesmus* (Madagascar). Several more examples can be found in chapter 8.

Summarizing, the broadening of the study to continental Asia, Africa, and America did not at all change the picture already gained from the Malesian material. In each continent the majority of the species forms one cohering complex without sharp boundaries. These three complexes are mutually connected by some species pairs which are hardly separable. The descriptions of these complexes overlap nearly completely. The total description after combination is about identical with the generic description. In all three major regions there are some populations which seem to be separable on morphological grounds and are isolated either geographically (some species of the Antilles) or ecologically. But all these forms were either already completely covered by the one wide description, or they differed in such futile characters and showed such clear relationships to forms already included in the complex that it seemed senseless to keep any of them separate.

V. THEORETICAL CONSIDERATIONS

From the taxonomical standpoint the result, as described in chapter 4, may be conclusive in a sense. Actually, however, it more emphasizes a problem than solving one: the problem of the cause of this wide and apparently continuous variation over such a large area. This problem is the more important as *Allophylus* represents by no means an exceptional, nor even a rare case of continuous variation. From my own studies I could cite several examples. To mention only some of the most interesting: *Canarium littorale* Bl. (*Burseraceae*; see Blumea 9, 1959, p. 337), *C. hirsutum* Willd. (op. cit. 424), *C. vitiense* A. Gray (Blumea 13, 1965, p. 166), *Dichapetalum timoriense* (DC.) Boerl. (*Dichapetalaceae*; Reinwardtia 4, 1956, p. 78), *Scaevola oppositifolia* R. Br. (*Goodeniaceae*; Fl. Males. I, 5, 1957, p. 342), *Rourea minor* (Gaertn.) Leenh. (*Connaraceae*; Fl. Males. I, 5, p. 514), *Connarus semidecandrus* Jack (op. cit. 534), *Fagraea racemosa* Wall. (*Loganiaceae*; Fl. Males. I, 6, 1962, p. 311), *F. ceilanica* Thunb. (op. cit. 315; Bull. Jard. Bot. Brux. 32, 1962, p. 420), *F. gracilipes* A. Gray (Bull. Jard. Bot. Brux. 32, 1962, p. 426), *F. berteriana* A. Gray (op.

cit. 419), *Strychnos axillaris* Colebr. (*Loganiaceae*; Fl. Males. I, 6, 1962, p. 358), and *Geniostoma rupestre* Forst. (*Loganiaceae*; op. cit. 371). These are just a few examples, more can be found in studies of many tropical groups (see e. g. Jacobs, Reinwardtia 6, 1962, p. 109 seq., on the Sapindaceous genus *Pometia*).

A comparison of *Allophylus* and the examples cited or alluded to above shows every case to be different: different in pattern of variation, in area, and/or in ecological amplitude. None is as widely distributed as *Allophylus*. But in all cases one gets the impression that both phenotypes and genotypes are involved, or in other words, that the complex species consists of a number of partly isolated and genetically defined ecological as well as geographical races and clines. This picture is in good accordance with that gained from biosystematic studies.

Without going into too much detail it may be worth while to summarize the theoretical possibilities to explain cases like those alluded to above, and especially that of *Allophylus*. These are four in number:

1. divergence;
2. convergence, including polyploidy;
3. hybridization; and
4. sibling species.

On each of these points a few remarks may suffice.

ad 1. Divergence is accepted as the normal course of evolution. Divergence means mutation and the possibility for at least some mutants to maintain themselves. This possibility largely depends on favourable ecological conditions. Conditions in the lowland of the everwet tropics are optimal for plant growth. Divergence will lead to speciation either by isolation (and continuing divergence) or by the extinction of connecting populations. Divergence with reduced extinction may lead to a wide and uninterrupted range of variability, especially when the isolation is incomplete or gradual. The area of *Allophylus*, however, extending over the tropics of four continents, is subdivided by barriers of all degrees and partly doubtless very old. If divergence with reduced extinction would provide the explanation in this case, *Allophylus* would really be a young genus, as suggested by Radlkofer (see chapter 2). This seems contradict not only to the geographic facts, but also to the ecological ones. It is true that part of the races are confined to all kinds of disturbed or secondary vegetation, but throughout the area there are also many races found exclusively in primary vegetation.

ad 2. a. Theoretically, convergence of two diverging genomes might lead to an overlap to such degree that the existing genetical barriers are completely demolished, resulting in one wide and uninterrupted range of variability. This explanation is only a delusive one, however, as only two closely related genomes could act this way. Hence, the problem is only slightly shifted back in time.

b. A well-known case of convergence of two or more well separated species into one complex with an uninterrupted and wide variability is the polyploid complex. A polyploid complex can only be disentangled biosystematically. In the herbarium it will present itself as a variable, often widely distributed, polytypic species, usually with a rather wide ecological amplitude, often including disturbed or secondary vegetations. No gross-morphological character provides indubitable evidence of polyploidy. It is possible that *Allophylus* is a polyploid complex, but positive evidence is still completely lacking. As far as I know there is not even one chromosome count. The only very slight indication may be that there is some variation in size of the pollen, especially in African species. It is known that in several, but certainly not in all cases the pollen of diploids is smaller than that of polyploids.

Apparently, polyploidy may not only lead to a complex in which still two or more well separated diploids are distinguishable, but ultimately by introgression even to the combination of these into one species, the compilospecies (see Harlan & De Wet, Evolution 17, 1963, pp. 497—501).

ad 3. Frequent hybridization between several different, but related species, though not affecting the identity of the parents, may still in the herbarium give the impression of continuous variation. Especially hybrid swarms, resulting from hybridization and back crossing, may completely fill the morphological gap between the parent species. The herbarium taxonomist may be aware of this kind of hybridization if the hybrid swarms are restricted to a few localities in the region where the more widely spread parent species overlap. An other possibility is that where the two parent species grow together a few rare hybrids are found which are either nearly completely sterile, or breed true. In this case the herbarium taxonomist will often be inclined to distinguish between three species rather than to combine them into one.

Apart from the comparison of characters, localities, and frequencies, the herbarium taxonomist has three objective criteria to recognize at least those hybrids which are partly or fully sterile. In the order of decreasing importance these are:

1. anthers not opening, often shrivelled;
2. pollen not well developed; and
3. only very few or no good seeds developed.

The last criterion, in many cases the first indication of hybridization, is nearly worthless in dioecious plants as *Allophylus* predominantly is. Only the positive, that is, plenty of good seeds, shows that fertilization was possible.

I have tested some hundreds of collections, representing 74 species in the sense of Radlkofer, with these three criteria. The anthers and the pollen (the latter always compared at 600 × enlargement) made in all cases the impression of being normal. In several fruiting specimens all or most of the seeds were very small and shrivelled, even though the fruits looked normal. As, however, in several cases one specimen of a species had only sterile seeds, another one well developed seeds, I do not set any value on this criterion. The conclusion is that hybridization, sometimes suggested as the cause of the difficulties in this genus, could not be proven. Moreover, it is hardly to be expected that this explanation would solve the problems more than locally.

ad 4. Sibling species may not be recognized as such in the herbarium. In many cases worked out biosystematically slight morphological differences between genetically well separated, but furthermore hardly distinguishable species appear to exist. These may have been overlooked by the museum worker, in several cases they will just have been underrated, however, the more so as good species mostly differ not only in morphology, but also in their ecology and geography. It seems improbable that in *Allophylus*, studied carefully by several botanists, the taxonomic important characters should always have been overlooked, or put aside for more conspicuous but unstable characters.

Summarizing, of the four theoretical possibilities discussed 1 (divergence) and 4 (sibling species) seem to be very improbable, whereas 2a (simple convergence) and 3 (hybridization) either do not provide a real.solution, or only a very incomplete one on a restricted scale. Hence, only 2b, polyploidy, is left, but absolutely unproven. This would mean that at least part of the species described in *Allophylus* might be good (apart from the case of the compilospecies), but for the time being it is impossible to say what part.

VI. CONCLUSIONS

The species concept has been, and still is, a matter of much discussion. The differing opinions mainly concentrate upon two contrasting definitions, the genetic one — a species is a reproductively isolated entity, regardless whether it is morphologically different from other such entities or not — and the phenetic one — a species is a morphologically distinct entity, mostly with the restriction that when two of these entities appear to cross freely with introgression to both sides, most will consider these two as belonging to one species.

In the case of *Allophylus*, with merely herbarium material available for study, it is clear that only the phenetic concept can be applied: it is only possible to distinguish between two or more species if they are separated by a distinct morphological gap and if nearly every sufficiently complete specimen can be referred to one of those species. As has been discussed in chapter 4, and will be shown for each species separately in chapter 8, such morphological gaps do not exist in *Allophylus*. If we knew more about the theoretical points discussed in chapter 5, if we knew whether part of the specimens, and what specimens, were hybrids, if we knew whether polyploid complexes were involved or not, if we knew whether slight and apparently unimportant morphological differences — some out of the many — were correlated with reproductive isolation, we could come to a better founded conclusion. As it is we can only conclude that, phenetically speaking, *Allophylus* consists of but one species.

What name should be given to this species? The two oldest epithets are *cobbe* and *zeylanicus*, both dating from 1753, Linnaeus' Species Plantarum. To my knowledge the two have never before been considered synonymous. The epithet *cobbe* was originally used in connection with the generic name *Rhus*, whereas *Allophylus zeylanicus* L. was the first combination under *Allophylus*. This would be a strong argument in favour of attaching the name *Allophylus zeylanicus* to the complex. Counter-arguments are 1) that *A. zeylanicus* is always used in a very strict sense, to designate a race with 1-foliolate leaves from Ceylon and southern India, and 2) that all authors who combined several of the Asian species used the name *Allophylus cobbe* for it. Joining current usage, I propose as the correct name for the only species accepted by me: *Allophylus cobbe* (L.) Raeusch. This implies that I consider all names, enumerated in chapter 8, as synonyms.

VII. PRACTICAL APPROACH

In the foregoing chapters the problem, put by *Allophylus*, has been tackled from one side only, that of the monographer working on a worldwide scale. From his standpoint the problem may be solved, whether to his satisfaction or not, by the reduction of all species to one. If the resulting species appears to be polytypic, like the present one, he will try to subdivide it on one or more infraspecific levels, again on a worldwide scale. If the variation is really continuous, however, as it appears to be in the present case, a (nearly) complete subdivision of the material on a formal infraspecific level is as impossible as it was on the specific level.

The monographer is not the only botanist who is faced with the problem of the complex species, however. His counterpart is the local botanist, working in a restricted region. To the latter the monographer's solution of the problem will in many cases appear purely theoretical, but not at all applicable to the practice of his own work. To give an example: As already shown in chapter 4, for a local botanist in some part of West Malesia who has a good knowledge of the flora of his region it is not too difficult to distinguish between 3 to 5 taxa of *Allophylus*. These taxa are clearly separable on several characters, have a different ecology, and may even be, all or in part, reproductively isolated, at least they are to all probability genetically defined. He may accept the monographer's viewpoint that they all belong to the species *Allophylus cobbe*, he may accept that in other regions, adjacent or farther away, his taxa are less clear, but he will want to separate them in his own region and to name them.

Several solutions for the problem of the infraspecific nomenclature of the complex species have been proposed. They can be arranged into the following three groups:

1. *Formal nomenclature*, making use of the infraspecific terms mentioned in the International Code of Botanical Nomenclature (Art. 4). As already discussed above, formal nomenclature, which requires a complete or nearly complete subdivision on a worldwide scale, is impossible in a case like the present one.

2. *Pseudo-formal nomenclature*, making use of a term like *lusus* not legalized by the Code. Adoption of these terms which have the appearance of formal terms and with which mostly Latin epithets are used, gives the false impression of a complete subdivision of the species on some, though low, infraspecific level. This is the reason that in my opinion a pseudo-formal nomenclature should be rejected.

3. *Informal nomenclature*, making use of terms like *group*, *population*, or *race*. This makes the arbitrary nature of the subdivision more clear. Of the terms cited, *population* is the one most used. However, this term has a definite genetical meaning and is in that sense mostly used for smaller entities. The term *group*, recently applied to subdivisions of *Allophylus africanus* by Exell (Fl. Zambesiaca 2, 1966, p. 507), is more often used at a higher level to designate some distinctly allied species. I prefer the use of the term *race*, defined as *a population or a group of populations which in a restricted area is morphologically (hence probably genetically), mostly ecologically, and sometimes geographically fully or at least to appreciable degree separable from other such entities.*

The term race being informal, the naming of these local races needs not be formal either. Many of them will be known by some binomium. In most cases it will be convenient to use the often well-known specific epithets, though after the correct name and between brackets and parentheses, like cultivars. The race of the sandy beach in West Malesia becomes then: *Allophylus cobbe* (*'timorensis'*). If no specific epithet is available, an ecological, geographic, or morphological designation should be used, e.g. *Allophylus cobbe* (*Central Javan mountain race*).

Though these local races are more important to the local botanists and ecologists, the monographer too should mention them, as well on his identification labels as in his publications. For a good monographer has also a detailed knowledge of these local races. Only by including these informally named local taxa in his monograph and by mentioning their names on his identification labels he can transmit this knowledge to the local botanist. And in this way he may prevent the use of the same racial denotation for different races in different parts of the world.

VIII. ENUMERATION AND EVALUATION

This chapter gives an alphabetical enumeration of all specific names under *Allophylus* which either

1. have been accepted by Radlkofer, or
2. have been mentioned by him but are not evaluated in his monograph, or
3. were overlooked by him, or
4. have been published after the appearance of his monograph.

Each name is followed by: the citation of the original publication; citation of the place in Radlkofer's monograph if included in it; in some cases citation of a further, more complete description or a figure. If the name was originally published in some other genus the basionym has been given with citation of the original publication. The nomenclatural status of any illegitimate name has been given. Each reference has been checked with the original, except those marked (*n. v.*). A short indication of the distributional area has been added to this first paragraph.

In the second paragraph the material studied has been mentioned, specified into type material, collections cited by Radlkofer, and further specimens.

The third paragraph gives the opinions of Radlkofer and other botanists, if any, and next my own opinion as to resemblances and/or relationship. Critical remarks concerning descrepancies between material, description, and key are added. If the name cited or its basionym is illegitimate, this paragraph is concluded by nomenclatural remarks. The only exceptions to this rule are the frequent illegitimate combinations under *Schmidelia*. *Schmidelia* L., Mantissa 1 (1767) 10, is a later homonym of the legitimate name *Schmidelia* Boehm. in Ludwig, Def. Gen. Pl. (1760) 371, which refers to a different group (it is considered a synonym of *Calophyllum* L.). In the few cases where the combination under *Allophylus* is illegitimate, the correct name has mostly been cited.

A. abyssinicus (Hochst.) Radlk. in E. & P., Nat. Pfl. Fam. 3, 5 (1895) 313; Mon. (1932) 534. — *Schmidelia abyssinica* Hochst., Flora 26 (1843) 80, *nom. illeg.* — E. Africa.

Studied: Type; 2 more specimens cit. Radlk.

Not separable from *A. nigrescens* (Madagascar); the differences in bark-colour, in apex and margin of the leaflets, in length of the petiolule, and in shape and size of the fruit, are slight only, grading, and partly overlapping. Furthermore apparently hardly different from *A. bullatus*, and distinctly related to *A. africanus* (to which it was reduced by Bak. in Oliv., Fl. Trop. Afr. 1, 1868, 421) and *integrifolius*.

A. acuminatus (Thw.) Radlk., Sitz. Ber. K. Bayer. Ak. Wiss. M.-Ph. Kl. Münch. 38 (1909) 227, 238; Mon. (1932) 555. — *Schmidelia acuminata* Thw., En. Pl. Zeyl. (1858) 55, *nom. illeg.* — Ceylon.

Studied: Type.

Reduced by Hiern (in Hook. *f.*, Fl. Br. Ind. 1, 1875, 673) as a variety to *A. zeylanicus*.

Very similar to *A. varians* (Ceylon); the differences in leaf shape and margin are very slight only, those in the length of the acumen are overlapping. On the other hand hardly different from *A. zeylanicus* (Ceylon). As well morphologically as ecologically intermediate between these two 'species': *zeylanicus* is a lowland form, *acuminatus* a riverine form, *varians* a montane form (all acc. to Trim., Fl. Ceyl. 1, 1893, 302).

A. acutatus Radlk. in Mart., Fl. Bras. 13, 3 (1900) 475, t. 101; Mon. (1932) 481. — Venezuela.

Studied: Type.

Surprisingly similar to *A. monophyllus* (S. Africa) and *A. simplicifolius* (Philippines); the differences with these two are so slight and relate to such minor characters that, if *A. acutatus* and one of these were sympatric, intermediates could be expected. Furthermore distinctly related to *A. amazonicus*.

A. africanus Pal. de Beauv., Fl. Oware Bénin 2 (1811) 75, t. 107; Radlk., Mon. (1932) 536, f. 12; Exell, Fl. Zambesiaca 2 (1966) 506. — Africa.

Studied: Type of f. *senegalensis*; several specimens cit. Radlk., representing f. *genuinus* and *senegalensis*; some more specimens.

There are certain discrepancies between on the one hand Radlkofer's key, on the other his description, or some of the specimens cited. The inflorescences may be simple instead of branched: for small-leaved specimens this leads to *A. tenuis*, probably only a depauperate form of f. *senegalensis*; the bark may be light yellowish grey to grey instead of brown: this leads either to *A. nigrescens*, or to *A. melanocarpus*; and the pedicels may be short instead of long, which leads to *A. fulvo-tomentosus*.

A. africanus is the central 'species' in Africa. Radlkofer already accepted it as widespread and variable, ranging throughout a great part of Africa, and from f. *genuinus* of the everwet tropical parts to f. *senegalensis* of periodically dry Senegal. Via f. *senegalensis* as well as via races of f. *genuinus* from the Nyassa highlands it is connected with several of the 'species' from the dry regions of E. Africa. In view of these facts it is not well understandable why Radlkofer did not draw the limits wider, and included several more 'species' in this complex. Exell, l. c., though working on a restricted region, made a considerable step on this way by including several new synonyms.

At least the following 'species' are not sharply delimited from *A. africanus* and should be included in it: *A. bicrurus, bojerianus, cataractarum, erosus, fulvo-tomentosus, griseotomentosus, holubii, kassneri, mawambensis, melanocarpus, melliodorus, nigrescens, pseudopaniculatus, rhodesicus, rubifolius, sapinii, schweinfurthii, spragueanus, subcoriaceus,* and *tenuis.* Furthermore, *A. abyssinicus, brachycalyx, crebriflorus,* and *richardsiae* are hardly different from, *A. amplissimus, gossweileri, grandifolius, longipetiolatus,* and *shirensis* more distantly related to *A. africanus* even in its more restricted sense. Outside of Africa, *A. africanus* is hardly different from *A. scrobiculatus* (Peru; I hardly hesitate to combine these two) and is very close to *A. glaber, timorensis,* and *villosus* (all SE. Asia). For a more complete argumentation may be referred to the names cited.

A. agbala Hauman, Bull. Jard. Bot. Brux. 28 (1958) 93. — Congo.

Not seen.

Apparently closely related to, or even hardly different from *A. macrobotrys* (sympatric).

A. aldabricus Radlk., Sitz. Ber. K. Bayer. Ak. Wiss. M.-Ph. Kl. München. 38 (1909) 218, 236; Mon. (1932) 519. — Aldabra Is (E. Africa).

Not seen.

The type (and only specimen known) was originally identified as *A. africanus*; apparently hardly more than a form of *A. bojerianus* (Madagascar) with simple inflorescences.

A. alnifolius (Bak.) Radlk. in E. & P., Nat. Pfl. Fam. 3, 5 (1895) 313; Mon. (1932) 521. — *Schmidelia alnifolia* Bak. in Oliv., Fl. Trop. Afr. 1 (1868) 422, *nom. illeg.* — E. Africa.

Studied: some specimens cit. Radlk.

According to Baker, l. c., related to *A. integrifolius* (Madagascar).

A savannah form, a link in the chain of grading forms adapted to the periodically dry climate of E. Africa, connecting *A. rubifolius* in the north with *A. decipiens* in the south, from both slightly different in leaf shape only. Furthermore apparently hardly different from *A. bongolavensis* (Madagascar) and *holstii* (E. Africa). See also *A. antunesii* and *rhusiphyllus*.

A. alte-scandens Haum., Bull. Jard. Bot. Brux. 28 (1958) 94. — Congo.

Not seen.

Hauman, l. c., compared it primarily with *A. chaunostachys* (Nyassaland), probably as both are lianas.

Probably rather close to *A. macrurus* and *oreophilus* (both E. Africa).

A. amazonicus (Mart.) Radlk. in E. & P., Nat. Pfl. Fam. 3, 5 (1895) 312; Mon. (1932) 480. — *Schmidelia amazonica* Mart., Flora 22, 1, Beibl. (1839) 6, *nom. illeg.* — Trop. S. America.

Studied: some syntypes; some more specimens cit. Radlk.; some further specimens.

The inflorescences are not always as long as mentioned in Radlkofer's key, they may be hardly longer than the petiole only.

Apparently hardly different from *A. loretensis* (Peru; see there); distinctly related to *A. acutatus* (Venezuela); a 1-foliolate form of *A. psilospermus* (Central America). See also under *A. puberulus.*

A. amentaceus Radlk., Sitz. Ber. K. Bayer. Ak. Wiss. M.-Ph. Kl. Münch. 38 (1909) 215, 236; Mon. (1932) 508. — Peru.

Not seen.

Whereas according to the key the inflorescence should bear more than 2 branches, Radlkofer mentions in the description of the type, being the only specimen known to him, 'thyrsi.... ramis 1—4.... aucti....'!

A. amplissimus Haum., Bull. Jard. Bot. Brux. 28 (1958) 95. — Congo.

Not seen.

Apparently related to the widespread *A. africanus,* as already suggested by its author.

A. andongensis Bak. *f.*, J. Bot. 57 (1919) 184; Radlk., Mon. (1932) 550. — Angola.

Not seen.

Type specimen cited by Radlkofer (Mon., 1932, 530) under *A. welwitschii.* See also under *A. whitei.*

A. angustatus (Triana & Planch.) Radlk. in E. & P., Nat. Pfl. Fam. 3, 5 (1895) 312; Mon. (1932) 507. — *Schmidelia angustata* Triana & Planch., Ann. Sc. Nat. Bot. 18 (1862) 371, *nom. illeg.* — Colombia.

Not seen.

A. antunesii Gilg, Bot. Jahrb. 24 (1897) 289; Radlk., Mon. (1932) 527. — Angola.

Not seen.

According to Gilg, l. c., related to *A. alnifolius* (E. Africa).

Distinctly related to *A. goetzeanus* (E. Africa), probably also to *A. cuneatus* (E. Africa) and *katangensis* (Congo). See also under *A. persicifolius* (Congo).

A. apiocarpus Radlk., Sitz. Ber. K. Bayer. Ak. Wiss. M.-Ph. Kl. Münch. 38 (1909 227, 238; Mon. (1932) 556. — Philippines.

Studied: Type.

A few specimens from Samar are vegetatively in good agreement with *A. unifoliolatus* (sympatric), the inflorescences agree completely with the present 'species', however;

they thus break down the already slight differences between the two. One of the 1-foliolate forms of *A. macrostachys* (sympatric). See under *A. simplicifolius.*

A. aporeticus (Voigt) Kurz, J. As. Soc. Beng. 44, ii (1876) 185; Radlk., Mon. (1932) 559. — *Schmidelia aporetica* Voigt, Hort. Suburb. Calcutt. (1845) 93, *nom. illeg.* — India, Burma.

Studied: some specimens cit. Radlk.; 2 more specimens.

No more than a glabrous form of *A. villosus* (sympatric; see there) as already suggested by Radlkofer.

Usually, *Ornitrophe aporetica* Roxb. is cited as the basionym. In that combination the epithet is illegitimate, however, as Roxburgh cited *Aporetica ternata* Forst. as a synonym. Voigt referred also to Roxburgh, but expressed his doubt as to Forster' s synonym; his name can be treated as new, therefore.

A. arboreus Choux, Mém. Ac. Malgache 4 (1927) 20, f. 3; Radlk., Mon. (1934) 1486. — Madagascar.

Not seen.

Probably hardly different from *A. mananarensis* (sympatric; see there); possibly identical with *A. schweinfurthii* (W. and Central Africa). See also under *A. macrocarpus.*

A. bartlettii Merr., Pap. Mich. Ac. Sc. 23 (1938) 183. — Sumatra.

Not seen.

According to Merrill, l. c., apparently most closely allied to *A. chartaceus* (Assam).

A. betongensis Craib, Kew Bull. (1926) 359; Radlk., Mon. (1934) 1489. — Thailand.

Not seen.

According to Craib very close to *A. chartaceus* (Assam); as far as can be judged from the description there seems to be hardly any reason to keep the two apart. Probably a 1-foliolate youth-form of a normally 3-foliolate 'species', e. g. *A. subfalcatus* (sympatric; see there).

A. bicruris Radlk., Sitz. Ber. K. Bayer. Ak. Wiss. M.-Ph. Kl. Münch. 38 (1909) 222, 237; Mon. (1932) 531. — Comoro Is (E. Africa).

Studied: 2 specimens.

According to Radlkofer's key and description, based upon 3 specimens, there are mostly 2 inflorescences per leaf axil. According to Choux, Mém. Ac. Malgache 4 (1927) 12—14, who apparently studied more material, the normal case is 1 inflorescence per axil. Specimens with 1 inflorescence per axil key out as *A. tenuis* (Kilimandjaro) which according to the description seems to be hardly different.

Furthermore about identical with *A. africanus, pervillei,* and *rubifolius* (all E. Africa), closely related to *A. decipiens* (S. Africa) and *racemosus* (especially the form *Schmidelia mutabilis* from Java), very similar to *A. pauciflorus* (S. America).

A. boinensis Choux, Mém. Ac. Malgache 4 (1927) 24; Radlk., Mon. (1934) 1487. — Madagascar.

Studied: 1 Syntype.

According to Choux, l. c., different from the sympatric *A. bojerianus* by the somewhat bigger inflorescences and the denser indument on the lower side of the leaflets. In the material available to me these differences are not very clear, however, and in my opinion the two are identical. At least closely related to *A. pinnatus* (sympatric; see there).

A. bojerianus (Camb.) Bl., Rumphia 3 (1843) 129; Radlk., Mon. (1932) 546. — *Schmidelia bojeriana* Camb., Mém. Mus. Hist. Nat. Paris 18 (1829) 38, *nom. illeg.* — Madagascar.

Studied: 1 specimen.

Different from *A. racemosus* (especially *Schmidelia mutabilis* from Java) mainly by the blunt, though apiculate, acumen of the leaflets. Furthermore about identical with *A. africanus*, *aldabricus* (Aldabra Is; see there), *boinensis* (sympatric; see there), and *yeru* (no more than a small-leaved form of that 'species' from E. Africa).

A. bongolavensis Choux, Mém. Ac. Malgache 4 (1927) 14, f. 2; Radlk., Mon. (1934) 1487. — Madagascar.

Not seen.

Probably identical with *A. alnifolius* (E. Africa; comparing the descriptions there seems to be no real difference; Radlkofer cites *alnifolius* also from Madagascar, Choux does not make mention of it). The shape of the leaflets reminds of *A. decipiens* (S. Africa).

A. brachycalyx Bak. *f.*, J. Bot. 57 (1919) 188; Radlk., Mon. (1932) 552. — Uganda.

Not seen.

According to Baker allied to *A. tristis* (Mozambique); in fact there seems to be hardly any difference. Furthermore, close to *A. africanus*.

A. brachypetalus Gagnep., Not. Syst. 13 (1947) 26; Fl. Gén. I.-C. Suppl. 1 (1950) 923, f. 115(1—8). — Indo-China.

Not seen.

Probably very close to *A. subfalcatus* and *glaber* (both sympatric); the main distinguishing character, the very short petals, seems to have been based upon flowerbuds in which they are always shorter than the sepals.

A. brachystachys Radlk., Sitz. Ber. K. Bayer. Ak. Wiss. M.-Ph. Kl. Münch. 38 (1909) 228, 238; Mon. (1932) 561. — Indo-China.

Studied: Type; Type of var. *attenuata.*

Hardly different from *A. hirsutus* and *villosus. A. brachystachys*, *eustachys*, *hirsutus*, and *villosus*, all from about the same region, seem to be just slight variations on the same theme, and should probably be united.

A. brevipes Radlk., Sitz. Ber. K. Bayer. Ak. Wiss. M.-Ph. Kl. Münch. 38 (1909) 216, 236; Mon. (1932) 512. — Mexico.

Not seen.

A. brevipetiolatus Radlk., Philip. J. Sc. 8 (1914) Bot. 449; Mon. (1932) 557. — Philippines.

Not seen.

Probably a depauperate form of *A. peduncularis* (sympatric; see there). See also under *A. lopezii* and *simplicifolius* (both sympatric).

A. buchananii Gilg *ex* Radlk., Sitz. Ber. K. Bayer. Ak. Wiss. M.-Ph. Kl. Münch. 38 (1909) 219, 237; Mon. (1932) 524. — Nyassaland.

Not seen.

Reduced by Exell, Fl. Zambesiaca 2 (1966) 503, to *A. chaunostachys* (sympatric). Furthermore apparently very close to *A. didymadenius* (sympatric).

A. bullatus Radlk., Sitz. Ber. K. Bayer. Ak. Wiss. M.-Ph. Kl. Münch. 38 (1909) 223, 237; Mon. (1932) 534. — Cameroons.

Not seen.

Apparently hardly different from *A. abyssinicus*, the name under which the two syntypes were originally cited, and from *A. grandifolius* (sympatric).

A. bussei Gilg *ex* Engl., Pflanzenw. Afr. 3, 2 (1921) 270, *nom. nud.* — Africa.

A. calophyllus Gilg, Bot. Jahrb. 24 (1897) 291; Radlk., Mon. (1932) 541. — E. Africa.

Not seen.

According to Gilg, l. c., close to *A. rubifolius* (NE. Africa); according to Hauman, Fl. Congo Belge 9 (1960) 297, possibly conspecific with *A. griseo-tomentosus* (sympatric). Apparently one of the small-leaved east-African races of *A. africanus*, related to *A. decipiens* in the south and to *A. holubii* (sympatric).

A. camptoneurus Radlk., Sitz. Ber. K. Bayer. Ak. Wiss. M.-Ph. Kl. Münch. 38 (1909) 224, 237; Mon. (1932) 540. — Cameroons.

Studied: Type.

Radlkofer (1932, l. c.) points to the resemblance with *A. nigrescens* (Madagascar). Possibly identical with *A. talbotii* (Nigeria; see there). Very close to *A. cobbe* (Ceylon), mainly different by the glabrous, entire leaflets with joining nerves (the latter two characters are mostly correlated). See also under *A. sapinii.*

A. camptostachys Radlk., Sitz. Ber. K. Bayer. Ak. Wiss. M.-Ph. Kl. Münch. 38 (1909) 213, 236; Mon. (1932) 498. — Mexico.

Not seen.

Hemsley (cf. Radlk. ll. cc.) originally cited the type under *A. glabratus.*

Description as given by Radlkofer (1932, l. c.) about literally conform to that of *A. strictus* (S. America); like the latter different from *A. floribundus* (Peru) only by the (mostly!) simple inflorescences. These three 'species' should doubtless be united. Furthermore identical with *A. longeracemosus* (Br. Honduras; see there); possibly closely related to *A. crassinervis* (Antilles; see there).

A. capillipes Gagnep., Not. Syst. 13 (1947) 26; Fl. Gén. I.-C. Suppl. 1 (1950) 925, f. 115(9—15). — Indo-China.

Not seen.

At least hardly different from, probably identical with *A. sootepensis* (Thailand).

A. cataractarum Bak. *f.*, J. Bot. 57 (1919) 189; Radlk., Mon. (1932) 552. — E. Africa.

Not seen.

According to Baker (l. c.) allied to *A. stachyanthus* (sympatric). Reduced by Exell, Fl. Zambesiaca 2 (1966) 508, to *A. africanus* as a fairly homogeneous local race connected by intermediates with *A. africanus s.s.* as well as with *A. africanus* '*holubii*'. See also under *A. griseo-tomentosus* and *spragueanus.*

A. caudatus Radlk., Sitz. Ber. K. Bayer. Ak. Wiss. M.-Ph. Kl. München. 38 (1909) 231, 239; Mon. (1932) 582. — Tonkin.

Not seen.

According to Radlkofer (1932, l. c.) related to *A. racemosus*, different in some points, however.

Very similar to *A. subfalcatus* (SE. Asia) from which it differs only in the somewhat longer inflorescences.

A. cazengoensis Bak. *f.*, J. Bot. 57 (1919) 183; Radlk., Mon. (1932) 550. — Angola.

Not seen.

A. chartaceus (Kurz) Radlk. in E. & P., Nat. Pfl. Fam. 3, 5 (1895) 313; Mon. (1932) 556. — *Schmidelia chartacea* Kurz, J. As. Soc. Beng. 43, ii (1874) 183, *nom. illeg.* — Assam.

Studied: 1 specimen cit. Radlk.; some more specimens.

According to Radlkofer (1932, l. c.) hardly more than a 1-foliolate (and sometimes even 3-foliolate) form of *A. subfalcatus* (sympatric); this is quite true. Furthermore about identical with *A. petelotii* (Indo-China; see there), probably so with *A. betongensis* (Thailand). Closely related to *A. hispidus* (Ceylon; see there), *sumatranus* (see there), and possibly to *A. zeylanicus* (in which 'species' Hiern, in Hook. *f.*, Fl. Br. Ind. 1, 1875, 673, included it as a var. *grandifolia*). See also under *A. bartlettii*, *simplex*, and *simplicifolius*.

A. chaunostachys Gilg, Bot. Jahrb. 30 (1901) 349; Radlk., Mon. (1932) 524. — Nyassaland.

Not seen.

According to Gilg (l. c.) related to *A. macrurus*.

Like in the group of small-leaved 'species' from the drier parts of E. Africa (see e. g. under *A. rubifolius*), the differences in the group of larger-leaved ones (*alte-scandens*, *buchananii*, *chaunostachys*, *didymadenius*, *gazensis*, *macrobotrys*, *macrurus*, *mossambicensis*, *oreophilus*, *richardsiae*, and *tenuifolius*) are hardly qualitative, it is just juggling with the same set of characters. And the difference between the large- and the small-leaved 'species' is of course only gradual too, *A. chaunostachys* being also distinctly related to *A. kilimandscharicus* and *pervillei* (Madagascar; see there). On the other hand, the group as a whole is distinctly related to *A. africanus*. See also under *A. griseo-tomentosus* and *spectabilis*.

A. chirindensis Bak. *f.*, J. Linn. Soc. Bot. 40 (1911) 48. — Mozambique.

Not seen.

Description difficult to interpret. According to its author allied to *A. welwitschii* (W. Africa).

A. chlorocarpus Radlk., Sitz. Ber. K. Bayer. Ak. Wiss. M.-Ph. Kl. München. 38 (1909) 232, 239; Mon. (1932) 586. — Philippines.

Studied: Type; 2 other specimens cit. Radlk.; some more specimens.

The differences from *A. grossedentatus* and *leptocladus* (both sympatric) are slight and grading only; also about identical with *A. concanicus* (Peninsular India) and *sumatranus*.

A. chrysoneurus Radlk. in Mart., Fl. Bras. 13, 3 (1900) 479; Mon. (1932) 488. — Brasil.

Studied: 1 Syntype.

Hardly different from *A. heterophyllus* (which differs only by being 1-foliolate; Radlkofer pointed already to the close relationship) and *melanophloeus* (see there), both sympatric.

A. cinnamomeus Radlk., Bull. Torr. Bot. Cl. 25 (1898) 336; Mon. (1932) 513. — Bolivia.

Studied: Type.

Close to *A. cominia* (Central and northern S. America), mainly different by the distinctly bigger flowers. Related to *A. excelsus* (Colombia, Venezuela). See also under *A. divaricatus.*

A. cobbe (L.) Raeusch., Nomencl. ed. 3 (1797) 108; Radlk., Mon. (1932) 594. — *Rhus cobbe* L., Sp. Pl. (1753) 267. — Ceylon, Peninsular India.

Studied: Type; some more specimens cit. Radlk.; 2 more specimens.

Hardly different from *A. cominia* (Central and S. America), *nigrescens* (Madagascar), *racemosus* (SE. Asia), and *rheedii* (SE. Asia); for argumentation may be referred to these names. Very close to *A. camptoneurus* (Cameroons; see there) and *serratus* (sympatric; specimens with simple inflorescences key out here). See also under *A. serrulatus.*

Corner, Gard. Bull. Str. Settl. 10 (1939) 40—42, who accepted also *A. cobbe* in a very wide sense, subdivided the material of the Malay Peninsula into 5 more or less distinguishable varieties. As these varieties play a role in the delimitation of the Malesian *Allophylus*, they have been included in this paper.

var. **glaber** Corner, Gard. Bull. Str. Settl. 10 (1939) 40, *nom. illeg.*, *non* O. Kuntze (1891).

Studied: Type; several specimens cit. Corner.

The specimens of *A. javensis* from the Malay Peninsula, cited by Radlkofer, are included in this variety. Part of these specimens agree completely with typical *A. javensis*; however, as the ovary may be glabrous or laxly to densely pilose, and as the inflorescences may be simple or branched, this form breaks down the differences between *A. javensis* and *sumatranus*, and some specimens agree with the latter. Furthermore, the only difference between this form and *A. cobbe* var. *villosus* Corner is in the indument, var. *glaber* being glabrous, var. *villosus* variably hairy. Hardly different from *A. longipes* (SE. Asia).

var. **limosus** Corner, Gard. Bull. Str. Settl. 10 (1939) 41.

Studied: Type; several specimens cit. Corner.

According to Corner, l. c., connected by intermediates with var. *glaber*, var. *marinus*, and var. *velutinus*. Belongs to the group of mutually connected 'species' *A. glaber*, *racemosus*, and *ternatus*; this form comes especially near the latter one. Vegetatively much resembling some races of *A. africanus* f. *genuinus.*

var. **marinus** Corner, Gard. Bull. Str. Settl. 10 (1939) 41.

Studied: Type; several specimens cit. Corner.

Identical with *A. timorensis.*

var. **velutinus** Corner, Gard. Bull. Str. Settl. 10 (1939) 41.

Studied: Type; several specimens cit. Corner.

Identical with *A. racemosus.*

var. **villosus** Corner, Gard. Bull. Str. Settl. 10 (1939) 42, *nom. illeg.*, *non* Trim. (1893).

Studied: Type; several specimens cit. Corner.

Identical with *A. villosus.*

A. cominia (L.) Swartz, Prod. (1788) 62; Radlk., Mon. (1932) 508. — *Rhus cominia* L., Syst. Nat. ed. 10, 2 (1759) 964. — Central America.

Studied: some specimens cit. Radlk.

Nearly identical with *A. cobbe* (Ceylon); a careful comparison gave the following differences: petiole on an average more terete in *cobbe*, more grooved in *cominia*, but overlapping, leaflets slightly thinner in *cobbe*, indumentum on an average somewhat denser in *cominia*. Without knowledge of the geographical origin it is impossible to distinguish between these two 'species', at least in the herbarium on the base of outer morphology. Furthermore hardly distinguishable from *A. kinlochii* (Br. Honduras; see there), probably identical with *A. coriaceus* and *densiflorus* from Peru and with *A. mollis* and *stenodictyus* from S. America (for all these see under *densiflorus*). Close to *A. cinnamomeus* (Bolivia; see there).

A. concanicus Radlk., Sitz. Ber. K. Bayer. Ak. Wiss. M.-Ph. Kl. Münch. 20 (1890) 230; Mon. (1932) 598. — Peninsular India.

Studied: Type; 1 other specimen.

A member of the *A. sumatranus*-group, probably closest to the Philippine *A. chlorocarpus* (actually, the two show hardly any difference).

A. congolanus Gilg, Bot. Jahrb. 24 (1897) 294; Radlk., Mon. (1932) 527. — Central Africa.

Studied: 3 specimens cit. Radlk.; 1 other specimen.

Gilg, l. c., points to the — doubtless distinct — resemblance with *A. spicatus* (W. Africa). Similar to *A. yeru* (E. Africa) which is only different by the larger lateral leaflets and the more sparse indumentum.

A. conraui Gilg *ex* Radlk., Sitz. Ber. K. Bayer. Ak. Wiss. M.-Ph. Kl. Münch. 38 (1909) 221, 237; Mon. (1932) 529. — Cameroons.

Not seen.

According to Radlkofer (1932, l. c.) possibly only a 3-foliolate form of the sympatric *A. hirtellus*. Furthermore apparently hardly different from *A. kiwuensis* (Central Africa), possibly close to *A. welwitschii* (W. Africa).

A. coriaceus Radlk., Sitz. Ber. K. Bayer. Ak. Wiss. M.-Ph. Kl. Münch. 38 (1909) 211, 235; Mon. (1932) 488. — Peru.

Not seen.

At least distinctly related to, possibly identical with *A. peruvianus*; both are described from Peru and from both only the type specimen is known; as to the descriptions the vegetative parts show no difference of any importance, whereas the generative parts are not well comparable, the one being known in bloom, the other one in fruit only. For further relationships see under *A. densiflorus* and *puberulus*.

A. costatus Choux, Mém. Ac. Malgache 4 (1927) 17; Radlk., Mon. (1934) 1487. — Madagascar.

Not seen.

Probably no more than a depauperate form of the sympatric *A. trichodesmus*. Choux compared only extreme representatives of these two 'species'; as well the description of *trichodesmus* given by Radlkofer (Mon., 1932, 543) as the specimen available to me (from the same locality as the type and only specimen known of *A. costatus*) are intermediate between the two.

A. crassinervis Radlk. in E. & P., Nat. Pfl. Fam. 3, 5 (1895) 312; Mon. (1932) 477. — Antilles.

Studied: Syntype; syntype of f. *cuneatus*; several specimens cit. Radlk.; 1 other specimen.

For a specimen with 3-foliolate leaves Radlkofer's key leads to *A. camptostachys* (Mexico); specimen and description are in good agreement. This would clash with my supposition about a close relationship of the latter with *A. strictus* and *floribundus*, however.

The three 'species' *A. crassinervis*, *reticulatus*, and *rigidus*, all from the Greater Antilles, and all before Radlkofer combined under the latter name, differ in such minor (and often overlapping) characters that in my opinion they should be united. Vegetatively, they are clearly distinct from most other *Allophylus*, though the flowers and fruits are of the normal kind.

A. crebriflorus Bak. *f.*, J. Bot. 57 (1919) 187; Radlk., Mon. (1932) 551. — Uganda.

Not seen.

Apparently hardly different from *A. africanus*, *hamatus* (Congo), and *schweinfurthii* (W. & Central Africa).

A. crenatus Radlk., Sitz. Ber. K. Bayer. Ak. Wiss. M.-Ph. Kl. München. 38 (1909) 234, 240; Mon. (1932) 601. — Australia.

Not seen.

Probably hardly more than a form of *A. racemosus/micrococcus/ternatus* (see under *A. micrococcus*); *A. racemosus* tends in the Lesser Sunda Is to more often branched inflorescences, together with more often crenate leaflets and smaller flowers.

A. cuneatus Bak. *f.*, J. Bot. 57 (1919) 183; Radlk., Mon. (1932) 550. — E. Africa.

Not seen.

Difficult to interpret, according to the description not far from *A. antunesii* (Angola).

A. dasystachys Gilg, Bot. Jahrb. 24 (1897) 293; Radlk., Mon. (1932) 526. — E. Africa.

Not seen.

A. dasythyrsus Radlk., Sitz. Ber. K. Bayer. Ak. Wiss. M.-Ph. Kl. München. 38 (1909) 231, 239; Mon. (1932) 582. — Philippines.

Studied: Type.

Very similar to *A. filiger* (different from that 'species' by the stiffer inflorescences and the smaller and narrower leaflets; Merrill, En. Philip. 2, 1923, 494, as well as Radlkofer, 1932, l. c., point to this close relationship) and *racemosus* (different only by the somewhat longer inflorescences; one specimen, included by Radlkofer under *A. racemosus*, belongs in my opinion to *dasythyrsus*). Two glabrous specimens from Luzon connect the present 'species' with *A. granulatus* and *macrostachys*. All four are sympatric.

A. decaryi Danguy & Choux, Bull. Mus. Hist. Nat. Paris 32 (1926) 388; Radlk., Mon. (1934) 1487. — Madagascar.

Studied: Type.

Probably only a depauperate form of *A. decipiens* (S. Africa), different only by the slightly sparser pubescence and the smaller, less but deeper lobed, and differently coloured leaflets.

A. decipiens (Sonder) Radlk. in E. & P., Nat. Pfl. Fam. 3, 5 (1895) 313, *sphalm. 'dicipiens'*; Mon. (1932) 522. — *Rhus decipiens* E. Mey. *ex* Drège, Cat. Pl. Exs. Afr. Austr. (1839) 26, *nom. nud., non* W. & A. (1834). — *Schmidelia decipiens* W. A., Hook. J. Bot. 3 (1840) 152, *nom. subnud.*; Presl, Abh. K. Böhm. Ges. Wiss. V, 3 (1845) 471, *nom. nud.*; Walp. Ann. 1 (1848) 134, *nom. nud.*; *ex* Sonder in Harvey & Sonder, Fl. Cap. 1 (1860) 239, *nom. illeg.* — S. Africa.

Studied: 3 Syntypes; 4 more specimens cit. Radlk.

As a member of the E. African ecocline to be inserted between *A. alnifolius* towards the north and *A. decaryi* in Madagascar; not sharply delimited against the former, no more than a grading change in leaf shape being concerned, connected with the latter by an intermediate specimen from Madagascar. Furthermore insufficiently delimited against *A. melanocarpus* (sympatric; the latter differs by the slightly bigger, though overlapping, leaflets and the sometimes branched inflorescences) and *A. spicatus* Fourc. (sympatric; see there). Close to *A. bicruris* (Comoro Is). Compare also *A. bongolavensis* and *calophyllus.*

The nomenclature is complicated. *Rhus decipiens* is invalid, being as well a *nomen nudum* as a later homonym. *Schmidelia decipiens* W. A. can not be regarded as valid, as only a few characters are mentioned to argument that a group of three species, this being one of them, should be included in *Schmidelia* instead of in *Rhus*; no further differentiation between these three species has been given. Sonder (l. c.) first published the name *Schmidelia decipiens* validly, though illegitimately. He cited two further heterotypic epithets, but these could not be used: *Schmidelia undulata* (*non* Jacq.) Presl was a misapplied name as pointed out further down ('*Rhus undulata* Jacq. .... differs ....'); *Rhus spicata* Thunb. was legitimate, but the epithet was already used in *Schmidelia*, as well as in *Allophylus.*

A. densiflorus Radlk., Sitz. Ber. K. Bayer. Ak. Wiss. M.-Ph. Kl. Münch. 38 (1909) 211, 235; Mon. (1932) 489. — Peru.

Not seen.

According to MacBride, Fl. Peru 3A (1956) 370, near *A. coriaceus*, '.... less pubescent, perhaps a variant; the panicles are sometimes a little branched; both species, with .... *A. stenodictyus* .... are very near *A. mollis* .... with somewhat broader leaves .... The extent of branching accepted by the monographer to distinguish these two similar shrubs certainly is not constant in development. Furthermore, these forms appear to be doubtfully distinct specifically from the more northern widely ranging *A. cominia* .... with perhaps more serrulate leaflets.' As a possible further variant of the same complex species he mentions *A. incanus*. These are all either sympatric or neighbouring 'species'.

According to the description also hardly different from *A. quercifolius* (Brasil).

A. didymadenius Radlk., Sitz. Ber. K. Bayer. Ak. Wiss. M.-Ph. Kl. Münch. 38 (1909) 219, 237; Mon. (1932) 525. — Nyassaland.

Not seen.

A member of the group referred to under *A. chaunostachys*, apparently closest to *A. buchananii* (sympatric).

A. dimorphus Radlk., Sapind. Holl.-Ind. (1879) 17, 56; Mon. (1932) 602. — Philippines.

Studied: Type; several specimens cit. Radlk.; some more specimens.

The link between the Philippine 5- and 3-foliolate 'species', among the former identical to *A. insignis* and *quinatus* (see under these names), among the latter to *A. filiger* (from which only distinguishable by the smaller leaflets). Compare also *A. malvaceus*.

A. dioicus (Nees & Mart.) Radlk. in E. & P., Nat. Pfl. Fam. 3, 5 (1895) 312; Mon. (1932) 479. — *Thouinia dioica* Nees & Mart., Nov. Act. Ac. Caes. Leop.-Car. 12, 1 (1824) 21, t. 4. — Brasil.
Studied: 1 specimen cit. Radlk.
Relationships uncertain.

A. distachys (DC.) Radlk. in E. & P., Nat. Pfl. Fam. 3, 5 (1895) 313; Mon. (1932) 576. — *Schmidelia distachya* DC., Prod. 1 (1824) 610, *nom. illeg.* — NE. India.
Studied: 2 specimens cit. Radlk.; 1 other specimen.
According to Radlkofer (1932, p. 577) only a form of *A. subfalcatus* with often 2 inflorescences per axil. In my opinion the two are doubtless the same.

A. divaricatus Radlk. in Mart., Fl. Bras. 13, 3 (1900) 493; Mon. (1932) 512. — Brasil, Peru.
Studied: 1 Syntype; 2 more specimens cit. Radlk.; 1 other specimen.
MacBride, Fl. Peru 3A (1956) 371, cites *A. cinnamomeus* (Bolivia) and *A. incanus* (Ecuador, Colombia) as close allies. In my opinion also distinctly related to *A. scrobiculatus* (sympatric; see there). See also under *A. nitidulus* and *stenodictyus*.

A. dregeanus (Sond.) De Winter, Bothalia 6 (1954) 407, *nom. illeg.* — *Schmidelia dregeana* Sond. in Harv. & Sond., Fl. Cap. 1 (1860) 239, *nom. illeg.* — S. Africa.
Published as a new name for *A. monophyllus* (for commentary see there). Illeg. as the legitimate name *A. monophyllus* has been cited as a synonym; the accepted 'older' epithet was derived from an illegitimate combination.

A. dummeri Bak. *f.*, J. Bot. 57 (1919) 187; Radlk., Mon. (1932) 551. — Uganda.
Not seen.
As far as can be judged from the description closely related to or possibly identical with *A. shirensis* from about the same region. See also under *A. ussheri*.

A. edulis (St. Hil.) Radlk. in Warming, Vid. Medd. Nat. For. Kjøbenhavn (1890) 995 (*n. v.*); Mon. (1932) 493. — *Schmidelia edulis* St. Hil., Juss. & Camb., Pl. Us. Bras. (1828) t. 67, *nom. illeg.* — S. America.
Studied: several specimens of var. *edulis* and var. *gracilis*, most of them cit. Radlk.
A. edulis takes in South America about the same central position as *A. africanus* in Africa. Radlkofer already accepted both as variable — in both cases he distinguished between some varieties — and widespread, and in either case it is not well comprehensible why he did not draw the limits wider. In the case of *A. edulis* at least *A. guaraniticus* (connected with var. *gracilis* by intermediates), *haitiensis* (see there), *punctatus* (hardly more than a large and especially broad leaved form of var. *edulis*), *pauciflorus* (identification of var. *gracilis* leads to this name), and *quercifolius* (Radlkofer cites a specimen as intermediate between that 'species' and var. *gracilis*) should have been included. Other doubtless closely allied 'species' are *A. laevigatus* and *melanophloeus*. See also under *A. puberulus*.

A. elongatus Radlk., Sitz. Ber. K. Bayer. Ak. Wiss. M.-Ph. Kl. München. 38 (1909) 221, 237; Mon. (1932) 529. — Tanganyika.

Not seen.

Apparently from the relationship of *A. rubifolius* (NE. Africa).

A. erlangeri Gilg *ex* Engl., Pflanzenw. Afr. 3, 2 (1921) 269, *nom. nud.* — Africa.

A. erosus Radlk. [in E. & P., Nat. Pfl. Fam. 3, 5 (1895) 313, *nom. nud.*] Sitz. Ber. K. Bayer. Ak. Wiss. M.-Ph. Kl. München. 38 (1909) 225, 238; Mon. (1932) 544. — *Schmidelia erosa* Presl, Abh. K. Böhm. Ges. Wiss. V, 3 (1845) 471, *nom. nud.*; Walp. Ann. 1 (1848) 133, *nom. nud.* — S. Africa.

Studied: 1 specimen cit. Radlk.; some more specimens.

So close to the E. African specimens of *A. africanus* f. *genuinus* that I do not understand that Radlkofer kept this separate. In my opinion it only represents an extreme ecotype of *A. africanus*. Erroneously renamed *A. natalensis*.

A. eustachys Radlk., Kew Bull. (1912) 264; Mon. (1932) 580. — Thailand.

Studied: Type; 1 other specimen.

Radlkofer (1932, l. c.) points to *A. javensis* for comparison (which is different by being fully glabrous), Gagnepain (Fl. Gén. I.-C. Suppl. 1, 1950, 922) to *A. trichophyllus* (Hainan). In my opinion indistinguishable from *A. villosus* (sympatric).

A. excelsus (Triana & Planch.) Radlk., Sitz. Ber. K. Bayer. Ak. Wiss. M.-Ph. Kl. Münch. 20 (1890) 230; Mon. (1932) 515. — *Schmidelia excelsa* Triana & Planch., Ann. Sc. Nat. Bot. IV, 18 (1862) 371, *nom. illeg.* — Colombia, Venezuela.

Studied: 1 specimen cit. Radlk.

Probably insufficiently delimited from *A. goudotii* (sympatric; slightly different in leaf shape and indument only). Apparently close to *A. paniculatus* (Peru), doubtless related to, though different from *A. cinnamomeus* (Bolivia).

A. ferrugineus Taub. in Engl., Pfl. Welt Ostafr. C. (1895) 249; Radlk., Mon. (1932) 526. — E. Africa.

Not seen.

Compared by its author with *A. magicus* Taub. = *A. spicatus* Radlk.

According to Hauman, Fl. Congo Belge 9 (1960) 307, possibly mixed up with *A. macrobotrys* (sympatric); at least very close to that 'species', different only in some minor characters.

A. filiger Radlk., Sapind. Holl.-Ind. (1879) 17, 56; Mon. (1932) 583. — Philippines.

Studied: Type; several specimens cit. Radlk.; some more specimens.

Identical to or hardly separable from *A. dasythyrsus*, *dimorphus*, and *macrostachys* (all sympatric; see under these names); close to *A. malvaceus* (sympatric).

A. floribundus (Poepp. & Endl.) Radlk. in E. & P., Nat. Pfl. Fam. 3, 5 (1895) 312; Mon. (1932) 502. — *Schmidelia floribunda* Poepp. & Endl., Nov. Gen. Sp. 3 (1843) 38, *nom. illeg.* — Peru.

Studied: 1 specimen cit. Radlk.

Our specimen has a strongly branched inflorescence; furthermore it is a good match.

According to MacBride, Fl. Peru 3A (1956) 373, probably identical with *A. leiophloeus*, also from Peru.

Not well separable from *A. petiolulatus* (adjacent Brasil), *camptostachys* (Mexico), *leptostachys*, and *strictus* (latter two Brasil and Bolivia), different from the former only by the somewhat smaller flowers (1½ instead of 2 mm), whereas the latter three represent forms with not or only slightly branched inflorescences (see for more details under these names). Apparently close to *A. glabratus* (Colombia).

A. fulvo-tomentosus Gilg, Bot. Jahrb. 24 (1897) 293; Radlk., Mon. (1932) 542. — Trop. E. Africa.

Studied: 1 specimen.

According to Radlkofer (l. c.) closely related to *A. africanus* f. *senegalensis*, if not a subforma of that form different only by the denser, sufferrugineous indument. Radlkofer cites a specimen intermediate between the two.

In my opinion certainly to be combined with *A. africanus* — connection via *A. kassneri* (Congo; see there) —, on the other hand hardly more than a link in the chain of small leaved E. African species, different mainly by the branched inflorescence. See also under *A. rutete*.

A. fuscus Radlk., Sitz. Ber. K. Bayer. Ak. Wiss. M.-Ph. Kl. Münch. 38 (1909) 229, 238; Mon. (1932) 564. — Indo-China.

Studied: Type.

Intermediate between *A. glaber* (*Jenkins HB 14469*, Assam, is in good agreement with *A. glaber*, differs from *fuscus* only by being fully glabrous) and *A. hirsutus* (different by being more hairy), sympatric with both. Closely related to *A. sootepensis* (Thailand; that differs by the green and more coarsely serrate leaflets and by being as a whole less hairy) and to *subfalcatus* (sympatric; mainly different by the slightly longer inflorescences and by being about glabrous, but there are intermediates). See also under *A. macrodontus*.

A. gardineri Summerhayes, Kew Bull. (1928) 389; Radlk., Mon. (1934) 1486. — Seychelle Is.

Studied: 1 specimen.

Summerhayes pointed to *A. chartaceus* (Assam) and *pervillei* (Madagascar) to compare it with; it appears to fall completely within the range of variability of the latter and has hence to be combined with it.

A. gazensis Bak. *f.*, J. Bot. 57 (1919) 182; Radlk., Mon. (1932) 550.— Mozambique.

Not seen.

Baker already pointed to the relationship with *A. chaunostachys* (Nyassaland) from which 'species' it should differ by the larger leaflets and the longer petiolule of the terminal leaflet. Exell, Fl. Zambesiaca 2 (1966) 503, reduced it to that 'species'.

A. glaber (Roxb.) Boerl., Handl. 1 (1890) 284, *nom. illeg.*; Radlk., Mon. (1932) 566. — *Ornitrophe glabra* Roxb., [Hort. Beng. (1814) 28, *nom. nud.*] Fl. Ind. 2 (1832) 267, *nom. illeg.* — S. and SE. Asia.

Studied: a copy of Roxburgh's drawing; several specimens cit. Radlk.; several more specimens.

The glabrous form of *A. racemosus* (sympatric; see there) as already remarked by Radlkofer; in Java the two are connected by many intermediates. Furthermore not or hardly separable from *A. fuscus* (sympatric; see there), *javensis* (as the bark colour, the main distinguishing character according to Radlkofer, varies), *macrostachys* (Philippines; a form with longer inflorescences), *ternatus* (intermediates from Java and the

Philippines), and *timorensis* (ditto). Close to *A. africanus* (with mostly branched inflorescences), *brachypetalus* (sympatric; see there), *subfalcatus* (sympatric), and *varians* (Ceylon; 1-foliolate). See also under *A. cobbe* var. *limosus.*

The epithet *glaber* is illegitimate as Roxburgh gave two synonyms. The oldest available epithet not used before in *Allophylus* is *triphyllus* (from *Usubis triphyllus* Burm. *f.*), hence the correct name is **A. triphyllus** (Burm. *f.*) Merr., Philip. J. Sc. 19 (1921) 363.

A. glabratus (Kunth) Radlk. in E. & P., Nat. Pfl. Fam. 3, 5 (1895) 312; Mon. (1932) 503. — *Schmidelia glabrata* Kunth in H. B. K., Nova Gen. Sp. 5 (1821) ed. qu. 122, *nom. illeg.* — Colombia.

Not seen.

Probably identical to *A. floribundus* (Peru), *leiophloeus* (Peru), and *petiolulatus* (Brasil). See under *A. camptostachys* and *leiophloeus.*

A. goetzeanus Gilg, Bot. Jahrb. 28 (1900) 423; Radlk., Mon. (1932) 527. — Trop. E. Africa.

Not seen.

According to its author from the relationship of *A. rubifolius.* Within that relationship in my opinion closest to (possibly indistinguishable from) *A. tenuis* (sympatric), distinctly related to *A. antunesii* (Angola), furthermore probably to *A. katangensis* (Congo).

A. gossweileri Bak. *f.*, J. Bot. 57 (1919) 186; Radlk., Mon. (1932) 551. — Angola.

Not seen.

Probably from the relationship of *A. africanus*; Baker points especially to *A. zenkeri* (Cameroons) to compare it with.

A. goudotii (Triana & Planch.) Radlk., Sitz. Ber. K. Bayer. Ak. Wiss. M.-Ph. Kl. München. 20 (1890) 230; Mon. (1932) 514. — *Schmidelia goudotii* Triana & Planch., Ann. Sc. Nat. Bot. IV, 18 (1862) 372, *nom. illeg.* — Colombia.

Not seen.

Triana & Planchon (l. c.) pointed to *Schmidelia mollis* (= *Allophylus myrianthus*) for comparison. It appears that *A. goudotii* differs only from that 'species' in the smaller and thinner leaflets and by being less hairy; the two are sympatric and doubtless the same. Furthermore probably identical with *A. excelsus* (sympatric; see there) and apparently close to *A. paniculatus* (Peru).

A. grandiflorus Radlk., Sitz. Ber. K. Bayer. Ak. Wiss. M.-Ph. Kl. München. 38 (1909) 228, 238; Mon. (1932) 559. — Cochinchina, Hainan.

Studied: 1 specimen cit. Radlk.; 2 other specimens.

Insufficiently delimited against *A. subfalcatus* (SE. Asia), different only by the shorter inflorescences. Compare also *A. longifolius.*

A. grandifolius (Bak.) Radlk. in E. & P., Nat. Pfl. Fam. 3, 5 (1895) 313; Mon. (1932) 532. — *Schmidelia grandifolia* Bak. in Oliv., Fl. Trop. Afr. 1 (1868) 421, *nom. illeg.* — Cameroons.

Studied: 4 specimens cit. Radlk.

Apparently hardly different from *A. bullatus* (sympatric) and *megaphylla* (Nigeria). Further close relatives seem to be. *A. le-testui* (Gabon; see there), *longicuneatus* (W. and Central Africa; see there), and *oyemensis* (Gabon; see there). Belongs to the wider relationship of *A. africanus.*

A. granulatus Radlk., Philip. J. Sc. 8, Bot. (1914) 451; Mon. (1932) 577. — Philippines.

Studied: Type; 1 other specimen.

Very similar to the Philippine forms *A. dasythyrsus* (see there), *hymenocalyx* (see there), and *unifoliolatus* (the 1-foliolate form), furthermore to *A. javensis* (Radlkofer, 1932, l. c., pointed already to this relationship).

A. griseo-tomentosus Gilg, Bot. Jahrb. 24 (1897) 290; Radlk., Mon. (1932) 540. — Trop. E. Africa.

Studied: 1 Syntype; 2 other specimens.

According to Radlkofer (l. c.) certainly closely related to *A. africanus*, if not a form of it or even a subform of f. *genuinus*; reduced to that 'species' by Exell, Fl. Zambesiaca 2 (1966) 506 ('.... does not appear to be more than a hairy form of *A. africanus*. It has much the same distribution and *A. griseo-tomentosus* forma *glabrior* Radlk. .... is an intermediate.').

A. griseo-tomentosus is one of the 'large leaved E. African forms', apparently a series of links between *A. africanus s. s.* and the group of small leaved forms from the mountainous or drier areas of E. Africa and Madagascar. Other members of this series are *A. rubifolius* in the north, *cataractarum*, *holubii*, and *stachyanthus* in the central part, *richardsiae* and *spragueanus* in Rhodesia, and *melanocarpus* in the south. *A. griseo-tomentosus* is especially related to and not always separable from *A. calophyllus* (sympatric; see there), *holubii* (sympatric; according to Exell, l. c., connected by intermediates), *melanocarpus* (S. Africa; Radlkofer, l. c., makes mention of an intermediate specimen; the differences between these two are very slight indeed), *richardsiae* (Rhodesia; see there), *rubifolius* (NE. Africa; Gilg, l. c., already pointed to this relationship, the main difference being according to him the branched inflorescence of the present species; see, however, also under that name), *stachyanthus* (sympatric; different mainly by the more spicate inflorescences and the serrate leaflets of the latter), and *tristis* (Mozambique; see there). See also under *A. chaunostachys*.

A. grossedentatus (Turcz.) F.-Vill., Nov. App. (1880) 51; Radlk., Mon. (1932) 585. — *Schmidelia grossedentata* Turcz., Bull. Soc. Nat. Mosc. 31, 1 (1858) 401, *nom. illeg.* — Philippines.

Studied: Type; 1 other specimen cit. Radlk.; some more specimens.

Insufficiently delimited against the Philippine forms *A. hymenocalyx* (see there), *leptocladus* (which differs mainly by its indument and the far more slender inflorescences), *repando-dentatus*, and *subinciso-dentatus* (the latter two different by the more strongly branched inflorescences). Hardly more than a coarse form of *A. javensis* with the leaflets more coarsely dentate (though this can be found in *javensis* too) and with a more robust inflorescence which is often (but not always) slightly branched, ovary pilose; in part of these characters intermediate between *javensis* and *sumatranus*. Further allies are *A. chlorocarpus* (sympatric; it differs by the lighter bark and the less deeply incised leaflets), *micrococcus* (New Guinea; some specimens show a surprising resemblance), and *samarensis* (sympatric; 1-foliolate).

A. guaraniticus (St. Hil.) Radlk. in E. & P., Nat. Pfl. Fam. 3, 5 (1895) 312; Mon. (1932) 489. — *Schmidelia guaranitica* St. Hil., Bull. Soc. Philom. (1823) 133, *nom. illeg.* (*n. v.*). — S. America.

Studied: 1 specimen cit. Radlk.; 3 other specimens.

Connected by intermediates (*Bertoni 1538*, Argentina; *Hassler 11801*, Paraguay) with

A. edulis var. *gracilis*; no more than a hairy form of *edulis* with slightly smaller leaflets, shorter inflorescences, and the leaf margin more dentate. Also hardly different from *A. pauciflorus* (Bolivia) and *quercifolius* (Brasil); see under these names. Comparable with the E. African forms *A. melanocarpus* and *decipiens.*

A. haitiensis Radlk. & Ekm., Ark. Bot. 21, A, 5 (1927) 13; Radlk., Mon. (1932) 501. — Haiti.

Studied: Type.

Not separable from *A. edulis* (S. America): *A. haitiensis* falls completely within the fairly wide range of variability of that 'species'; according to the key it should be different by the branched inflorescences, in the M sheet of the type, however, the branching is very slight, and in *edulis* the inflorescence is sometimes also slightly branched. Much resembling the 1-foliolate *A. reticulatus* (Cuba). The relationship with *A. petiolulatus* (Brasil, Bolivia) specially stressed by Radlkofer (1932, l. c.) is somewhat less close.

A. hamatus Vermoesen *ex* Haum., Bull. Jard. Bot. Brux. 28 (1958) 95. — Congo.

Not seen.

Probably nearest to *A. crebriflorus* (Uganda), *schweinfurthii* (sympatric), and *touracus* (W. Afr.), specially characterized by the thorny twigs.

A. hayatae Gagnep., Not. Syst. 13 (1947) 27. — Indo-China.

Not seen.

Apparently hardly different from *A. villosus*, a 'species' from adjacent regions which also can have 5-foliolate leaves.

A. heterophyllus (Camb.) Radlk. in E. & P., Nat. Pfl. Fam. 3, 5 (1895) 312; Mon. (1932) 480. — *Schmidelia heterophylla* Camb. in St. Hil., Fl. Bras. Mer. 1, fol. ed. (1828—9) 296, t. 82, *nom. illeg.* — Brasil.

Studied: some specimens cit. Radlk.

According to Radlkofer (1932, l. c.) the 1-foliolate form of *A. chrysoneurus* and the velutinous form of *A. leucoclados* (both sympatric); conspecific with both. Even hardly more than a 1-foliolate form of *A. villosus* (SE. Asia).

The name *Schmidelia heterophylla* is not only illegitimate as a combination under *Schmidelia*, but also by the citation of *Thouinia dioica* Nees & Mart. as a synonym. Radlkofer could legitimately use the epithet, however, as he excluded the synonym, basing another combination in *Allophylus* on it.

A. hirsutus Radlk., Sitz. Ber. K. Bayer. Ak. Wiss. M.-Ph. Kl. Münch. 38 (1909) 228, 238; Mon. (1932) 562. — SE. Asia.

Studied: Type; some more specimens.

Hardly different from *A. brachystachys* (sympatric; see there), *fuscus* (sympatric; see there), *racemosus* (sympatric; F. N. Williams, Bull. Herb. Boiss. II, 5, 1905, 221, originally published the type under the name of *A. fulvinervis* which is a synonym of *A. racemosus*), *trichophyllus* (Hainan; see there), and *villosus* (sympatric; see there).

A. hirtellus (Hook. *f.*) Radlk. in E. & P., Nat. Pfl. Fam. 3, 5 (1895) 312; Mon. (1932) 516. — *Schmidelia hirtella* Hook. *f.* in Hook., Niger Fl. (1849) 248, t. 25, *nom. illeg.* — W. Africa.

Not seen.

Apparently very similar to *A. nigericus* (see there) and, as already pointed out by Radlkofer (1932, l. c.), a 1-foliolate form of *A. conraui*, both from the same region.
The name *Schmidelia hirtella* Hook. *f.* is not only illegitimate as a combination under *Schmidelia*, but also as it is a superfluous new name for *Schmidelia monophylla* Hook. *f.* (1848), *non* Presl (1845) which was a *nom. nud.* In *Allophylus*, however, the epithet *monophyllus* could not be used.

A. hispidus (Thw.) Trim., Ceylon Br. J. R. As. Soc. 9 (1885) 20; Radlk., Mon. (1932) 554. — *Schmidelia hispida* Thw., En. Pl. Zeyl. (1858) 55, *nom. illeg.* — Ceylon.
Studied: Type.
Reduced by Hiern (in Hook. *f.*, Fl. Br. Ind. 1, 1875, 673) as a variety to *A. zeylanicus.* Closest to *A. chartaceus* (Assam) from which it differs by the hairiness and the shorter inflorescences; belongs to the wider relationship of *A. villosus.*

A. holophyllus Radlk. in Merr., Philip. J. Sc. 9 (1914) Bot. 106; Mon. (1932) 593. — Marianas.
Studied: Type; 1 other specimen.
According to Radlkofer (1932, l. c.) related to *A. timorensis.* In my opinion it falls completely within the range of variability of *A. sumatranus.*

A. holstii Gilg *ex* Engl., Pflanzenw. Afr. 3, 2 (1921) 270. — E. Africa.
Not seen.
The only African species in complete accordance with the few facts known (collected by Holst, common near Dar-es-Salaam, lateral leaflets small, obovate) is *A. alnifolius.*

A. holubii Bak. *f.*, J. Bot. 57 (1919) 189; Radlk., Mon. (1932) 552. — E. Africa.
Not seen.
According to its author 'allied to *A. stachyanthus*'; in my opinion there is nothing in his description not in accordance with Radlkofer's description of that species, also from E. Africa. Exell, Fl. Zambesiaca 2 (1966) 506, reduced it to *A. africanus* and mentioned (p. 508) luxuriant specimens transitional to *A. griseo-tomentosus* (sympatric), specimens transitional to *A. cataractarum* (sympatric), and a specimen with characters possibly derived from *A. rubifolius* (NE. Africa). In my opinion there is furthermore a close relationship with *A. calophyllus* (sympatric).

A. hylophilus Gilg, Bot. Jarhb. 24 (1897) 294. — Cameroons.
Not seen.
According to Gilg closest to *A. monophyllus* (S. Africa) and *pervillei* (Madagascar); geographically, this seems improbable.

A. hymenocalyx Radlk., Sitz. Ber. K. Bayer. Ak. Wiss. M.-Ph. Kl. München. 38 (1909) 229, 238; Mon. (1932) 565. — Philippines.
Studied: Type; 2 other specimens cit. Radlk.
In the type the inflorescences are simple, in both other specimens they bear at least 1 rather strong branch. These latter specimens key out as *A. grossedentatus* (sympatric) and there appears to be no real difference. Specimens with simple inflorescences are not really different from *A. granulatus* (sympatric): the leaflets should be chartaceous in *granulatus*, stiff-coriaceous in *hymenocalyx*, in reality they are in both rather thick- and stiff-chartaceous.

A. imenoensis Pelleg., Bull. Soc. Bot. Fr. 100 (1953) 190. — Gabon.
Not seen.
Probably close to *A. schweinfurthii* (sympatric).

A. incanus Radlk., Sitz. Ber. K. Bayer. Ak. Wiss. M.-Ph. Kl. Münch. 38 (1909) 216, 236; Mon. (1932) 513. — Ecuador, Colombia.
Studied: Type; 1 other specimen.
According to the description hardly different from *A. mollis* (northeast S. America). See also under *A. densiflorus* and *divaricatus.*

A. insignis Radlk., Sitz. Ber. K. Bayer. Ak. Wiss. M.-Ph. Kl. Münch. 38 (1909) 234, 240; Mon. (1932) 604. — Philippines.
Studied: Type; 1 specimen cit. Radlk.
Identical with *A. dimorphus* (sympatric): the leaves are sometimes also 3-foliolate, the differences in incision of the leaflets and in length of the petiolules do in reality not exist. Compare also *A. malvaceus.*

A. integrifolius (Willd.) Bl., Rumphia 3 (1843) 129, *nom. illeg.*; Radlk., Mon. (1932) 531. — *Ornitrophe integrifolia* Willd., Sp. Pl. 2, 1 (1799) 322. — Madagascar, Mascarenes, Seychelle Is.
Studied: Types of *Ornitrophe borbonica* and *Allophylus commersonii*; 3 other specimens cit. Radlk.; some more specimens.
Identical with *A. salignus* (Madagascar); hardly different from *A. abyssinicus, macrocarpus* (Madagascar; see there), *nigrescens* (Madagascar), *sechellensis* (see there), and *serrulatus* (Deccan).
The name is illegitimate as Blume included the type of *Ornitrophe borbonica* Gmel., 1791 (*Commerson 415*). It is even possible that the same collection was also the type of *Ornitrophe integrifolia,* in which case the latter was a superfluous name.

A. jamaicensis Radlk. in Urban, Symb. Antill. 5 (1908) 407; Mon. (1932) 506. — Jamaica.
Studied: 1 Syntype.

A. javensis (Bl.) Bl., Rumphia 3 (1843) 126; Radlk., Mon. (1932) 578. — *Schmidelia javensis* Bl., Bijdr. (1825) 232, *nom. illeg.* — Malesia.
Studied: Types incl. those of all varieties described; several specimens cit. Radlk.; many more specimens.
Not separable from *A. glaber* (sympatric; see there), *granulatus* (Philippines; see there), *grossedentatus* (Philippines; see there), *leucochrous* (Philippines; see there), *racemosus* (sympatric; in *A. celebicus* the differences between these two 'species' fade completely away), *sumatranus* (typical specimens of that 'species' differ by the mostly branched inflorescence and pilose ovary, but intermediates are known from Sumatra and Java, whereas in the Malay Peninsula *A. cobbe* var. *glaber* Corner connects them), and *timorensis* (which differs mainly by the branched inflorescences and crenate leaflets with emarginate acumen; several intermediates are known from Java, however). Hardly different from *A. varians* (Ceylon). See also under *A. eustachys.*

A. jejunus Standl. *ex* Lundell, Publ. Carn. Inst. Wash. 436 (1934) 280, 315, *nom. nud.* — Mexico.

A. kassneri Bak. *f.*, J. Bot. 57 (1919) 188; Radlk., Mon. (1932) 552. — Congo.
Not seen.
Reduced by Hauman, Fl. Congo Belge 9 (1960) 296, to *A. fulvo-tomentosus* (E. Africa).
As to the description it falls completely within the range of variability of *A. africanus*, seems to be the link between that 'species' and *fulvo-tomentosus*.

A. katangensis Haum., Bull. Jard. Bot. Brux. 28 (1958) 96; Fl. Congo Belge 9 (1960) 308. — Congo.
Not seen.
Probably from the relationship of *A. antunesii* (Angola) and *goetzeanus* (E. Africa).

A. kilimandscharicus Taub. in Engl., Pfl. Welt Ostafr. C (1895) 249; Radlk., Mon. (1932) 519. — E. Africa.
Studied: 1 specimen cit. Radlk.; 1 other specimen.
According to its author allied with *A. rubifolius.*
A link in the chain of small-leaved east-African forms, possibly closest to *A. chaunostachys* (sympatric).

A. kinlochii Standl., Trop. Woods 32 (1932) 16; Radlk., Mon. (1934) 1485. — British Honduras.
Not seen.
Originally, Standley pointed to *A. longeracemosus* to compare it with. Later reduced by Standley and Steyermark, Fieldiana Bot. 24, VI (1949) 236—237, to *A. cominia.*
According to the description also only slightly different from *A. nitidulus* (Colombia).

A. kiwuensis Gilg in Mildbr., Wiss. Ergebn. Deutsch. Zentr. Afr. Exp. 1907—1908, 2 (1912) 477; Radlk., Mon. (1932) 548; Haum., Fl. Congo Belge 9 (1960) 298, t. 31. — Central Africa.
Not seen.
According to the description hardly different from *A. conraui* (Cameroons) and close to *A. spicatus* Radlk. (W. Africa).

A. laete-virens Ridl., Trans. Linn. Soc. Bot. 9 (1916) 32; Radlk., Mon. (1932) 604. — New Guinea.
Studied: Type.
Identical with *A. micrococcus* (sympatric).

A. laeteviridis Gilg *ex* Engl., Pflanzenw. Afr. 3, 2 (1921) 271, *nom. nud.* — Cameroons.

A. laetus Radlk., Sitz. Ber. K. Bayer. Ak. Wiss. M.-Ph. Kl. München. 38 (1909) 228, 238; Mon. (1932) 561. — Marianas.
Studied: 3 specimens.
According to Radlkofer (1932) near *A. timorensis* (Malesia, W. Pacific), mainly different by the simple inflorescences. Really, *A. timorensis* has in the Pacific more often rather small, simple, dense inflorescences than in Malesia, and is often bearded in the nerve-axils beneath, and the leaves are often smaller. This is especially clear from several specimens from the Marshall Is. *A. laetus* represents only an extremely depauperate form at the northern limit of the generic area.

A. laevigatus (Turcz.) Radlk. in E. & P., Nat. Pfl. Fam. 3, 5 (1895) 312 (*'aevigatus'*); Mon. (1932) 493. — *Schmidelia laevigata* Turcz., Bull. Soc. Nat. Mosc. 31, 1 (1858) 399, *nom. illeg.* — Brasil.

Studied: 1 specimen cit. Radlk.

According to Radlkofer (1932, l. c.) hardly more than a form of *A. puberulus* (sympatric). In view of the very slight differences between the two they should in my opinion be combined. Distinctly related to *A. edulis* (sympatric).

A. largifolius Radlk., Sitz. Ber. K. Bayer. Ak. Wiss. M.-Ph. Kl. Münch. 38 (1909) 226, 238; Mon. (1932) 552. — Philippines.

Studied: Type; 1 other specimen.

A relatively isolated form, geographically very restricted. Possibly near *A. samarensis* (sympatric; see there), probably from the wider relationship of *A. sumatranus.*

A. lasiopus Bak. *f.*, J. Bot. 57 (1919) 159; Radlk., Mon. (1932) 549. — Cameroons.

Not seen.

A. lastoursvillensis Pelleg., Bull. Soc. Bot. Fr. 100 (1953) 189. — Gabon, Congo.

Not seen.

According to its author to be compared with *A. tenuifolius* (Nyassa land), in the opinion of Hauman, Fl. Congo Belge 9 (1960) 310, very close to *A. welwitschii* (sympatric). The latter opinion is in good agreement with the fact that some of the specimens cited by Hauman, l. c., were included by Radlkofer (1932) under *A. macrobotrys* (sympatric).

A. latefoliolatus Bak. *f.*, J. Linn. Soc. Bot. 37 (1905) 137; Radlk., Mon. (1932) 546. — E. Africa.

Not seen.

Apparently closest to *A. macrobotrys* (sympatric), as already remarked by Radlkofer, l. c. Compared by its author with *A. welwitschii.*

A. latifolius Hub., Bull. Soc. Bot. Genève II, 6 (1915) 186; Radlk., Mon. (1932) 516. — Brasil.

Not seen.

Probably related to *A. occidentalis* (Caribbean region). See also under *A. puberulus.*

A. laxiflorus Gagnep., Not. Syst. 13 (1947) 28; Fl. Gén. I.-C. Suppl. 1 (1950) 928, f. 116(1—6). — Indo-China.

Not seen.

Hardly different from or identical with *A. racemosus* (sympatric).

A. leiophloeus Radlk., Sitz. Ber. K. Bayer. Ak. Wiss. M.-Ph. Kl. Münch. 38 (1909) 214, 236; Mon. (1932) 503. — Peru.

Not seen.

According to Radlkofer (1932, l. c.) certainly closely allied to *A. petiolulatus* (Brasil, Bolivia). MacBride, Fl. Peru 3A (1956) 372, suggests conspecificity with *A. floribundus* (sympatric) and *petiolulatus* (intermediates with the latter in Bolivia), and reduction of all these to *A. glabratus* (Colombia).

Apparently also hardly different from *A. scrobiculatus* (sympatric).

A. leptocaulos Radlk. in De Wildem. & Durand, Ann. Mus. Congo, Bot., II, 1 (1899) 17; Mon. (1932) 530. — Congo.

Not seen.

Reduced by Hauman, Fl. Congo Belge 9 (1960) 310, to *A. welwitschii* (W. Africa).

A. leptocladus Radlk., Elm. Leafl. Philip. Bot. 5 (1913) 1602; Mon. (1932) 593. — Philippines.

Studied: Type.

A. leptocladus, *subinciso-dentatus*, and *repando-dentatus* are all described from the same locality (Mindanao, Davao Distr., Todaya, Mt Apo, at 4000′, 3500′, and 2750′ resp.). Each is based upon one specimen only, the first one in flower, the other two in fruit. *A. leptocladus* is the most different one among these, being characterized by its less-branched and more slender inflorescences and by being slightly more hairy. They are all three doubtless the same and represent mere forms of *A. grossedentatus* from Luzon (see there). Furthermore, *A. leptocladus* is insufficiently delimited against *A. chlorocarpus* (sympatric).

A. leptococcus Radlk., Sapind. Holl.-Ind. (1879) 17, 56; Mon. (1932) 581. — Philippines, Moluccas.

Studied: Type; some specimens cit. Radlk.; some more specimens.

According to Radlkofer (1932, l. c.) a form of *A. ternatus* with longer inflorescences; in reality, the delimitation between these two is vague, and *Merrill Sp. Blanc. 1028*, one of the neo-syntypes of *Aporetica penicillata* Blco, identified by Radlkofer as *A. ternatus*, agrees in my opinion completely with the present 'species'. Different from typical *A. timorensis* mainly by the simple inflorescences and the brown bark, but at least the character mentioned first does not hold for Philippine *timorensis*. The delimitation between these two which are ecologically also not sharply separated — *A. timorensis* is exclusively, *leptococcus* probably mainly coastal — is also vague. Distinctly related to *A. leucochrous* (sympatric) which according to Radlkofer differs only in the white bark.

A. leptostachys Radlk. in Mart., Fl. Bras. 13, 3 (1900) 489, *nom. illeg.*, *non* Boerl. (1890); Mon. (1932) 499. — Brasil, Bolivia.

Studied: 1 Syntype.

According to Radlkofer (1932, l. c.) closely related to *A. strictus* (sympatric), different only by the minute flowers (*'diametro vix 1 mm'* versus *'circ. 1 mm'* in *strictus*!). Doubtless identical with that 'species' as well as with *A. floribundus* (Peru) to which identification of specimens with branched inflorescences leads.

A. leptostachyus (Bl.) Boerl., Handl. 1 (1890) 284, *non* Radlk. (1900). — *Schmidelia leptostachya* Bl., Rumphia 3 (1843) 141, *nom. illeg.* — Java.

Overlooked by Radlkofer; a synonym of *A. javensis*.

A. le-testui Pelleg., Bull. Soc. Bot. Fr. 100 (1953) 189. — Gabon.

Not seen.

Apparently closest to *A. grandifolius* (Cameroons), according to Pellegrin (l. c.) mainly different from that 'species' by the bigger and more hairy leaves.

A. leucochrous Radlk., Philip. J. Sc. 8 (1914) Bot. 444; Mon. (1932) 582. — Philippines.

Studied: Type; 2 other specimens.

Radlkofer (1932, l. c.) points especially to the relationship with *A. leptococcus* and *ternatus*, both sympatric, which differ mainly in bark colour; especially the close relationship with *ternatus* is clear.

Not separable from *A. javensis* (sympatric): that 'species' has the inflorescences mostly distinctly shorter, but they can reach the same length.

A. leucoclados Radlk. in Mart., Fl. Bras. 13, 3 (1900) 473, *non* Radlk. (1911); Mon. (1932) 479. — Brasil.

Studied: 1 specimen cit. Radlk.

The 1-foliolate form of *A. leucophloeus* and a glabrous form of *A. heterophyllus*, sympatric with both. Radlkofer (1932, l. c.) pointed already to these relationships.

A. leucophloeus Radlk. in Mart., Fl. Bras. 13, 3 (1900) 478; Mon. (1932) 487. — Brasil.

Studied: Type.

The 3-foliolate form of *A. leucoclados* (sympatric), as already remarked by Radlkofer.

A. livescens Gagnep., Not. Syst. 13 (1947) 28. — Indo-China.

Not seen.

Probably very close to *A. serratus* (Peninsular India, Bengal) and *serrulatus* (Peninsular India), mainly different by being glabrous.

A. longeracemosus Standl., Trop. Woods 16 (1928) 39; Radlk., Mon. (1934) 1484. — British Honduras.

Not seen.

Reduced by Standley and Steyermark, Fieldiana Bot. 24, VI (1949) 236, to *A. camptostachys* (Mexico). See also under *A. kinlochii*.

A. longicuneatus Vermoesen *ex* Haum., Bull. Jard. Bot. Brux. 28 (1958) 97; Haum., Fl. Congo Belge 9 (1960) 300. — W. and Central Africa.

Not seen.

Apparently closely related to *A. grandifolius* (Cameroons), mainly different from that 'species' by the relatively narrower leaflets and the smaller flowers.

A. longifolius Radlk., Not. Syst. 1 (1910) 298; Mon. (1932) 559. — Indo-China.

Studied: Type.

According to Radlkofer (1932) related to *A. grandiflorus*. Like that 'species' a form of *A. subfalcatus* with shorter inflorescences; the three are sympatric and certainly identical.

A. longipes Radlk., Sitz. Ber. K. Bayer. Ak. Wiss. M.-Ph. Kl. Münch. 38 (1909) 233, 239; Mon. (1932) 598. — China, Indo-China, Assam.

Studied: 1 Syntype; 1 other specimen.

Hardly different from *A. cobbe* var. *glaber* Corner from the Malay Peninsula. Furthermore, *Kurz 17* from Assam, cited by Radlkofer under *A. subfalcatus*, differs only in the simple inflorescences.

A. longipetiolatus Gilg, Bot. Jahrb. 24 (1897) 286; Radlk., Mon. (1932) 533. — Trop. Central and E. Africa.

Not seen.

Gilg placed this in the wider relationship of *A. africanus*. According to Hauman, Fl. Congo Belge 9 (1960) 303, it seems to be just an extreme form of *A. schweinfurthii*, an opinion which I fully share: same region; *longipetiolatus* is very insufficiently known, agrees in the more important characters completely with *schweinfurthii*, being mainly different from that 'species' in the bigger, thinner, more serrate, and more greenish leaflets, characters often typical for juvenile forms.

A. lopezii Merr., Philip. J. Sc. 26 (1925) 469; Radlk., Mon. (1934) 1490. — Philippines.

Not seen.

According to Merrill (l. c.) closely allied to *A. brevipetiolatus* (sympatric). Compare *A. simplicifolius*.

A. loretensis Standl. in MacBride, Fl. Peru 3A (1956) 373. — Peru.

Not seen.

MacBride (l. c.) suggests it to be identical with *A. amazonicus* var. *angustifolius* Benth. (sympatric) and doubts its specific independence.

A. macrobotrys Gilg, Bot. Jahrb. 24 (1897) 288; Radlk., Mon. (1932) 524. — Congo, trop. E. Africa.

Not seen.

According to Radlkofer, l. c., probably close to *A. latefoliolatus* (sympatric); Gilg, l. c., pointed to the wider relationship of *A. alnifolius* for comparison.

Apparently one of the large-leaved E. African species cited under *A. chaunostachys*. Apart from *A. latefoliolatus*, its nearest allies seem to be *A. agbala* (sympatric) and *ferrugineus* (sympatric; see there). Compare also *A. lastoursvillensis* and *spectabilis*.

A. macrocarpus Danguy & Choux, Bull. Mus. Hist. Nat. Paris 32 (1926) 387; Radlk., Mon. (1934) 1488. — Madagascar.

Not seen.

Originally included as a variety under *A. nigrescens*; according to Danguy & Choux, l. c., furthermore related to *A. arboreus* and *mananarensis* (all sympatric).

Probably closest to *A. integrifolius* (sympatric) and *salignus* (sympatric), different from both by the more strongly branched inflorescences and bigger fruits, from the latter moreover by the serrate leaflets.

A. macrodontus Merr., J. Arn. Arb. 19 (1938) 45. — Indo-China.

Not seen.

According to Merrill, l. c., related to *A. fuscus* (sympatric), *serratus* (Peninsular India, Bengal), *sootepensis* (Thailand), and *viridis* (sympatric).

A. macrostachys Radlk. in Perk., Fragm. Fl. Philip. 1 (1904) 56; Mon. (1932) 584. — Philippines.

Studied: 1 Syntype; some other specimens cit. Radlk.; some more specimens.

Radlkofer (1932, l. c.) pointed especially to the close relationship with *A. filiget* (sympatric); it appears to be hardly more than a glabrous form of that 'species'. Furthermore not well delimited from *A. dasythyrsus* (connected by intermediates with glabrous specimens of that 'species'), *glaber* (especially specimens of the latter from the Andamans are different only by the somewhat shorter and less slender inflorescences), and *ternatus* (the syntype *Cuming 826* agrees completely with *ternatus* but for the slightly longer and more slender inflorescences), all sympatric. Sympatric 1-foliolate forms are *A. apiocarpus, peduncularis,* and *simplicifolius.* Different from *A. subfalcatus* (cont. SE. Asia) mainly by the longer inflorescences and the glabrous ovary.

A. macrurus Gilg, Bot. Jahrb. 24 (1897) 287; Radlk., Mon. (1932) 525. — Trop. E. Africa.
Not seen.
According to Gilg, l. c., out of the wider relationship of *A. alnifolius.*
In my opinion it belongs to the series of large-leaved east-African 'species' cited under *A. chaunostachys*; especially the differences between *A. macrurus* and *oreophilus* (both from the same region) are so slight that there seems to be hardly any reason to keep the two separate. Furthermore probably about identical with *A. persicifolius* (Congo) and close to *A. alte-scandens* (Congo).

A. malvaceus Radlk., Sitz. Ber. K. Bayer. Ak. Wiss. M.-Ph. Kl. Münch. 38 (1909) 231, 239; Mon. (1932) 583. — Philippines.
Studied: Type.
In literature mixed up with *A. dimorphus, insignis,* and *quinatus* (cf. Radlkofer, 1932, l. c.). Close to *A. filiger* (sympatric), different in some minor points only.

A. mananarensis Choux, Mém. Ac. Malgache 4 (1927) 21, t. 2; Radlk., Mon. (1934) 1489. — Madagascar.
Studied: 1 specimen.
Our specimen (*Lam & Meeuse 5618*) comes from the same region and is in good accordance with the description as well as with the photograph published.It was identified by Capuron as *A. arboreus,* another 'species' described from the same region. In some characters, especially the not fully entire leaf margin, our specimen is intermediate between the two. Choux himself (l. c.) pointed already to the resemblance of these two. On the other hand, our specimen seems to be as good in accordance with *A. schweinfurthii* (cont. Africa) as with *arboreus.* Distinctly related to *A. sumatranus.* See also under *A. macrocarpus.*

A. marquesensis F. Brown, Bull. Bish. Mus. 130 (1935) 162, f. 24 b—f. — Marquesas.
Not seen.
According to F. Brown, l. c., 'evidently allied to *A. tahitensis*'.
In my opinion a member of the group of closely related island 'species' *A. marquesensis, rhomboidalis, sublaxus, tahitensis, umbrinus,* and *vitiensis,* all forms with branched inflorescences of *A. ternatus* in the region where *ternatus* and *timorensis* are no longer sharply delimited.

A. mawambensis Gilg in Mildbread, Wiss. Ergebn. Deutsch. Zentr. Afr. Exp. 1907—1908, 2 (1912) 475; Radlk., Mon. (1932) 548. — Central Africa.
Not seen.
According to Gilg, l. c., allied with *A. zenkeri* (Cameroons). The reduction to *A. africanus* by Hauman, Fl. Congo Belge 9 (1960) 293, as a form connected by intergrades with *f. acuminatus,* is in agreement herewith. Compare also *A. poungouensis.*

A. mayimbensis Pelleg., Bull. Soc. Bot. Fr. 100 (1953) 188. — Gabon.
Not seen.

Pellegrin, l. c., pointed especially to *A. ferrugineus* to compare it with. In my opinion, however, it is not with that E. African 'species', but with *A. zenkeri* from the Cameroons that it agrees the best. Compared with the latter it differs mainly by the far longer inflorescences and less-flowered cymules; the two may be insufficiently delimited.

A. megaphylla Hutch. & Dalz., Kew Bull. (1929) 25; Radlk., Mon. (1934) 1485. — Nigeria.

Not seen.

As far as can be judged from the rather incomplete description probably conspecific with *A. grandifolius* from the Cameroons.

A. melanocarpus Radlk. in E. & P., Nat. Pfl. Fam. 3, 5 (1895) 313; Mon. (1932) 545. — *Rhus melanocarpa* E. Mey. *ex* Drège, Cat. Pl. Exs. Afr. Austr. (1839) 26, *nom. nud.*; *ex* Walk.-Arn. in Hook. J. Bot. 3 (1840) 152, *nom. inval.* — *Schmidelia melanocarpa* Presl, Abh. K. Böhm. Ges. Wiss. V, 3 (1845) 470, *nom. illeg.*; Sond. in Harv. & Sond., Fl. Cap. 1 (1860) 238. — S. Africa.

Studied: Type; 3 other specimens cit. Radlk.; some more specimens.

Insufficiently delimited from *A. africanus* (see there) as already suggested by Baker, in Oliv., Fl. Trop. Afr. 1 (1868) 421, from *A. decipiens* (sympatric; see there), *pervillei* (Madagascar; especially from f. *trifoliolatus*), and *transvaalensis* (sympatric; see there). Furthermore hardly different from *A. griseo-tomentosus* (E. Africa; see there), possibly related to *A. subcoriaceus* (E. Africa). See also under *A. rubifolius* and *spragueanus*.

Rhus melanocarpa Walk.-Arn. is invalid as the author did not accept the name in that combination, though he provided it with a short description. That description may validate Presl's name; in any case Radlkofer's name is validated by the description by Sonder.

A. melanophloeus Radlk. in Mart., Fl. Bras. 13, 3 (1900) 478; Mon. (1932) 487. — Brasil.

Studied: 3 Syntypes; 1 other specimen det. Radlk.

According to Radlkofer (1932, l. c.) 'rather near *A. edulis*, but different by the colour of the leaves, the pubescence of the branchlets and especially of the petioles, by the branched inflorescences, and by the larger fruits'. However, branched inflorescences are exceptional in *melanophloeus*, whereas the difference in size of the fruits is minute only. Furthermore, especially as to leaves and inflorescences much alike *A. edulis* (sympatric), at least closely related to that 'species'. No more than a less hairy form of *A. chrysoneurus* (sympatric).

A. melliodorus Gilg *ex* Radlk., Sitz. Ber. K. Bayer. Ak. Wiss. M.-Ph. Kl. Münch. 38 (1909) 217, 236; Radlk., Mon. (1932) 519. — E. Africa.

Not seen.

According to Radlkofer (l. c.) '*Quasi forma 1-foliolata A. africani*'; when comparing the descriptions this seems quite plausible.

A. membranifolius Radlk. in Mart., Fl. Bras. 13, 3 (1900) 492; Mon. (1932) 505. — Brasil.

Not seen.

See under *A. mollis*.

A. micrococcus Radlk. in K. Sch. & Laut., Nachtr. (1905) 307; Mon. (1932) 599. — New Guinea.

Studied: 2 Syntypes; 2 other specimens cit. Radlk.; several more specimens.

Contrary to the key, the bark is sometimes dark brown, some specimens (among which one seen by Radlkofer) are pubescent on twigs and lower side of leaflets, and the fruits may be up to 1 cm long.

In New Guinea the differences between *A. racemosus*, *ternatus*, *timorensis*, and *micrococcus* fade away; the first two are just the specimens with unbranched, the 3rd one is the form with slightly branched, and the last one with more strongly branched inflorescences. Before 1905, *A. micrococcus* was always included in *A. timorensis*. Furthermore identical with *A. laete-virens* (sympatric), much resembling *A. grossedentatus* (Philippines).

A. mollis (Kunth) Radlk., Sitz. Ber. K. Bayer. Ak. Wiss. M.-Ph. Kl. München. 20 (1890) 230; Mon. (1932) 511. — *Schmidelia mollis* Kunth in H. B. K., Nov. Gen. et Spec. 5 (1821) ed. qu. p. 123, *nom. illeg.* — S. America.

Not seen.

Very insufficiently known, originally mixed up with *A. myrianthus* (Colombia) and probably no more than a youthform of it (see there).

A. monophyllus (E. Mey.) Radlk. in E. & P., Nat. Pfl. Fam. 3, 5 (1895) 312; Mon. (1932) 518. — *Rhus monophylla* E. Mey., Flora 26, Beigabe (1843) 156, 216, *nom. nud.* — *Schmidelia monophylla* Presl, Abh. K. Böhm. Ges. Wiss. V, 3 (1845) 470, *nom. nud.*, *non* Hook. *f.* (1848) (see under *A. hirtellus*). — *Schmidelia dregeana* Sond. in Harv. & Sond., Fl. Cap. 1 (1860) 239, *nom. illeg.* — S. Africa.

Studied: 1 Syntype; 1 other specimen.

Not well separable from *A. pervillei* from E. Africa and Madagascar, the differences being very slight and relate to unimportant characters. Even hardly different from *A. simplicifolius* (Philippines) and *acutatus* (S. America; see there); there seems to be no reason to separate it from at least the former of these. See also under *A. hylophilus*.

Radlkofer's name is validated by the description of *Schmidelia dregeana* Sond., the names being homotypic. Erroneously renamed *A. dregeanus* (Sond.) De Winter.

A. montanus F. N. Williams, Bull. Herb. Boiss. II, 5 (1905) 221; Radlk., Mon. (1932) 558. — Thailand.

Studied: Type.

Doubtless a phenotypical form of burnt-over areas (*pyromorphosis*), probably derived from *A. racemosus*, and comparable with *A. salinarius*. It shows a great resemblance to the most extreme drought-resistant forms from Africa (*A. decipiens*) and S. America (*A. guaraniticus*, *pauciflorus*).

A. mossambicensis Exell, Bol. Soc. Brot. II, 38 (1964) 107. — Mozambique.

Not seen.

According to Exell, l. c., 'near to *A. chaunostachys* and *richardsiae*, differing from the former by the larger more serrate leaflets and from the latter by the larger less densely pubescent leaflets.' Clearly one of the series of large-leaved E. African forms referred to under *A. chaunostachys*, and differing in the same set of unstable characters.

A. mutabilis (Bl.) Boerl., Handl. 1 (1890) 284. — *Schmidelia mutabilis* Bl., Rumphia 3 (1843) 140, *nom. illeg.* — Java.

This name was overlooked by Radlkofer, who cited the basionym in the synonymy of *A. racemosus*.

A. myrianthus Radlk. in E. & P., Nat. Pfl. Fam. 3, 5 (1895) 312; Mon. (1932) 516. — Colombia.

Not seen.

Triana & Planchon, Ann. Sc. Nat. Bot. IV, 18 (1862) 372, originally published the type of this 'species' under *Schmidelia mollis* Kunth. In a note they say that the differences between their specimen and the type of Kunth (which they had at hand and cite) can be explained by theirs being fullgrown material with flowers and fruits, whereas the type of *Schmidelia mollis* consists only of young twigs with not yet fully developed inflorescences and very small flower buds. A comparison of the descriptions given by Radlkofer seems to confirm this opinion. Furthermore not well separated from *A. goudotii* (sympatric; see there) and much resembling *A. stenodictyus* (sympatric).

A. natalensis (Sond.) De Winter, Bothalia 6 (1954) 408, *nom. illeg.* — *Schmidelia natalensis* Sond. in Harv. & Sond., Fl. Cap. 1 (1860) 239, *nom. illeg.* — S. Africa.

Published as a new name for *A. erosus* Radlk., 1909. Illegitimate, however, as the 'older' epithet was only published in an illegitimate combination and hence had no right of priority.

A. ngounyensis Pelleg., Bull. Soc. Bot. Fr. 100 (1953) 190. — Gabon.

Not seen.

Apparently hardly more than a glabrous form of *A. zenkeri* (Cameroons), as already remarked by Pellegrin himself.

A. nigericus Bak. *f.*, J. Bot. 57 (1919) 158; Radlk., Mon. (1932) 549. — Nigeria.

Not seen.

According to Baker, l. c., 'closely allied to *A. hirtellus* Radlk., differing in the margin of the leaflets being crenate-dentate and the apex being gradually not abruptly acuminate.'; in my opinion the differences between these two sympatric taxa are so slight that there seems to be no reason whatever to keep them separate.

A. nigrescens Bl., Rumphia 3 (1843) 129; Radlk., Mon. (1932) 544. — Madagascar.

Studied: Type; 2 other specimens cit. Radlk.

Not sufficiently separable from *A. abyssinicus* (E. Africa; see there), *africanus* (cont. Africa), and *cobbe* (Ceylon; the latter differs only by being more pubescent and by the less-branched inflorescences), hardly different from *A. integrifolius* (sympatric; see there) and even *A. scrobiculatus* (Peru). Compare also *A. camptoneurus* and *macrocarpus*.

A. nitidulus (Triana & Planch.) Radlk. in E. & P., Nat. Pfl. Fam. 3, 5 (1895) 312; Mon. (1932) 504. — *Schmidelia nitidula* Triana & Planch., Ann. Sc. Nat. Bot. IV, 18 (1862) 370, *nom. illeg.* — Colombia.

Not seen.

Apparently closest to *A. kinlochii* (British Honduras) and from the relationship of *A. cominia*.

A. obliquus Radlk. in Merr., Pl. Elm. Born. (1929) 173, *nom. nud.* — Borneo.

A. occidentalis (Willd.) Radlk., Sitz. Ber. K. Bayer. Ak. Wiss. M.-Ph. Kl. München. 20 (1890) 230, *nom. illeg.* — *A. racemosus* Swartz, Prod. (1788) 62, *non* Boerl. (1890). — *Ornitrophe occidentalis* Willd., Sp. Pl. 2, 1 (1799) 323, *nom. illeg.* — Caribbean region.

Studied: Type of f. *velutinus*; several specimens cit. Radlk.; some more specimens.

According to Radlkofer (1890, l. c.) only different from *A. sericeus* (Brasil) by the pilose seeds; the weight of this character — as far as known unique in the genus — seems doubtful, however. *Weberling 1351* from El Salvador agrees completely with *A. occidentalis* but for the glabrous seeds, and is sympatric with it. With the same exception, *A. panamensis* falls completely within the range of variability of the present 'species'. Furthermore, *A. occidentalis* is hardly different from *A. quercifolius* (Brasil; see there) and *stenodictyus* (S. America; see there), close to *A. robustus* (Cayenne; see there) and *semidentatus* (Brasil), distinctly related to *A. psilospermus* (sympatric), and probably to *A. latifolius* (Brasil). It belongs to the alliance of *A. edulis* (see under *A. puberulus*).

Ornitrophe occidentalis, and hence *Allophylus occidentalis*, is illegitimate because of the citation of the legitimate name **Allophylus racemosus** Swartz, which is the correct name for the taxon. The real authority of the epithet *occidentalis* is also Swartz. Willdenow cited in synonymy *Schmidelia occidentalis* Swartz, Fl. Ind. Occid. 2, p. 665. That appeared only in 1800, however. The description was also derived from Swartz.

A. oreodryadum Gilg *ex* Engl., Pflanzenw. Afr. 3, 2 (1921) 271, *nom. nud.* — Cameroons.

A. oreophilus Gilg, Bot. Jahrb. 24 (1897) 289; Radlk., Mon. (1932) 525. — Trop. E. Africa.

Not seen.

Gilg, l. c., pointed especially to *A. kilimandscharicus* for comparison.

In my opinion rather belonging to the group of mutually closely related E. African 'species' with larger leaves mentioned under *A. chaunostachys*; nearest to *A. macrurus* (sympatric; see there), apparently also hardly different from *A. persicifolius* (Congo), and probably rather close to *A. alte-scandens* (Congo).

A. oyemensis Pelleg., Bull. Soc. Bot. Fr. 100 (1953) 189. — Gabon.

Not seen.

According to Pellegrin, l. c., related to *A. grandifolius* (Cameroons), distinctly different, however, by the smaller, hairy leaves.

A. pachyneurus Gilg *ex* Engl., Pflanzenw. Afr. 3, 2 (1921) 271, *nom. nud.* — Cameroons.

A. pachyphyllus Radlk. in Urban, Symb. Antill. 5 (1908) 406; Mon. (1932) 500. — Jamaica.

Studied: Type.

Relationships not clear to me.

A. pallidus Radlk., Sitz. Ber. K. Bayer. Ak. Wiss. M.-Ph. Kl. München. 38 (1909) 231, 239; Mon. (1932) 580. — Thailand.

Studied: Type.

About identical with *A. sootepensis* (sympatric) from which it mainly differs in the smaller leaves and hence relatively longer inflorescences. Doubtless from the alliance of *A. racemosus* and *glaber*.

A. panamensis Radlk., Sitz. Ber. K. Bayer. Ak. Wiss. M.-Ph. Kl. Münch. 38 (1909) 212, 236; Mon. (1932) 491. — Panama.

Studied: Type; 2 further specimens.

Hardly different from *A. occidentalis* (West Indies; see there). Belongs to the alliance of *A. edulis* as referred to under *A. puberulus.*

A. paniculatus (Poepp. & Endl.) Radlk. in E. & P., Nat. Pfl. Fam. 3, 5 (1895) 312; Mon. (1932) 514. — *Schmidelia paniculata* Poepp. & Endl., Nov. Gen. Sp. 3 (1843) 38, *nom. illeg.* — Peru.

Not seen.

Apparently close to *A. excelsus* (Colombia, Venezuela) and *goudotii,* hence belonging to the alliance of *A. cominia.*

A. paralleloneurus Gilg *ex* Engl., Pflanzenw. Afr. 3, 2 (1921) 271, *nom. nud.* — Cameroons.

A. pauciflorus Radlk., Med. Rijksherb. 19 (1913) 61; Mon. (1932) 491. — Bolivia.

Studied: Type.

Identical with *A. edulis* var. *gracilis* (sympatric; see there), whereas *A. guaraniticus* (sympatric) and *quercifolius* (Brasil) are only slightly more hairy forms. Furthermore, there is a striking resemblance to *A. bicrurus* from Madagascar.

A. pedunculatis Radlk., Philip. J. Sc. 8 (1914) Bot. 450; Mon. (1932) 557. — Philippines.

Studied: 1 Syntype; 4 other specimens.

One of the 1-foliolate races of *A. macrostachys* (sympatric) referred to under *A. simplicifolius.* Its nearest allies among these are *A. brevipetiolatus,* with which it is connected by some specimens from Luzon, Sorsogon Prov., and which represents probably only a depauperate form, and *A. simplicifolius* (no sharp delimitation).

A. persicifolius Haum., Bull. Jard. Bot. Brux. 28 (1958) 98; Fl. Congo Belge 9 (1960) 312, t. 32. — Congo.

Not seen.

Compared by its author with *A. antunesii* (Angola).

Apparently very close to *A. macrurus* and *oreophilus* (both E. Africa), especially nearly identical with the former. This places it in the *chaunostachys*-group of the *africanus*-alliance.

A. peruvianus Radlk. in Mart., Fl. Bras. 13, 3 (1900) 488; Mon. (1932) 497. — Peru.

Not seen.

Radlkofer (1932, l. c.) cited a specimen intermediate between this 'species' (from which only the type is known) and the rather wide-spread *A. punctatus* (sympatric); the latter differs mainly by its thinner leaflets. Furthermore apparently hardly different from or identical with *A. coriaceus* (sympatric; see there). Belongs to the *edulis*-alliance (see under *A. puberulus*).

A. pervillei Bl., Rumphia 3 (1843) 123; Radlk., Mon. (1932) 517. — Madagascar, Comoro Is, Seychelles, Zanzibar.

Studied: Type; 1 Syntype of f. *trifoliolatus*; 2 other specimens cit. Radlk.

Insufficiently delimited against *A. bicruris* (sympatric), *gardineri* (sympatric; see there), *melanocarpus* (S. Africa), and *monophyllus* (S. Africa; see there). F. *trifoliolatus* shows furthermore a distinct resemblance to *A. chaunostachys* (Nyassaland). The resemblance to *A. varians* (Ceylon) is striking. See also under *A. hylophilus.*

A. petelotii Merr., J. Arn. Arb. 19 (1938) 46; Gagnep., Fl. Gén. I.-C. Suppl. 1 (1950) 920. — Indo-China.

Studied: 1 specimen.

Merrill, l. c., compared this 'species' with *A. samarensis* with which it shows a superficial resemblance. It is doubtless nearest to *A. chartaceus* (Assam), however, the main differences being the somewhat shorter petiole and some minor flower details, as well as to *A. repandifolius* (Hainan; see there). See under *A. simplicifolius* for further allies.

A. petiolulatus Radlk., Abh. K. Bayer. Ak. Wiss. M.-Ph. Kl. Münch. 16, 1 (1886) 181; Mon. (1932) 501. — Brasil, Bolivia.

Studied: several specimens cit. Radlk.

Radlkofer (1932, l. c.) stressed especially the relationship with *A. haitiensis* and *leiophloeus* (see under these names); as to the former, the differences given by Radlkofer are in reality overlapping, the range of variability of *A. petiolulatus* being much wider than accepted in the key. Furthermore not well delimited against *A. floribundus* (Peru; see there) and probably *glabratus* (Colombia). Compare also *A. steinbachii* (sympatric). Belongs to the wider relationship of *A. edulis.*

A. pierrei Pelleg., Bull. Soc. Bot. Fr. 100 (1953) 191. — Gabon.

Not seen.

Difficult to interpret; possibly a 1-foliolate form of one of the W. African 'species' (*A. le-testui* or *oyemensis*?).

A. pinnatus Choux, Compt. Rend. Assoc. Franç. 49 (1926) 380 (*n. v.*); Mém. Ac. Malgache 4 (1927) 26; Radlk., Mon. (1934) 1489; *non* Roxb. *ex* W. & A. (1834), *nom. inval.* — Madagascar.

Not seen.

Difficult to interpret. Choux (1927, p. 30) compared it with *A. boinensis, costatus,* and *trichodesmus,* all sympatric. Probably closest to the former of these: both are described from the same region; *A. pinnatus* is only known in fruit; the main differences seem to be the somewhat differently shaped and bigger leaflets and the bigger inflorescences in *boinensis.*

A. poungouensis Pelleg., Bull. Soc. Bot. Fr. 100 (1953) 190. — Gabon.

Not seen.

According to Pellegrin, l. c., nearest related to *A. mawambensis.*

In my opinion the description points especially to a relationship with *A. zenkeri* (Cameroons), though they differ in some details. In any case from the alliance of *A. africanus.*

A. pseudo-paniculatus Bak. *f.*, J. Linn. Soc. Bot. 37 (1905) 137; Radlk., Mon. (1932) 547. — E. Africa.

Not seen.

Compared by its author with *A. stachyanthus.* Reduced by Radlkofer (1932, p. 538) with some doubt as a subform to *A. africanus* f. *chrysothrix.*

A. psilospermus Radlk., Sitz. Ber. K. Bayer. Ak. Wiss. M.-Ph. Kl. Münch. 20 (1890) 230; Mon. (1932) 486. — Central America, Martinique.

Studied: 3 specimens cit. Radlk.

Belongs to the relationship of *A. edulis* (see under *A. puberulus*). Identical with *A. punctatus* (S. America), there being no real difference between these two. Furthermore at least closely related to *A. amazonicus* (S. America; a 1-foliolate form) and *semidentatus* (Brasil); distinctly related to *A. occidentalis* (sympatric) and *sericeus* (Brasil), different from both by being glabrous.

A. puberulus (Camb.) Radlk. in E. & P., Nat. Pfl. Fam. 3, 5 (1895) 312, *nom. illeg.*; Mon. (1932) 492. — *Schmidelia puberula* Camb. in St. Hil., Fl. Bras. Mer. 1 (1828) ed. fol. p. 295, *nom. illeg.* — Brasil.

Studied: several specimens cit. Radlk.

Nearly identical with *A. laevigatus* (sympatric; see there). Belongs to a group of mutually distinctly related 'species', all at least closely related to, and probably better to be included in, the widely distributed and variable *A. edulis*, and which comprises at least *A. acutatus* and *amazonicus* (both 1-foliolate), *coriaceus, laevigatus, latifolius, occidentalis, panamensis, peruvianus, psilospermus, puberulus, punctatus, semidentatus*, and *sericeus*. There is furthermore a surprising resemblance between *A. puberulus* and *A. viridis* from Hainan: vegetatively they are hardly distinguishable and the differences in the flower are as slight as usual.

A. puberulus is a superfluous name. Radlkofer based it upon *Schmidelia puberula* Camb., but included also *S. levis* Camb. These two illegitimate names formed the base of **A. cambessedei** BL., Rumphia 3 (1843) 129, which is the correct name.

A. punctatus (Poepp. & Endl.) Radlk. in E. & P., Nat. Pfl. Fam. 3, 5 (1895) 312; Mon. (1932) 496. — *Schmidelia punctata* Poepp. & Endl., Nov. Gen. 3 (1843) 38, t. 244, *nom. illeg.* — S. America.

Studied: 3 specimens cit. Radlk.; some more specimens.

According to MacBride, Fl. Peru 3A (1956) 375 'very near *A. edulis*.'

In my opinion not separable from *A. edulis* (sympatric), *peruvianus*, and *psilospermus* (Central America) (see under these names). Compare also *A. reticulatus* (Cuba). Belongs to the group of mutually related forms cited under *A. puberulus*.

A. quercifolius (Mart.) Radlk. in E. & P., Nat. Pfl. Fam. 3, 5 (1895) 312; Mon. (1932) 490. — *Schmidelia quercifolia* Mart., Flora 22, 1, Beibl. (1839) 7, *nom. illeg.* — Brasil.

Studied: both syntypes; 1 other specimen cit. Radlk.

No more than a pubescent form of *A. pauciflorus* (Bolivia); delimitation against *A. guaraniticus* (sympatric) also insufficient; like these two to be united with *A. edulis* (sympatric; see there). On the other hand hardly more than a small-leaved form from drier regions of *A. occidentalis* (Caribbean; *Tonduz 13963* from Costa Rica, cited by Radlkofer under *A. occidentalis*, could as well be included in *A. quercifolius*). Probably closely related to *A. densiflorus* (Peru).

A. quinatus Radlk. in Perk., Fragm. Fl. Philip. 1 (1904) 57; Mon. (1932) 603. — Philippines.

Studied: Type; 2 other specimens cit. Radlk.; some more specimens.

A. quinatus (western Luzon) is intermediate between *A. dimorphus* (Mindanao, Mindoro, southern Luzon) and *stenophyllus* (northwestern Luzon) and not sharply delimited against either of these two. Radlkofer (1932, l. c.) pointed already to the close relationship with *A. dimorphus*, to which Merrill, En. Philip. 2 (1923) 494, reduced it. A 5-foliolate form of *A. filiger* (Luzon). Compare also *A. malvaceus*.

A. racemosus (L.) Boerl., Handl. 1 (1890) 284, *nom. illeg.*, *non* Swartz (1788); Radlk., Mon. (1932) 568. — *Schmidelia racemosa* L., Mant. 1 (1767) 67, *nom. illeg.* — SE. Asia, Malesia.

Studied: many specimens, among which several cit. Radlk.

Not well separable from *A. bojerianus* (Madagascar), *cobbe* (Ceylon, Peninsular India; specimens from the Malay Peninsula of *racemosus* are only different from *cobbe* in the simple inflorescences, but *cobbe* may occasionally have simple and *racemosus* slightly branched inflorescences), *crenatus* (Australia), *dasythyrsus* (Philippines), *glaber* (sympatric; the glabrous form: *Bünnemeijer 7785* and *Polak 564*, both from Sumatra, are intermediate), *hirsutus* (sympatric), *javensis* (sympatric), *micrococcus* (sympatric), *serratus* (sympatric; a form with shorter inflorescences, connected with *racemosus* by intermediates), *setulosus* (sympatric), *ternatus* (sympatric; a more robust form; in E. Malesia there is no sharp demarcation between the two; the New Guinea specimens, cited by Radlkofer under *A. racemosus*, are not different from *ternatus*), *timorensis* (sympatric; also in E. Malesia no sharp delimitation), *villosus* (sympatric; in W. Malesia no sharp delimitation), *viridis* (sympatric), and *yeru* (E. Africa). Other close allies are *A. bicruris* (Comoro Is), *cobbe* var. *limosus* (sympatric), *laxiflorus* (sympatric), *montanus* (sympatric), and *salinarius* (sympatric). For argumentation may be referred to the name cited, when it is not given here. See also under *A. caudatus*.

The name is illegitimate, being a later homonym of *A. racemosus* Swartz, Prod. (1788) 62, a name apparently not based upon *Schmidelia racemosa* L. Radlkofer cited Swartz's name in the synonymy of *A. occidentalis* Radlk.

A. rapensis F. Brown, Bull. Bish. Mus. 130 (1935) 161, f. 24 a. — Rapa I.

Not seen.

Probably a depauperate form of *A. ternatus* (sympatric) from which it differs mainly by the smaller dimensions, the relatively shorter and apparently sometimes branched inflorescences, and the coriaceous leaves. The latter two characters may also point to *A. timorensis* (sympatric) as the nearest ally.

A. repandifolius Merr. & Chun, Sunyatsenia 5 (1940) 113, t. 16. — Hainan.

Not seen.

Very close to *A. petelotii* (Indo-China) from which it mainly differs by the more coarsely dentate leaves and the shorter inflorescences, both grading characters only. Furthermore hardly different from *A. samarensis* (Philippines). See also under *A. simplex* and *simplicifolius*.

A. repando-dentatus Radlk., Elm. Leafl. Philip. Bot. 5 (1913) 1603; Mon. (1932) 600. — Philippines.

Studied: Type.

Agrees completely with *A. subinciso-dentatus* from the same locality; Merrill, En. Philip. 2 (1923) 497, already recuded it to that 'species'. Both are hardly different from *A. grossedentatus* (sympatric; see there). Compare also *A. leptocladus*.

A. reticulatus Radlk. in E. & P., Nat. Pfl. Fam. 3, 5 (1895) 312; Mon. (1932) 478. — Cuba.

Studied: 3 specimens cit. Radlk.

Hardly distinguishable from *A. crassinervis* (sympatric; see there) and *rigidus* (S. Domingo). Probably from the relationship of *A. edulis* in which case *A. haitiensis* and *punctatus* (S. America) may be the nearest allies with 3-foliolate leaves.

A. rheedii (Wight) Radlk. in E. & P., Nat. Pfl. Fam. 3, 5 (1895) 313; Mon. (1932) 597. — *Schmidelia rheedii* Wight, Ic. (1845) t. 964, *nom. illeg.* — SE. Asia.

Studied: 1 Syntype; 2 other specimens cit. Radlk.

According to Radlkofer (1932, l. c.) probably only a more robust and more pilose form of *A. cobbe* (Ceylon, Deccan). As, indeed, the differences between these two are only slight and quantitative, they should be combined in my opinion (as has been done already by Hiern). Distinctly related to *A. serratus* and *villosus*, both sympatric.

A. rhodesicus Exell, Bol. Soc. Brot. II, 38 (1964) 108; Fl. Zambesiaca 2 (1966) 505, t. 100 f. 10. — Rhodesia.

Not seen.

According to Exell (1964, l. c.) 'very similar in appearance to some forms of *A. africanus* but with unbranched inflorescences.' Simple inflorescences are, however, already included in Radlkofer's concept of *A. africanus* (Exell accepted a still much wider concept!), whereas, on the other hand, Exell included in his diagnosis on the inflorescences '*plerumque vix ramosa*' and cited some specimens with branched inflorescences but otherwise scarcely distinguishable from *A. rhodesicus*. He took these latter ones for hybrids with *A. africanus*. In my opinion these facts leave only one conclusion: the reduction of *A. rhodesicus* to *A. africanus*.

A. rhomboidalis (Nadeaud) Radlk., Sitz. Ber. K. Bayer. Ak. Wiss. M.-Ph. Kl. München. 20 (1890) 230; Mon. (1932) 600. — *Schmidelia rhomboidalis* Nadeaud, En. Tahiti (1873) 70, *nom. illeg.* — Tahiti.

Studied: Type; 1 other specimen.

Contrary to the key the inflorescences bear 1 or 2 branches only. Identical with *A. ternatus* (sympatric). See also under *A. marquesensis*.

A. rhusiphyllus Balf. *f.*, Proc. R. Soc. Edinb. 11 (1882) 507; Radlk., Mon. (1932) 521 ('*rhoiphyllus*'). — Sokotra.

Not seen.

Apparently hardly different from *A. rubifolius* (adjacent continents); mixed up with *A. alnifolius*.

A. richardsiae Exell, Bol. Soc. Brot. II, 38 (1964) 109; Fl. Zambesiaca 2 (1966) 503, t. 100 f. 1. — Rhodesia.

Not seen.

According to Exell (1964, l. c.) nearest to *A. chaunostachys* (Nyassaland) and related to *A. mossambicensis* (see there); furthermore, one of the paratypes is a syntype of *A. griseo-tomentosus* (trop. E. Africa). Apparently one of the large-leaved E. African forms alluded to under the latter name, which come close to the relationship of *A. africanus*.

A. rigidus Swartz, Prod. (1788) 62; Radlk., Mon. (1932) 476. — S. Domingo.

Studied: Type; 1 other specimen cit. Radlk.

About identical with *A. crassinervis* (sympatric; see there) and *reticulatus* (Cuba).

A. robustus Radlk., Abh. K. Bayer. Ak. Wiss. M.-Ph. Kl. Münch. 19 (1895/6) 251; in Mart., Fl. Bras. 13, 3 (1900) 493, t. 105; Mon. (1932) 506. — Cayenne.

Not seen.

Distinctly very close to *A. occidentalis* (Caribbean) and *sericeus* (Brasil), mainly different by the (mostly) slightly branched inflorescences and the somewhat stiffer leaflets.

Compare also *A. stenodictyus.*

A. rubifolius (Hochst.) Engl., Hochgeb. Fl. Trop. Afr. (1892) 292; Radlk., Mon. (1932) 520. — *Schmidelia rubifolia* Hochst. in A. Rich., Tent. Fl. Abyss. 1 (1847) 103, *nom. illeg.* — NE. Africa, Arabia.

Studied: 2 Syntypes; 1 other specimen cit. Radlk.; 2 more specimens.

This 'species' seems to be the link between three groups: *A. africanus,* the group of large-leaved E. African forms, and the ecocline (?) of small-leaved E. African ones. Not separable from *A. africanus* (sympatric; see there), *alnifolius* (E. Africa; a form with slightly smaller, more stiff, and less hairy leaflets probably of drier conditions), *bicruris* (Comoro Is), *griseo-tomentosus* (E. Africa; mainly different by the — mostly and slightly — branched inflorescences; Exell, Fl. Zambesiaca 2, 1966, 503, who keeps the two separate, nevertheless cites 7 specimens from N. and S. Rhodesia as transitional between *A. rubifolius* and *griseo-tomentosus,* apart from many specimens with branched inflorescences which seem to belong to *rubifolius*), and *tristis* (Mozambique; see there). Furthermore, Exell, l. c., points to either close relationship to or even conspecificity with *A. melanocarpus* (S. Africa). Distinctly related to *A. elongatus* (Tanganyika), *rhusiphyllus* (Sokotra), *spicatus* Radlk. (W. Africa), and *stachyanthus* (E. Africa; see there). Compare also *A. calophyllus, goetzeanus, holubii,* and *tenuis.*

A. rutete Gilg in Mildbr., Wiss. Ergebn. Deutsch. Zentr. Afr. Exp. 1907—1908, 2 (1912) 476; Radlk., Mon. (1932) 547. — E. Africa.

Not seen.

According to Gilg, l. c., close to *A. fulvo-tomentosus* (sympatric), hence apparently from the relationship of *A. africanus.*

A. salignus Bl., Rumphia 3 (1843) 129; Radlk., Mon. (1932) 543. — Madagascar.

Studied: Type; 1 other specimen.

Contrary to the key of Radlkofer, at least the type has simple inflorescences. Identical with *A. integrifolius* (sympatric), probably close to *A. macrocarpus* (sympatric).

A. salinarius Gagnep., Not. Syst. 13 (1947) 29; Fl. Gén. I.-C. Suppl. 1 (1950) 928. — Indo-China.

Not seen.

Compared by Gagnepain (1947, l. c.) with *A. laxiflorus* and *montanus* (see there). Apparently a depauperate form like the latter, and also from the relationship of *A. racemosus.*

A. samarensis Merr., Philip. J. Sc. 11 (1916) Bot. 192; Radlk., Mon. (1932) 553. — Philippines.

Not seen.

According to Radlkofer, l. c., hardly more different from *A. largifolius* (sympatric) than by the incised leaves. Apparently hardly different from *A. repandifolius* (Hainan) — hence from *A. chartaceus* — and from *A. simplex* (sympatric; see there). On the other hand possibly a 1-foliolate (youth?) form of *A. grossedentatus* (sympatric). See also under *A. petelotii* and *simplicifolius.*

A. sapinii Vermoesen *ex* Haum., Bull. Jard. Bot. Brux. 28 (1958) 99; Haum., Fl. Congo Belge 9 (1960) 294. — Congo.

Not seen.

Originally included in *A. africanus* (De Wildem., Bull. Jard. Bot. Brux. 4, 1914, 154); apparently hardly different from that 'species', especially close to subf. *subcoriaceus.* According to its author also closely related to *A. camptoneurus* (Cameroons).

A. scandens Ridl., J. Str. Br. R. As. Soc. 75 (1917) 26; Radlk., Mon. (1934) 1489. — Malay Pen., Borneo.

Studied: 2 Syntypes.

Belongs to the relationship of *A. sumatranus.*

A. schweinfurthii Gilg, Bot. Jahrb. 24 (1897) 286; Radlk., Mon. (1932) 535. — W. and Central Africa.

Studied: 1 Syntype.

Doubtless to be united with *A. africanus,* there being no difference of any importance. Probably the same as *A. longipetiolatus* (sympatric; see there); closely related to or hardly different from *A. arboreus* (Madagascar), *crebriflorus* (Uganda), *imenoënsis* (sympatric), and *mananarensis* (Madagascar). Compare also *A. hamatus* (sympatric), *touracus* (sympatric), and *ussheri* (Uganda).

A. scrobiculatus (Poepp. & Endl.) Radlk. in E. & P., Nat. Pfl. Fam. 3, 5 (1895) 312; Mon. (1932) 504. — *Schmidelia scrobiculata* Poepp. & Endl., Nov. Gen. Sp. 3 (1843) 37, t. 244, *nom. illeg.* — Peru.

Studied: 1 Syntype.

Apparently hardly different from *A. africanus* (see there), *leiophloeus* (sympatric), and *nigrescens* (Madagascar). Distinctly related to *A. divaricatus,* mainly different from that 'species' by the less branched inflorescence (but it may have up to 4 branches), by being more glabrous as a whole (a grading character, however), and by the more remotely and more coarsely serrate leaflets; the area's of distribution overlap; *A. scrobiculatus* was to Radlkofer known only in 2 fruiting specimens, *A. divaricatus* only in flower. Summarizing, the delimitation against *A. divaricatus* seems to be doubtful too.

A. sechellensis Summerhayes, Kew Bull. (1928) 390; Radlk., Mon. (1934) 1486. — Seychelles.

Not seen.

Type originally (Baker, Fl. Maurit., 1877, 56) cited under *Schmidelia racemosa* var. *integrifolia* (= *A. integrifolius*). In agreement herewith Radlkofer cited it under *A. integrifolius.* As far as can be judged from the description there seems to be hardly any difference indeed. Summerhayes apparently did not compare these two 'species', he refers to *A. africanus* for comparison; that should be distinctly different by its branched inflorescences.

A. semidentatus (Miq.) Radlk. in E. & P., Nat. Pfl. Fam. 3, 5 (1895) 312; Mon. (1932) 486. — *Schmidelia semidentata* Miq., Linnaea 22 (1849) 798, *nom. illeg.* — Brasil.

Studied: 4 specimens cit. Radlk.

At least closely related to *A. occidentalis* (Caribbean), *psilospermus* (Central America), and *sericeus* (sympatric).

A. sericeus (Camb.) Radlk., Sitz. Ber. K. Bayer. Ak. Wiss. M.-Ph. Kl. München. 20 (1890) 230; Mon. (1932) 485. — *Schmidelia sericea* Camb. in St. Hil., Fl. Bras. Mer. *ed. fol.* 1 (1828) 294, *nom. illeg.* — Brasil.

Studied: several specimens cit. Radlk.; some more specimens.

Probably hardly different from *A. occidentalis* (Caribbean; see there); distinctly and closely related to *A. psilospermus* (Central America; see there), *robustus* (Cayenne; see there), and *semidentatus* (sympatric).

A. serratus (Roxb.) Kurz, J. As. Soc. Beng. 44, ii (1876) 185; Radlk., Mon. (1932) 562. — *Ornitrophe serrata* Roxb., Pl. Corom. (1796) 44, t. 61. — Peninsular India, Bengal.

Studied: some specimens cit. Radlk.; some more specimens.

Not separable from *A. racemosus* (sympatric; intergrades in the Malay Peninsula; see also under that name) and *villosus* (sympatric; the main differences are the short and reflexed inflorescences in *villosus*, the longer and erect ones in *serratus*; specimens of both may show occasional inflorescences of the other kind, however). Closely related to, or at least only slightly different from *A. cobbe* (sympatric; see there), *livescens* (Indo-China), *rheedii* (sympatric), *serrulatus* (sympatric; see there), *spicatus* Radlk. (W. Africa), and *yeru* (E. Africa). Compare also *A. macrodontus*.

A. serrulatus Radlk., Rec. Bot. Surv. Ind. 3 (1907) 341; Mon. (1932) 565. — Peninsular India.

Studied: 3 Syntypes; 1 other specimen.

Contrary to the key the inflorescences may be rather short which leads to *A. serratus* (which differs in the more deeply incised and more rhomboid leaflets), and they may be few-branched which leads to *A. cobbe* (different only by the slightly smaller flowers and fruits). Originally included in *A. serratus* or *cobbe*, or mixed up with *A. rheedii*, all sympatric. Furthermore probably close to *A. integrifolius* (Madagascar), *livescens* (Indo-China), and *yeru* (E. Africa).

A. setulosus Radlk. in Perk., Fragm. Fl. Philip. 1 (1904) 58; Mon. (1932) 581. — Philippines.

Studied: 4 specimens cit. Radlk.; 2 other specimens.

Not well separable from *A. racemosus* (sympatric), especially about identical with the E. Malesian specimens intermediate between *A. racemosus* and *ternatus*.

A. shirensis Gilg, Bot. Jahrb. 24 (1897) 289; Radlk., Mon. (1932) 533. — E. Africa.

Not seen.

Possibly identical with *A. dummeri* (sympatric) and probably not very different from *A. volkensii* (sympatric; see there). Belongs apparently to the wider relationship of *A. africanus*.

A. simplex Quis., Philip. J. Sc. 76, 3 (1944) 44, *nom. illeg.*, *non* Baill. (1893). — Philippines.

Not seen.

The description agrees nearly completely with that of *A. repandifolius* (Hainan) and comes close to those of *A. samarensis* (sympatric) and *chartaceus* (Assam). Probably, several of these hardly more than 1 m high, not or hardly branched shrubs with large, often rather deeply incised, simple leaves represent youth-forms of races which normally have 3-foliolate leaves with smaller, thicker, and less deeply incised leaflets.

A. simplicifolius Radlk., Elm. Leafl. Philip. Bot. 5 (1913) 1601; Mon. (1932) 558. — Philippines.

Studied: 2 Syntypes; 2 other specimens.

Close to *A. apiocarpus* (sympatric; that differs only in the less distinctly dentate leaves), *macrostachys* (sympatric; see there), *monophyllus* (S. Africa; see there), and *peduncularis* (sympatric; see there). Closely related to or at least hardly different from *A. acutatus* (S. America; see there) and *chartaceus* (Assam). Probably, the Philippine 1-foliolate 'species' *A. apiocarpus, brevipetiolatus, lopezii, peduncularis, samarensis, simplex, simplicifolius,* and *unifoliolatus,* all described from different islands, are no more than local (and in some cases probably even youth-) forms; on one side they are all hardly more than 1-foliolate forms of *A. macrostachys,* on the other side they seem distinctly related with the series *A. repandifolius* (Hainan), *petelotii* (Indo-China), and *chartaceus* (Assam, Birma).

A. sootepensis Craib, Kew Bull. (1911) 474; Radlk., Mon. (1932) 564. — Thailand.

Studied: 1 specimen.

Identical with *A. pallidus* (sympatric; see there) and probably with *A. capillipes* (Indo-China), hardly different from *A. fuscus* (Indo-China; see there). Compare also *A. macrodontus.*

A. spectabilis Gilg in Mildbr., Wiss. Ergebn. Deutsch. Zentr. Afr. Exp. 1907—1908, 2 (1912) 474; Radlk., Mon. (1932) 548. — Central Africa.

Not seen.

Apparently closest to *A. chaunostachys* (Nyassaland) as already remarked by Gilg, l. c. Hauman, Fl. Congo Belge 9 (1960) 309, pointed to *A. macrobotrys* to compare it with.

A. spicatus (Poir.) Radlk. in E. & P., Nat. Pfl. Fam. 3, 5 (1895) 313, *non* Fourc. (1934); Mon. (1932) 528. — *Ornitrophe spicata* Poir., Encycl. 8 (1808) 265. — W. Africa.

Studied: 2 specimens cit. Radlk.

Much resembling *A. congolanus* (Central Africa), *kiwuensis* (Central Africa), *rubifolius* (NE. Africa), *serratus* (Peninsular India), *stachyanthus* (E. Africa; see there), and *yeru* (E. Africa; see there). See also under *A. ferrugineus* and *touracus.*

A. spicatus (Thunb.) Fourc., Trans. R. Soc. S. Afr. 21 (1934) 100, *nom. illeg., non* Radlk. (1895). — *Rhus spicatum* Thunb., Fl. Cap. (1823) 265. — S. Africa.

Rhus spicatum was included by Radlkofer in *A. decipiens.*

A. spragueanus Burtt-Davy, Kew Bull. (1921) 280; Radlk., Mon. (1934) 1485. — Rhodesia.

Not seen.

According to Burtt-Davy, l. c., related to *A. melanocarpus* and *transvaalensis.* Reduced by F. White, For. Fl. N. Rhodesia (1962) 223, to *A. cataractarum,* by Exell, Fl. Zambesiaca 2 (1966) 506, to *A. africanus.* See also under *A. griseo-tomentosus.*

A. stachyanthus Gilg, Bot. Jahrb. 24 (1897) 292; Radlk., Mon. (1932) 541. — E. Africa.

Studied: 1 specimen cit. Radlk.

Contrary to the key, the inflorescences may be simple which leads to *A. rubifolius* (NE. Africa; different only by the simple inflorescences with more distant cymules, vegetatively in complete agreement) or *spicatus* Radlk. (W. Africa; different only by the simple inflorescences). In literature mixed up with *A. rubifolius*. In my opinion identical with *A. rubifolius*, *spicatus* Radlk., and probably *holubii* (sympatric; see there); at least distinctly related to *A. griseo-tomentosus* (sympatric; see there). See also under *A. cataractarum* and *pseudo-paniculatus*.

A. steinbachii Barkley & Villa, Lilloa 28 (1957) 161, f. 10-2. — Bolivia.
Not seen.
According to the key given by the authors it comes close to *A. petiolulatus* (sympatric). Difficult to interpret because of the rather incomplete description.

A. stenodictyus Radlk., Sitz. Ber. K. Bayer. Ak. Wiss. M.-Ph. Kl. Münch. 38 (1909) 215, 236; Mon. (1932) 505. — S. America.
Not seen.
Originally mixed up with *A. occidentalis* (Caribbean), apparently hardly more different than by the mostly branched inflorescences. Other apparent relatives are *A. densiflorus* (Peru), *divaricatus* (Brasil, Peru), *myrianthus* (sympatric), and *robustus* (Cayenne).

A. stenophyllus Merr., Philip. J. Sc. 14 (1919) 417; Radlk., Mon. (1932) 603. — Philippines.
Studied: Type.
According to Radlkofer, l. c., possibly only a more slender form of *A. quinatus* (sympatric; see there); in reality not well delimited against that 'species'.

A. strictus Radlk. in E. & P., Nat. Pfl. Fam. 3, 5 (1895) 312, f. 162; Mon. (1932) 498, f. 11. — Brasil, Bolivia.
Studied: 2 Syntypes; 2 other specimens cit. Radlk.
Insufficiently delimited against *A. camptostachys* (Mexico; see there), *floribundus* (Peru; a form of that 'species' with simple or slightly branched, often somewhat more pubescent inflorescences), and *leptostachys* (sympatric; see there). The relationship with *A. edulis*, to which Radlkofer originally pointed, seems to me less close.

A. subcoriaceus Bak. *f.*, J. Linn. Soc. Bot. 37 (1905) 136; Radlk., Mon. (1932) 547. — E. Africa.
Not seen.
Reduced by Radlkofer (1932, p. 538) hesitatingly as a subforma to *A. africanus* f. *senegalensis*. Hauman, Fl. Congo Belge 9 (1960) 293, who kept it as a separate species, mentioned several specimens intermediate between *A. africanus* f. *africanus* and *A. subcoriaceus*. Eggeling & Dale, The indigenous trees of the Uganda Protectorate, 2nd ed. (1952) 375, reduced it to *A. africanus*. In my opinion possibly also related to *A. melanocarpus* (S. Africa).

A. subfalcatus Radlk., Rec. Bot. Surv. Ind. 3 (1907) 342; Mon. (1932) 577. — Cont. SE. Asia.
Studied: several syntypes; some other specimens.
Not well separable from *A. caudatus*, *chartaceus* (especially *Kurz 17* from the Andamans differs only from that 'species' by being 3-foliolate; Radlkofer, 1932, p. 557, already

considered *chartaceus* as hardly more than a 1-foliolate form of *subfalcatus*), *distachys*, *grandiflorus*, *longifolius*, *longipes*, and *villosus*. Distinctly closely related to *A. brachypetalus*, *fuscus* (which has shorter inflorescences and is more hairy), *glaber*, and *macrostachys* (Philippines). Apart from *A. macrostachys* these are all sympatric; see under the respective names for comment if it has not been given here.

A. subinciso-dentatus Radlk., Elm. Leafl. Philip. Bot. 5 (1913) 1603; Mon. (1932) 599. — Philippines.
Studied: Type.
Insufficiently delimited from *A. grossedentatus*, *leptocladus*, and *repandodentatus* (all sympatric; see under these names).

A. sublaxus Gillespie, Bull. Bish. Mus. 83 (1931) 16, f. 18; Radlk., Mon. (1934) 1490; A. C. Smith, Bull. Torr. Bot. Cl. 70 (1943) 542. — Fiji.
Studied: 1 Paratype; some other specimens.
Compared by Gillespie and A. C. Smith with *A. ternatus* and *vitiensis*. Doubtless one of the Pacific forms of *A. ternatus* alluded to under *A. marquesensis*, apparently closest to that 'species', to *rhomboidalis* (Tahiti), and to *umbrinus* (Fiji).

A. sumatranus Bl., Rumphia 3 (1843) 132; Radlk., Mon. (1932) 586. — Malesia.
Studied: Type; many other specimens partly cit. Radlk.
Not separable from *A. chlorocarpus* (sympatric), *cobbe* var. *glaber* Corner (sympatric; see there), *holophyllus* (Marianas), *javensis* (sympatric), and *villosus* (SE. Asia; the pubescent form from Sumatra and the Malay Peninsula connects the two), also hardly different from *A. chartaceus* (Assam; a specimen from Sumatra, *Korthals s. n. in herb. L 908. 269—684 & 688*, differs only from that 'species' by being 3-foliolate, inflorescence possibly simple) and *grossedentatus* (sympatric; see there). Furthermore related to *A. largifolius* (sympatric), *mananarensis* (Madagascar), and *scandens* (sympatric).

A. tahitensis Radlk., Sitz. Ber. K. Bayer. Ak. Wiss. M.-Ph. Kl. Münch. 38 (1909) 233, 239; Mon. (1932) 600. — Tahiti.
Studied: 1 specimen.
A form of *A. ternatus* with branched inflorescences; see under *A. marquesensis*.

A. talbotii Bak. *f.*, J. Bot. 57 (1919) 186; Radlk., Mon. (1932) 550. — Nigeria.
Not seen.
According to Baker especially related to *A. zenkeri* (Cameroons).
The short and insufficient description fits completely with *A. camptoneurus* (Cameroons).

A. tenuifolius Radlk., Sitz. Ber. K. Bayer. Ak. Wiss. M.-Ph. Kl. Münch. 38 (1909) 221, 237; Mon. (1932) 529. — Nyassaland.
Not seen.
According to Exell, Fl. Zambesiaca 2 (1966) 504, the type is a specimen with very young leaves of *A. chaunostachys*. Compare also *A. lastoursvillensis*.

A. tenuis Radlk., Sitz. Ber. K. Bayer. Ak. Wiss. M.-Ph. Kl. Münch. 38 (1909) 218, 236; Mon. (1932) 520. — E. Africa.
Not seen.
Probably a depauperate form of *A. africanus* f. *senegalensis*. Furthermore probably

very close to or identical with *A. bicruris* (Comoro Is; see there) and *goetzeanus* (sympatric). Belongs to the relationship of *A. rubifolius.*

A. ternatus (Forst.) Radlk. in E. & P., Nat. Pfl. Fam. 3, 5 (1895) 313, *nom. illeg., non* Lour. (1790); Mon. (1932) 572. — *Aporetica ternata* Forst., Char. Gen. Pl. (1776) 66, t. 66. — Malesia, Pacific.

Studied: many specimens, several of which cit. Radlk.

Radlkofer's delimitation of this 'species' is rather vague. This is well understandable as it is rather variable in its wide area of distribution, and in several parts of its area it grades into other 'species'. *A. ternatus* is in the first place a race in a geographical cline, in the west grading into *A. racemosus,* towards the east in *A. timorensis* (intermediates in the Philippines and New Guinea; moreover, *A. micrococcus* is about intermediate between the two). Moreover, *ternatus/timorensis* is the central 'species' in the Pacific, many of the island 'species' being no more than local races of it. Apart from the 'species' mentioned above, it is at least unseparable from *A. glaber, leptococcus, macrostachys, marquesensis, rhomboidalis, setulosus, sublaxus, tahitensis, umbrinus, villosus,* and *vitiensis,* probably also from *A. rapensis,* at least related to *A. leucochrous* (all sympatric; for details see under these names). Compare also *A. cobbe* var. *limosus.*

A. tessmannii Gilg *ex* Engl., Pflanzenw. Afr. 3, 2 (1921) 271, *nom. nud.* — Cameroons.

A. timorensis (DC.) Bl., Rumphia 3 (1843) 130; Radlk., Mon. (1932) 587. — *Schmidelia timoriensis* DC., Prod. 1 (1824) 611, *nom. illeg.* — Malesia, W. Pacific.

Studied: many specimens, several of which cit. Radlk.

At least not well delimited against or fully identical with *A. cobbe* var. *marinus, A. glaber, javensis, laetus, leptococcus, micrococcus, racemosus,* and *ternatus,* possibly moreover with *rapensis* (all sympatric; for comment see under these names). Furthermore, there is a surprising resemblance as to vegetative characters with certain Nyassa specimens of *A. africanus.* See also under *A. holophyllus.*

A. tomentosus (Hook. *f.*) Boerl., Handl. 1 (1890) 284. — *Schmidelia tomentosa* Hook. *f.*, Trans. Linn. Soc. 23 (1860) 164, *nom. illeg.* — Sumatra.

This name was overlooked by Radlkofer, who cited the basionym under *A. sumatranus.*

A. toroensis Bak. *f.*, J. Bot. 57 (1919) 181; Radlk., Mon. (1932) 549. — Uganda.

Not seen.

A. touracus (A. Chev.) Pelleg., Bull. Soc. Bot. Fr. 100 (1953) 191, *nom. inval.* — *Schmidelia touraca* A. Chev., Expl. Bot. Afr. Occid. Fr. 1 (1920) 150, *nom. nud.* — W. Africa.

Not seen.

According to Pellegrin, l. c., reduced by Hutchinson & Dalziel, Fl. W. Trop. Afr. 1 (1928) 500, to *A. spicatus* Radlk., different, however, by the branched, long-peduncled inflorescence. That character is to my knowledge from that region only known from *A. schweinfurthii,* so we have to compare it in the first place with that 'species'. Another probable relative is *A. hamatus* (Congo).

The name is invalid as the description is in French only.

A. transvaalensis Burtt-Davy, Kew Bull. (1921) 280; Radlk., Mon. (1934) 1485. — Transvaal.

Studied: 1 specimen.

According to its author allied to *A. melanocarpus* (sympatric), the name under which Radlkofer (op. cit., p. 546) cited the type. Apparently only a more hirsute form of that 'species'. See also under *A. spragueanus.*

A. trichodesmus Radlk. [in E. & P., Nat. Pfl. Fam. 3, 5 (1895) 313, *nom. nud.*; in Palacky, Cat. Pl. Madag. 5 (1907) 52] Sitz. Ber. K. Bayer. Ak. Wiss. M.-Ph. Kl. München. 38 (1909) 225, 238; Mon. (1932) 543. — Madagascar.

Studied: 1 Syntype; 1 other specimen.

Hardly distinguishable from *A. villosus* (SE. Asia), especially from the specimens from the Malay Peninsula; when the two were sympatric they would doubtless be combined. Probably identical with *A. costatus* (sympatric; see there).

A. trichophyllus Merr. & Chun, Sunyatsenia 2 (1935) 270, t. 57. — Hainan.

Not seen.

According to Merrill & Chun, l. c., 'Apparently allied to *A. hirsutus* Radlk. of Indo-China, differing in its leaflets being rather uniformly and softly pilose beneath.' This seems to be the only and very slight difference. Moreover possibly identical with *A. villosus* (SE. Asia). Compare also *A. eustachys.*

A. tristis Radlk., Sitz. Ber. K. Bayer. Ak. Wiss. M.-Ph. Kl. Münch. 38 (1909) 225, 237; Mon. (1932) 542. — Mozambique.

Not seen.

Originally included in *A. rubifolius* (NE. Africa), an opinion recently shared by Exell, Fl. Zambesiaca 2 (1966) 502. Apparently no more than a form with branched inflorescences of that 'species'. Probably not well separable from *A. brachycalyx* (Uganda; see there); hardly different from *A. griseo-tomentosus* (sympatric).

A. umbrinus A. C. Smith, Bull. Torr. Bot. Cl. 70 (1943) 543. — Fiji.

Not seen.

According to A. C. Smith, l. c., hardly more than a hairy form of *A. sublaxus* (sympatric). In my opinion also closely allied to *A. rhomboidalis* (Tahiti), doubtless one of the Pacific forms of *ternatus/timorensis.*

A. unifoliolatus Radlk., Elm. Leafl. Philip. Bot. 1 (1907) 208; Mon. (1932) 555. — Philippines.

Studied: Type.

Insufficiently delimited against *A. apiocarpus* (sympatric; see there) from which only different in the shorter inflorescences, and *granulatus* (sympatric; see there). One of the 1-foliolate forms of *A. macrostachys s. l.* alluded to under *A. simplicifolius.*

A. ussheri Bak. *f.*, J. Bot. 57 (1919) 186; Radlk., Mon. (1932) 551. — Uganda.

Not seen.

According to Baker, l. c., 'In some respects allied to *A. schweinfurthii* Gilg, which, however, when dried turns a chocolate colour.' United by Eggeling & Dale, Indigenous trees of the Uganda Protectorate, 2nd ed. (1952) 376, with *A. dummeri.*

A. varians (Thw.) Radlk., Sitz. Ber. K. Bayer. Ak. Wiss. M.-Ph. Kl. Münch. 38 (1909) 227, 238, *non* Craib (1911); Mon. (1932) 555. — *Schmidelia varians* Thw., En. Pl. Zeyl. (1864) 408, *nom. illeg.* — Ceylon.

Studied: Type.

Reduced by Hiern, in Hook. *f.*, Fl. Br. Ind. 1 (1875) 673, to *A. zeylanicus* as a variety.

Nearly identical to *A. acuminatus* (sympatric; see there); distinctly related to *A. glaber* (S. and SE. Asia; hardly more than a 1-foliolate race, especially comparable with the W. Malesian race '*ligustrinus*'), *javensis*, and *pervillei* (Seychelles to Madagascar).

A. villosus (Roxb.) Bl., Rumphia 3 (1843) 132; Radlk., Mon. (1932) 560. — *Ornitrophe villosa* Roxb., [Hort. Beng. (1814) 28, *nom. nud.*] Fl. Ind. ed. 2, 2 (1832) 265. — SE. Asia.

Studied: many specimens, several of which cit. Radlk.

Only part of the specimens from continental Asia show the characteristic short, reflexed inflorescences with the long bracts mentioned in the key; even *King's coll. 495* from the Chittagong Hills (the type region) as well as several specimens from the Malay Peninsula cited by Radlkofer do not show this character. Among the specimens from the Malay Peninsula some have branched inflorescences and in several they are as long as the leaves or even longer.

A. villosus is at least nearly identical with *A. aporeticus* (sympatric; see there; Radlkofer, 1932, p. 561: '*Quasi forma villosa Allophyli aporetici.*'), *brachystachys* (sympatric; see there), *eustachys* (see there), *hirsutus* (sympatric; indistinguishable from some of the specimens of *villosus* from the Malay Peninsula), *racemosus* (sympatric; the differences fade away in Sumatra and the Malay Pen.), *serratus* (sympatric; see there), *subfalcatus* (sympatric; some narrow-leaved and not very hairy specimens like *Hullett 842*, *Seidenfaden 2262*, *Alvins 808*, are intermediate; *Kurz 17*, one of the syntypes of *A. subfalcatus*, is identical with *King's coll. 3730*, identified by Radlkofer as *A. villosus*, but for the slight pubescence of the latter), *sumatranus* (see there), *ternatus* (sympatric; the Sumatran form of *villosus* with long simple inflorescences differs only in hairiness from *ternatus*; *Yates 1603*, identified by Radlkofer as *ternatus*, agrees completely with *villosus*), and *trichodesmus* (Madagascar; see there). At least close allies are *A. africanus*, *hayatae* (sympatric), *heterophyllus* (S. America; see there), *hispidus* (Ceylon), *rheedii* (sympatric), and *trichophyllus* (Hainan).

A. viridis Radlk., Sitz. Ber. K. Bayer. Ak. Wiss. M.-Ph. Kl. Münch. 38 (1909) 229, 238; Mon. (1932) 564. — Hainan, Indo-China.

Studied: 1 specimen.

Merrill, Lingn. Sc. J. 14 (1935) 28, already pointed to the close relationship with *A. racemosus*; especially specimens of the latter 'species' from Sumatra, the Malay Peninsula, and Indo-China are sometimes hardly distinguishable, and the two should doubtless be combined. Radlkofer (1932, l. c.) mentioned the surprising resemblance to the Brasilian *A. puberulus* (see there). Compare also *A. macrodontus*.

A. vitiensis Radlk., Sitz. Ber. K. Bayer. Ak. Wiss. M.-Ph. Kl. Münch. 20 (1890) 230; Mon. (1932) 601. — Fiji.

Not seen.

One of the Pacific forms out of the relationship of *A. ternatus* cited under *A. marquesensis*. Compare also *A. sublaxus*.

A. volkensii Gilg, Bot. Jahrb. 24 (1897) 290; Radlk., Mon. (1932) 526. — E. Africa.

Not seen.

Gilg, l. c., considered *A. shirensis* (sympatric) the nearest related 'species', in which he may be right. The latter mainly differs in the branched and longer inflorescences and in some flower details.

A. welwitschii Gilg, Bot. Jahrb. 24 (1897) 287; Radlk., Mon. (1932) 530. — W. Africa.
Studied: 1 specimen.

Apparently identical with *A. andongensis* (Angola; see there) and *leptocaulos* (Congo; see there); possibly close to *A. conraui* (Cameroons), *lastoursvillensis* (sympatric), and *whitei* (Rhodesia; see there). Compare also *A. chirindensis* and *latefoliolatus.*

A. whitei Exell, Bol. Soc. Brot. II, 38 (1964) 110; Fl. Zambesiaca 2 (1966) 504, t. 100 f. 2. — Rhodesia.
Not seen.

Exell (1966, l. c.) cited: 'This species is near to *A. welwitschii* Gilg, from which it differs in the densely pubescent under surface of the leaves, and to *A. andongensis* Bak. *f.*, which has much more coarsely serrate to dentate margins of the leaflets and the latter are also more sharply acuminate.'

A. yeru Gilg, Bot. Jahrb. 30 (1901) 348; Radlk., Mon. (1932) 528. — E. Africa.
Studied: Type.

Gilg, l. c., pointed to *A. rubifolius* to compare it with; in my opinion this relationship is a more distant one. Hardly different from *A. bojerianus* (Madagascar; see there), *congolanus* (see there), and *spicatus* Radlk. (W. Africa; this differs mainly by the relatively bigger lateral leaflets — at least half as long as the terminal one, in *yeru* at most half as long — and the somewhat longer inflorescences; in *congolanus* the lateral leaflets are still shorter, but the inflorescences are longer). Distinctly out of the relationship of *A. racemosus* (SE. Asia), more in special near *A. serratus/serrulatus* (Peninsular India).

A. zenkeri Gilg *ex* Radlk., Sitz. Ber. K. Bayer. Ak. Wiss. M.-Ph. Kl. Münch. 38 (1909) 224, 237; Mon. (1932) 539. — Cameroons.
Studied: 3 Syntypes; 1 other specimen.

Doubtless from the *A. africanus* alliance. Apparently hardly different from *A. ngounyensis* (Gabon; see there) and *mayimbensis* (Gabon; see there), related to *A. poungouensis* (Gabon; see there). Compare also *A. gossweileri, mawambensis,* and *talbotii.*

A. zeylanicus L., Sp. Pl. (1753) 348; Radlk., Mon. (1932) 553. — Ceylon.
Studied: Type; 1 other specimen cit. Radlk.

The type agrees quite well with *A. acuminatus* (sympatric; see there). The specimen *Thwaites CP. 2679,* cited by Radlkofer, though doubtless conspecific, differs in leafshape — the leaves being longer and narrower and repando-dentate in the upper part — in which it comes nearer to *A. chartaceus.* See also under *A. hispidus.*

A. zimmermannianus Gilg *ex* Engl., Pflanzenw. Afr. 3, 2 (1921) 270, *nom. nud.* — E. Africa.