Genetic Resources Communication

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ISSN 0159-6071
ISBN 0643 03686 5

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SUMMARY:

A collection of 292 accessions of the legume genus Rhynchosia and some allied species was grown and classified using morphological and agronomic attributes. The collection was divided into three subsets which were examined separately. Twenty-three morphological-agronomic groups were identified. The classification, when considered with information from the site of origin, enabled suggestions to be made regarding selection of germplasm for further evaluation.

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INTRODUCTION

The legume genus Rhynchosia is distributed in warm temperate and tropical regions of both the eastern and western hemispheres (Grear 1978). Its wide geographic distribution is associated with a large number of species (approximately 200) and considerable intraspecific variation. The most widespread species is R. minima which is found on all tropical continents. Most other species are confined to either the new world or the Afro-Asian region.

Many species are found in savanna vegetation in regions with a markedly seasonal rainfall pattern. All have deep and extensive root systems and the more xeric species are well adapted to periodic burning (Grear 1978).

Although none has become cultivated, several species may have economic value. Rhynchosia minima is a valued component of native pastures in the dry and semi-arid areas of tropical and subtropical Australia. It is especially prominent, in good seasons, on heavier textured clay soils for which few adapted legume species are available. R. sublobata was considered in Zambia as a plant with potential for domestication as a forage (Crauford and Prins, 1979) while Anderson and Naveh (1968) identified R. sennaarensis (now R. verdcourtii) as a promising indigenous forage plant in northern Tanzania. Apart from these species, agronomic information is, at best, sparse. The presence of narcotic hallucinogens in some species, especially R. longeracemosa and R. pyramidalis (Grear 1978), reduces the number of species for consideration as forage plants.

By 1983, a germplasm collection of 293 accessions had been assembled in Brisbane, Australia. This included material from most regions where Rhynchosia is known to be native. The collection was mainly limited to species which are native to grassland and savanna and comprised 29 of the 200 species in the genus.

As a precursor to evaluation of pasture potential in this collection, it was considered important to characterize, identify taxonomically and classify the collection and hence restrict the number of accessions chosen for more detailed study.

MATERIALS AND METHODS

Two hundred and seventy-eight accessions were established in October/November 1981 at the CSIRO Division of Tropical Crops and Pastures Research Station, Samford, Queensland. A further 14 lines were established in January/February 1983 and a small number of lines for checking in December/January 1983/84. Nine pregerminated seedlings were established for each accession (three in each of three 20 cm pots) and grown in glasshouses. Thirty-four morphological and agronomic characters were recorded and used for subsequent analysis. These are listed in Appendix 1.

The occurrence of resin glands on the surfaces of leaves is characteristic of the genus (Grear 1978) and may influence palatability and digestibility. Specimens of each accession were examined for resin glands. There was little variation in gland density between leaves on a particular specimen nor in the distribution of glands on a leaf surface. The number of glands in two 1.5 mm^2 quadrats for each leaf surface was recorded from the last fully expanded leaf. This attribute was not

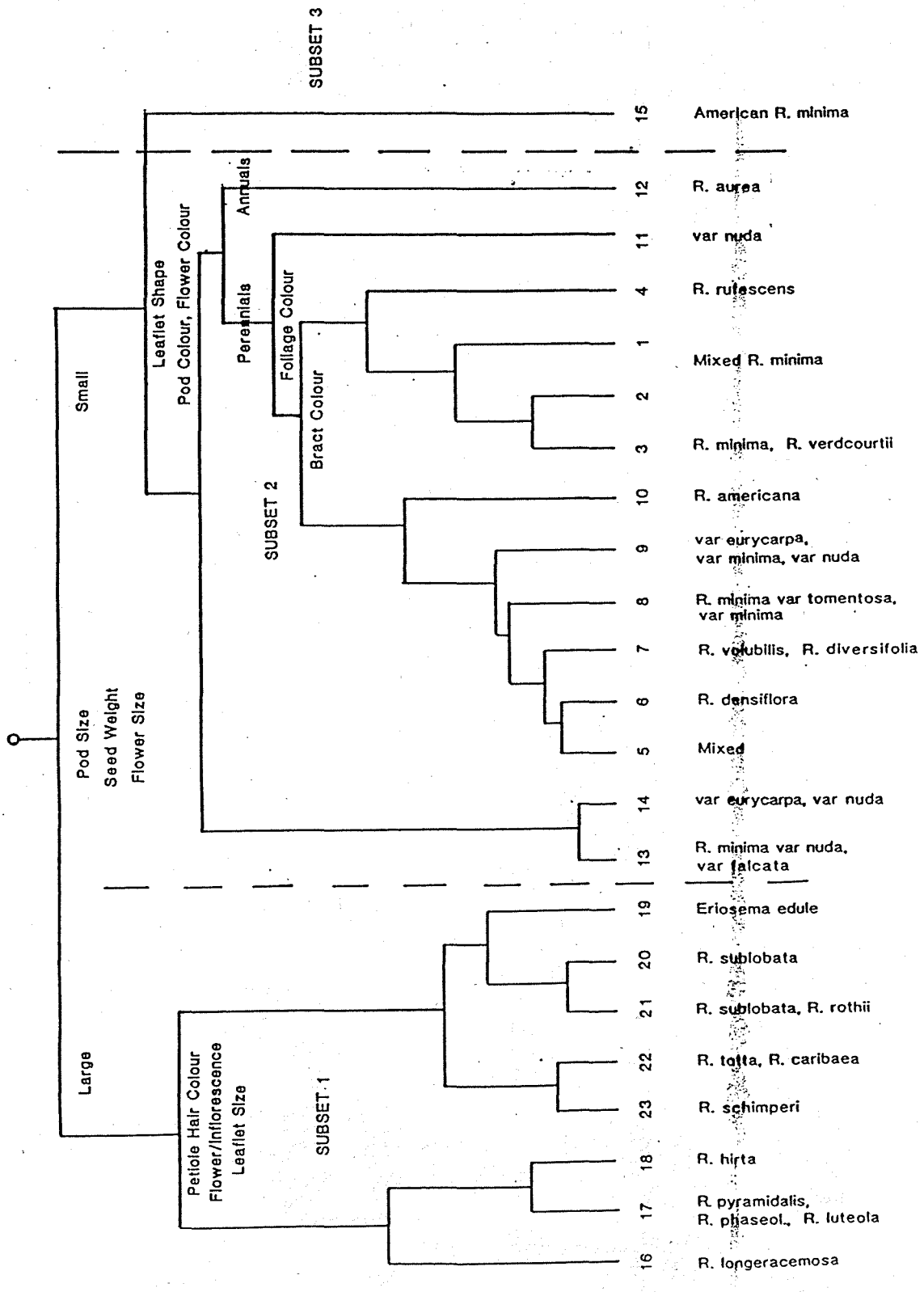

Figure 1 Hierachical classification of the Rhynchosia collection derived from SAHN analysis using attributes listed in Appendix 1. Accessions are identified in Appendix 2.

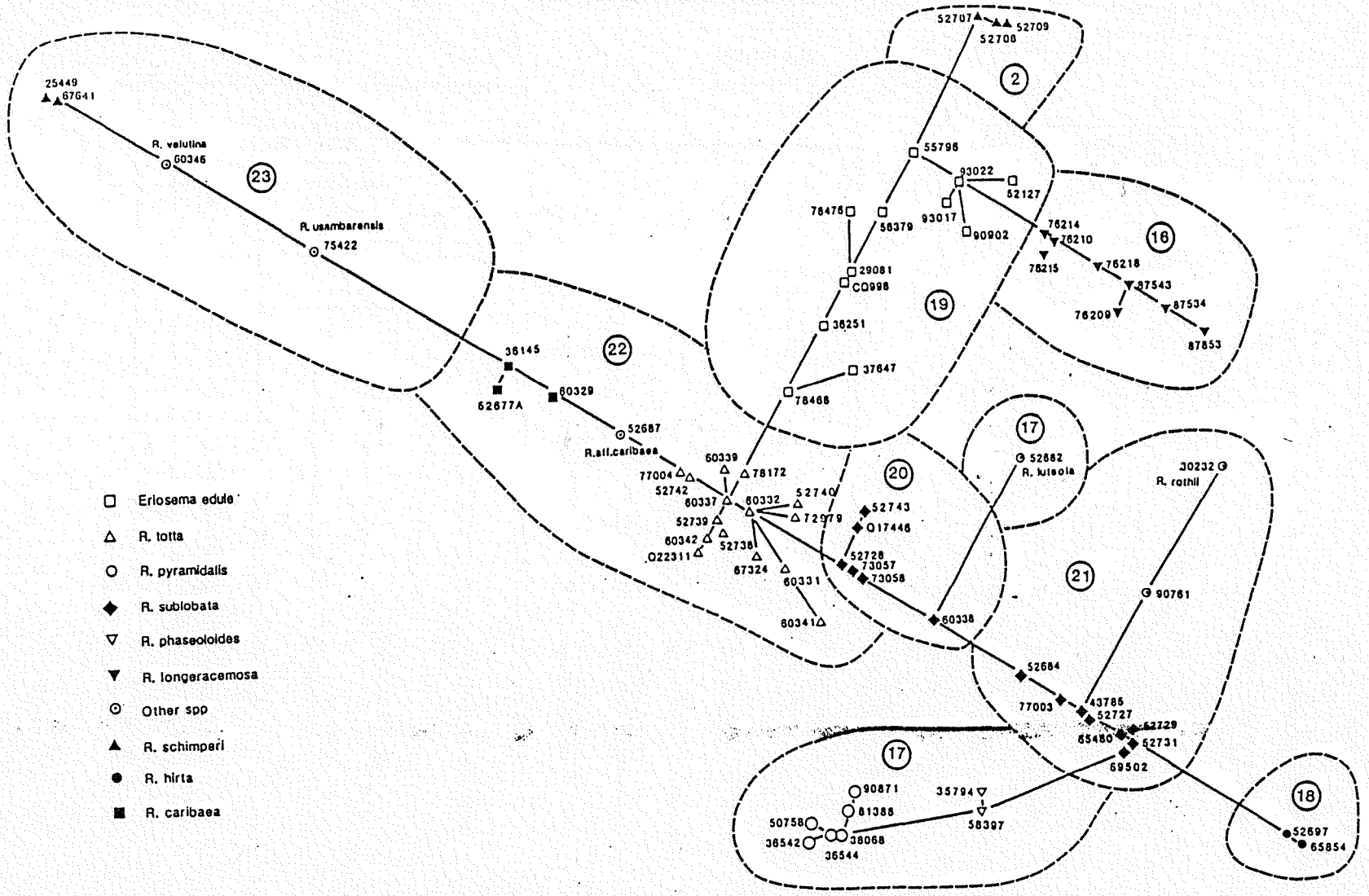

Figure 2 Minimum spanning tree derived from MST analysis for the Large Rynchosia subset (Subset I). Symbols indicate species while numbers in circles are the M-A groups.

included in the analysis but is presented because of its possible importance in determining palatability and digestibility.

Full botanical specimens of all accessions were lodged in the Queensland Herbarium, Brisbane (BRI) for taxonomic study and reference purposes.

Numerical Methods

Numerical analysis has been used by several authors as an aid ulderstanding the variation within collections of particular taxa, e.g. Burt et al. (1971), Gramshaw et al. (1987), Bishop et al. (1988). In most cases, certainly in the more recent of these, both classificatory and graph-theoretic methods (such as minimum spanning trees) have been used. The hierarchical classification allows groups to be established and the characteristics used in structuring these groups to be identified. However, in a data set which contains continuous variation, the use of graph-theoretic techniques enables the relationships both between and within groups to be displayed. In the analysis of this data set we have used both hierarchical classificatory and graph-theoretic techniques.

The data consisted of up to 34 characters (Appendix 1) for each of the 292 accessions (Appendix 2). Past experience had shown that minimum spanning trees representing over 150 accessions were both cumbersome and difficult to display on a reasonable scale. Since we intended to use minimum spanning trees, it was necessary to divide the collection into subsets.

Use of classical taxonomy at the species level as a basis for splitting the collection did not overcome the problem for two reasons. Firstly, of the 292 accessions, 60% had been identified as R. minima, which meant that we still would have one subset of almost 200 accessions. Secondly, the removal of all R. minima accessions would remove the opportunity to examine affinities between R. minima and other species.

The method we used was to subject the whole data set to the matrix generating program MSED and use the agglomerative polythetic program SAHN to generate a hierarchy. The programs CRAMER and GCOM were used in interpreting the classification. All of these programs were available on the TAXON package (Ross 1982).

Three subsets were established using this technique, each with 115 accessions or fewer. Each of these subsets was then subjected to the TAXON programs MSED, MST and NEAREST. The program MST generates a minimum spanning tree while the program NEAREST identifies the five nearest neighbours of an individual and is especially useful in the interpretation of minimum spanning trees.

RESULTS

The dendrogram to the 23 group level from the SAHN program on the whole data set is shown in Figure 1. Although SAHN is agglomerative, we shall discuss the results as if it were divisive as is customary.

The first split (Figure 1) separated 'large' (Subset I) and 'small' plants, the characters contributing being pod size, seed weight, flower (both keel and standard) size. The second split divided the 'small' accessions into Subsets II and III, largely through differences in leaflet shape, pod colour and flower colour. The taxonomic composition of each of

The MST has provided a good deliniation of species within this subset with no cases of an accession being intepposed in another species.

R. longeracemosa (Group 16)

All accessions of this species are from collections made in central America. As the specific epithet implies, the species is characterised by large numbers of flowers per inflorescence and although some variation is displayed in the minimum spanning tree, most of this refers to flowers per inflorescence and days to flower. As mentioned previously, seed of this species contains narcotic hallucinogens (Grear 1978). It has no agronomic interest.

Eriosema edule (R. edulis) (Group 19)

The genus Eriosema differs from Rhynchosia only marginally. E. edule was represented by twelve accessions from south and central America with considerable diversity exhibited in seed weight, flowering time, stem colour, stripe density and calyx/keel ratio. The early flowering accessions, CQ998, 78468, 78476 and 90902 are from latitudinal extremes of the collection, Argentina and northern Mexico. The most tropical collection, 55796, has extremely small seed and is late flowering.

Collecting information available suggests that the species is adapted to lighter soils (sands and loams) in areas with semi-arid to dry environments. CPI 55796 was noted as being 'common in pasture' at the site of collection (rainfall = 1 300 mm).

R. schimperi (Groups 2 and 23)

This species is represented by five accessions and is one of three species which occur in both subsets I and II. There are clearly two distinct types of this species with almost no variation within the types. All accessions are from India although the original collecting information for CPI 25449 and CPI 67641 is not known. The types vary in several characters including seed weight, eg. CPI 25449, 86.6 g/1000 seeds; CPI 52707, 23.9 g/1000 seeds; Habit, eg. CPI 25449 erect, CPI 52707 trailing; flower colour, eg. CPI 25449, yellow; CPI 52707, yellow/orange.

From the location of the smaller-seeded accessions on the minimum spanning tree of subset II, these three accessions are similar in many attributes to R. minima. Collecting information suggests that the species is adapted to semi-arid environments and light soils.

R. totta (Group 22)

This is the second of the three species which occur in two subsets. Fifteen accessions occur in subset I and two in subset II, although these latter two accessions were included in subset I for comparison. All accessions are from southern Africa with the two accessions from subset II having been collected near the South Africa-Mozambique border. The remaining accessions are from regions throughout southern and eastern Africa and have larger plant parts than the two accessions from subset II. Variation within the collection is based largely on seed size and days to flowering. Morphological variation is limited.

The species appears to be adapted to a range of soils but the majority of the collection is from lighter textured soils in semi-arid environments.

the 3 subsets is shown in Table 1. There was some overlapping of species between subsets. R. totta and R. schimperi accessions occur in both Subsets I and II and R. minima occurs both in Subset II and III. In the case of R. totta and R. schimperi, all accessions were included in subset I to allow a direct comparison between types. American accessions of R. minima not originally included in subset III were added to this subset for the same reason. The division into three subsets overcame the limitations of a taxonomic division mentioned previously since all the subsets contained fewer than 115 accessions and affinities between taxa could still, to a large extent, 'e examined.

TABLE 1. Species contained in each of the three major subsets

SUBSET I (13 sp.)	SUBSET II (19 sp.)	SUBSET III (2 sp.)
R. caribaea	Chryoscias sp.	R. kilimandscharica
R. edulis (Eriosema edule)	R. americana	R. minima
R. hirta	R. aurea	
R. longeracemosa	R. balanse	
R. luteola	R. burkartii	
R. phaseoloides	R. candida	
R. pyramidalis	R. densiflora	
R. rothii	R. diversifolia	
R. schimperi	R. kilimandscharica	
R. sublobata	R. micrantha	
R. totta	R. minima	
R. usambarensis	R. oblatifoliata	
R. velutina	R. reticulata	
	R. rufescens (Paracalyx sp.)	
	R. schimperi	
	R. senna	
	R. totta	
	R. verdcourtii	
	R. volu'ilis	

SUBSET I ('Large' subset)

This subset contains 13 species and 73 accessions. The MST is shown in Figure 2. Generally this subset contains accessions with larger plant parts. Table 2 shows comparisons between subsets for some of these characters.

TABLE 2. Comparison of mean values, between the three subsets, of some features measured.

	SUBSET I	SUBSET II	SUBSET III
Pod length (mm)	22.12	14.66	15.01
Pod width (mm)	7.08	4.57	3.81
Keel length (mm)	10.81	7.50	6.70
Standard width (mm)	8.70	5.80	5.57
Leaf length (mm)	71.04	43.93	57.16
Seed weight (g) (1000 sd/wt)	44.63	15.04	13.70

R. usambarensis var obtusifoliata (Group 23)

This accession also possessed a greyish foliage, a semi-erect habit and was late flowering. As with R. velutina, this accession is from Kenya.

R. luteola (Group 17)

This species is represented by only one accession from Zambia. It is distinguished from other accessions and species by the large numbers of flowers per inflorescence, (c.90), almost twice as many as the next highest. It was collected from a sandy soil in mopane woodland.

R. rothii (Group 21)

Once again, this species was represented by only one accession. It is well removed from any other on the minimum spanning tree and was distinguished by its orbicular leaf shape, the only accession in the entire collection with this characteristic, and the large number of flowers per inflorescence, (c.30). The origin of the collection is India but its collection site details are unknown.

R. sp. CPI 90761 (Group 21)

This accession, in many characteristics similar to R. rothii, had very large seeds (180 g per 1000) and as opposed to R. rothii, very few flowers per inflorescence (3). The origin of the collection is Chihuahua, Mexico. Soil texture at the site of collection was loamy and rainfall 350 mm.

SUBSET II ('Other' Rhynchosia)

This subset contains the smaller accessions in the collection and is dominated by the large number of R. minima accessions. The minimum spanning tree of the subset is presented in figure 3. A total of 19 species are represented, some by only one accession.

R. aurea (Nomismia aurea) (Group 12)

These two accessions from India are almost identical; they are annuals with a prostrate trailing habit. Both are stoloniferous, a characteristic which was found in only two other species, R. volubilis and R. diversifolia. The combination of these characteristics resulted in these accessions being far removed from any other.

R. oblatifoliata (Group 5)

This Ethiopian accession is the only representative of the species. Its nearest neighbours were the two accessions of R. totta. It was late flowering and possessed large seeds (45 g/1000 seeds) in comparison with other members of this subset. This accession had only two flowers per inflorescence.

R. volubilis (Group 7)

The single representative (from China) of this species was distinguished by its trailing habit, reddish brown stems and dark red pods. It is well removed from any other individual. No collecting information is available for this accession.

R. sublobata (Groups 20 and 21)

The 14 accessions of this species exhibited a fair degree of variation in flowering time and differed in the presence or absence of scent in the flower. These two characters were largely responsible for the variation exhibited on the minimum spanning tree. Other morphological characters varied only marginally.

Three groups can be distinguished on flowering time alone. The five accessions (Group 20) adjacent to R. totta in figure 2 are early-flowering accessions (approximately 140 days) while eight accessions (Group 21) adjacent to R. hirta are later flowering (approximately 178 days). The intermediate acession, CPI 60338 (Group 20) was the earliest flowering accession, 115 days.

All accessions are from east Africa with CPI 60338 being collected from the most northerly location. The remainder are from Zambia, Tanzania, Zimbabwe and Malawi with one accession, CPI 52743, from Madagascar. Collecting data indicates that the species is adapted to lighter soils in semi-arid to sub-humid environments.

R. hirta (Group 18)

This species is represented by two accessions only. They are almost identiaal in every respect. Leaf, flower and seed size were extremely large, the largest in the collection for flower and seed characters. Both collections are from Zimbabwe at 1 200 and 1 500 mm in dry environments.

R. phaseoloides, R. phaseoloides.aff (Group 17)

These two accessions are both from Brazil. All plant parts were large with the exception of seed. The accessions are almost identical. There is no collecting information for these accessions.

R. pyramidalis (Group 17)

Although this species is represented by six accessions, there is almost no morphological variation represented. Information regarding the origins of these accessions is available for CPI 81388 and 90871. Both are from north-western Mexico. As with R. longeracemosa, the seed of this species contains narcotic hallucinogens (Grear 1978).

R. caribaea, R. caribaea.aff CPI 52687 (Group 22)

The four acceqsions of this species are adjacent to R. totta or figure 2 and differ from that species in having shorter petiole hairs, poc colour, terminal leaflet shape and stem colour. The collections are all from South Africa from areas with annual rainfall between 700 and 900 mm. Soil textures at the sites of collection ranged from sand to clay loams.

R. velutina (Group 23)

The single accession of this species is well removed from any othe accession on the minimum spanning tree. It differed from other accession in having a grey-green foliage, grey stems, large deep yellow flowers an dark brown pods. Its habit was semi-erect. The origin of this accessio is lowland Kenya on a site with deep sands and 750 mm rainfall.

Collecting information for the Tanzanian material shows their origin as medium altitude (1 500 m) with rainfall between 700 and 750 mm. Soil texture at the sites of collection where known was a clay loam.

R. balansae (Group 5)

This species is represented by only two accessions, one from Argentina; the other from Paraguay. From the minimum spanning tree, it is clear that they differ significantly, especially in flowers per inflorescence; 21 for CPI 52129 and 94 for CPI 78485. The Argentine accession (78485) flowered earlier. It was collected from a sandy loam soil site; rainfall was 1 100 mm.

R. burkartii (Group 5)

This accession is very similar to the previous species and differed primarily in floral characters such as keel length. There is no information on collecting site available.

R. reticulata, R. reticulata.aff (Group 5)

Both accessions were collected from clay soil, high rainfall sites in Panama. Both are late flowering (>200 days) and have large plant parts in comparison with other members of this subset, eg. leaves and pods. These accessions are the extreme of this subset.

R. sp. (CPI 76213) (Group 5)

This accession was collected in Belize. Rainfall at the site of collection was 1 450 mm. In comparison with most other members of this subset it has large seeds and leaves and most closely resembles R. diversifolia CPI 92648.

R. diversifolia (Groups 5, 7)

This species is representated by two accessions, one from Argentina (CPI 78463) and the other from Colombia (CPI 92698). The former was collected on a clay loam with 1 170 mm and the latter from a clay soil site with 800 mm rainfall and an altitude of 1 700 metres.

Although they are dissimilar in many attributes, CPI 92648 is the fourth nearest neighbour of CPI 78463 in the nearest neighbour analysis. The attributes they differ in include maximum leaf length (72 mm for CPI 92648, 38 mm for CPI 78463), flowers per indlorescence (13 vs 3) and habit (erect/twining vs prostrate/trailing.)

Chrysoscias sp. (Group 5)

This single accession difders from its nearest neighbour, R. senna CPI 52126, in mature and immature stem colour and petiole colour. It was collected from a 'black volcanic soil' in South Africa; rainfall at the collecting site was 900 mm.

R. minima (Groups 1, 2, 8, 11, 13, 14)

This species dominates the collection in terms of numbers of representatives. Six varieties have been identified within the set. All of these are represented in subset II but only R. minima var. minima in subset III. In terms of morphology, there is considerable variation

R. rufescens (Paracalyx sp.) (Group 4)

The species is distinguished by expanded calyx lobes (longer than the corolla) and by having only one seed per pod. The accession was collected in Coimbatore, India.

R. verdcourtii (Group 3)

These large flowered accessions from east Africa are at one extreme of the subset. There is little variation within the collection of this species.

They are distinguished from other members of the subset by their viscid stems and pods, large flowers and habit (semi-erect with twining branches).

R. micrantha (Group 2)

This species is represented by six accessions, all from east Africa. They differ from R. minima in seed size and some floral characters but in other respects are very similar. Collecting information suggests they are adapted to light soils. Rainfall at the sites of collection ranged from 750 to 1 125 mm.

R. candida (Group 2)

This single Angolan accession is similar to R. micrantha in almost all characters. The exceptions are the strongly aromatic pod and a semi-erect habit, with twining branches; the habit for R. micrantha is twining.

R. senna (Groups 5 and 13)

There are five accessions of this species, four (Group 5) of which are almost identical. The fifth accession (Group 13) from Paraguay differs in flower and pod characteristics but agronomically they are all very similar. The origin of the other four accessions is Argentina.

CPI 52126 was collected from a 'salty soil' in Paraguay and was recorded as being 'aggressive'. CPI 78474, from Argentina was heavily grazed at the site of collection. Soil texture at the sites of collection, where known, was light and rainfall between 500 and 700 mm.

R. americana (Group 10)

This species is distinguished by its unifoliolate leaves. There is little difference between the accessions, both of which are from Mexico. Both accessions were collected from loamy soils, at 1 500 m altitude and 700 mm rainfall.

R. densiflora, R. densiflora.aff (Group 6)

R. densiflora is represented by four accessions with another, CPI 78173, closely linked. The four accessions of R. diversiflora were collected in Tanzania and are almost identical. They differ from CPI 78173, from Botswana, in seed weight, days to flower and flower keel length. In most attributes, the Tanzanian accessions resemble R. minima var. tomentosa although they differ in habit.

between varieties but the degree of variation within varieties is inconsistent. The attributes used in the analysis to distinguish the varieties were of little or no agronomic value and included stem and foliage colour, bract colour and flower colour. There were differences between groups (and varieties) in pod viscidity and pod retention and within groups, in days to flower (see Appendix 3).

R. minima var. tomentosa (Group 8)

All 14 accessions were collected within a small region of north Queensland with little variation evident. There is some variation in days to flower with Q22182 and Q22188 being very early.

R. minima var. eurycarpa (Group 9)

The accessions of this variety are Australian in origin, uniform (see figure 3) and distinguished by their petiole colour (green and very light green when mature) and the presence of viscid hairs on the pods. The variation within the variety appears to be based on leaflet colour and shape but there does not appear to be any pattern between geography and this variation.

R. minima var. nuda (Groups 1, 2, 11, 13, 14)

This variety is represented in four groups on the classification and four separate locations on the minimum spanning tree. The attributes which contribute most to this diversity are foliage colour, days to flower, leaflet size and shape and flower colour.

CPI 84163 and the three accessions of R. schimperi are almost identical and all were collected in Tamil Nadu, India. Within this variety, CPI 84163 most closely resembles Q22204 and Q22216, both from Australia, and CPI 89220 from Mali. With the exception of CPI 89220, these are early flowering and all have small leaflets.

CPI 52702 and CPI 52711 are late flowering and differ from the majority of the Australian material in flower colour, leaflet shape and other minor characters. Both are from Zimbabwe and are more similar to R. minima var. minima and R. minima var. prostrata than other accessions of this variety.

The third group is made up of three accessions from subtropical Australia and a fourth whose origin is unknown. This group is distinguished by its low petiolule hair density.

The main group consists of 9 accessions, all from the Northern Territory or northern Western Australia. They are similar to CPI 52702 and CPI 52711 in having large leaflets and being late flowering. They are distinguished from other accessions on foliage colour, habit and petiole colour. The habit of these accessions was always prostrate/trailing.

R. minima var. falcata (Group 13)

This African/Madagascan variety is represented by three accessions, CPI 52677B, 52703 and 60335. They are very similar to each other and differ from the other R. minima accessions in having viscid hairs on the pods (although some R. minima var. nuda and R. minima var. eurycarpa also have pods with viscid hairs), slightly larger leaves and a smaller calyx/keel ratio. CPI 60355 is earlier flowering than the other two accessions.

R. minima var. prostrata (Groups 1, 2, 3)

All accessions of this variety were collected in southern Africa. Four accessions are loosely linked to the R. verdcourtii accessions and these are more closely linked to other R. minima varieties.

The four accessions placed near R. verdcourtii, CPI 35464, 52716, 52717 and 60626 all had large flowers (keel length and standard width) as did R. verdcourtii and possessed a semi-erect/twining habit. They varied considerably in days to flower and seed size.

The other accessions, CPI 52701, 52704 and 69501, had smaller flowers and a twining or trailing habit. Days to flower was again variable as was leaf size. CPI 52704 was more closely linked to R. schimperi accessions than to other R. minima accessions.

R. kilimandscharica (Group 8)

The single accession of this species was included in both subsets II and III since it was one of only two African collections included in group 15 in the original classification.

In this subset it was placed with the R. minima var. tomentosa accessions but it differed from these in days to flower (much later for R. kilimandscharica), seed size and stem colour. As with the American R. minima, the pod colour was dark brown but it does differ from the American R. minima in leaflet shape. Flower colour for this accession was yellow-orange whereas the colour of the American R. minima accessions was dark yellow.

SUBSET III (American R. minima) (Group 15)

This subset is made up entirely of R. minima var minima with the exception of the one accession of R. kilimandscharica. The variation within the subset is minimal as can be seen from figure 1 where this group (Group 15) remained as one to the 23 group level. The group is characterised by having a leaflet shape of 'ovate tending to lanceolate', dark brown pods and dark yellow flowers (wings).

Resin gland density for the genus ranged from 0 to 18 per 1.5 mm^2 on the upper surface of the leaves and from 0 to 57 per 1.5 mm^2 on the lower surface. All R. sublobata accessions had few resin glands (< 9 per 1.5 mm^2) whilst R. balanse, R. burkartii, R. caribaea, R. densiflora, R. diversifolia, R. phaseoloides, R. senna and R. volubilis accessions had high resin gland densities (> 16 per 1.5 mm^2). Data was not obtained for accessions of R. hirta, R. velutina, R. usambarensis and one accession of R. schimperi because of the dense leaf pubescence on the under surface of the leaves. In all other species resin gland density was variable and did not appear to be related to either the geographic origin of accessions or to environmental factors such as latitude, altitude or mean annual rainfall at the site of collection.

DISCUSSION

Intuitive classification carried out during the period of data recording closely matched the results produced by the numerical analysis. This has added considerably to the confidence placed in the TAXON package techniques. The close correspondence between the minimum spanning trees and the classification can be seen in figures 2 and 3. Only the group

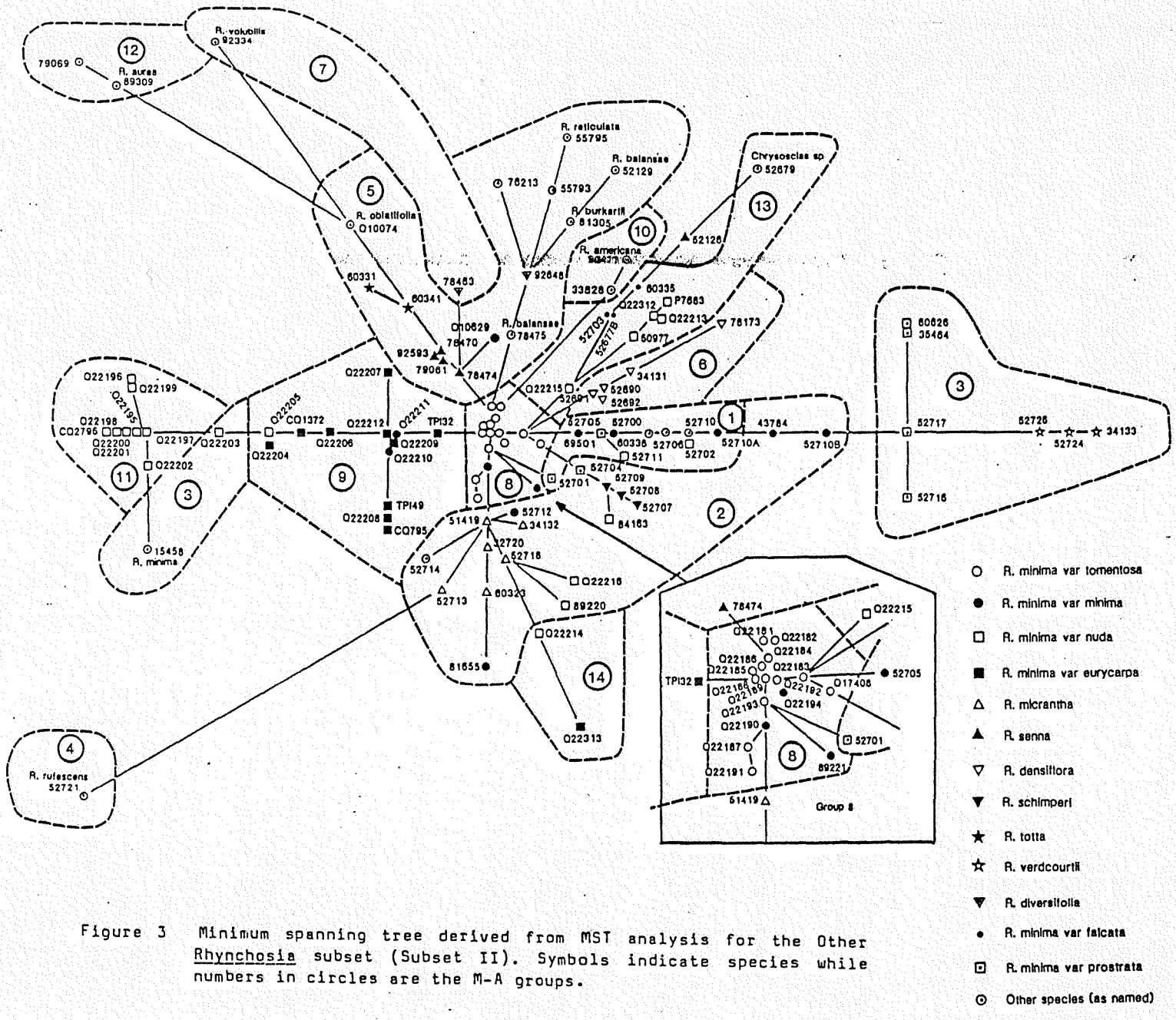

Figure 3 Minimum spanning tree derived from MST analysis for the Other Rhynchosia subset (Subset II). Symbols indicate species while numbers in circles are the M-A groups.

labelled 17 in figure 2 is disjunct on the minimum spanning tree. CPI 52682 has as its nearest neighbour R. sublobata CPI 77003 with the third, fourth and fifth nearest neighbours being R. pyramidalis accessions which corresponds to its placement in the classification. In figure 3, group 3 is split into two locations on the minimum spanning tree. In this case, neither CPI 15458 nor Q22203 have had any of the other members of group 3 included their five nearest neighbours. This suggests that these two accessions differ by some degree from the other members of the group and that the minimum spanning tree provides a more meaningful picture of the relationship of these accessions. Apart from these two cases, the two methods of analysis correspond closely.

Of the 200 species belonging to the genus, only 29 are represented in the collection. This is due in part to the methods of acquiring germplasm. Many accessions are the result of plant collecting missions to grassland/savanna regions of the tropics and this precludes the possibility of collecting those species whose distribution is limited to forest vegetation. This does not mean, however, that the collection contains all species with potential as forage.

The data set included few characters of agronomic importance. The characters recorded and used in the analysis were selected during the growing of the collection and measurements were taken of particular characters where variation in that character was apparent. Although floral characters were thought to be of limited use in discriminating taxa in this genus (Grear 1978), they did assist in discriminating taxa and ecotypes within the collection. Characters such as pod size and colour, leaflet shape and colour and petiole hair colour and density were more important. Some species were characterised by possessing a character not found elsewhere in the collection. For example, R. americana was the only species not having a trifoliolate leaf; R. aurea was the only species to behave as an annual; R. rufescens had only one seed per pod.

Agronomic characters such as flowering time, habit and seed weight were frequently used to discriminate groups within a taxon, eg. R. minima var. nuda. Seed shattering was rapid in most accessions but some species such as R. aurea and R. pyramidalis did hold their seeds for a longer period. Even within species there was some variation in this character with some accessions of R. minima retaining their seeds longer than others. As all of these measurements were taken under glasshouse conditions, there is some doubt that the variation in this character would sustain under field conditions. Certainly ratings of 3 or 4 would be needed to be of use in commercial seed production.

Growth habit within the collection was usually trailing or twining. Some accessions, such as R. usambarensis CPI 75422, had a semi-erect habit. Stolon development was limited to a few species, viz. R. aurea, R. volubilis and R. diversifolia.

Many accessions were sticky and others non-sticky but strongly aromatic. Particular attention at an early stage in field evaluation should be paid to palatability. If resin gland density is associated with palatability then the variation in this character provides opportunity to select material for low resin gland density. As this variation does not appear to be related to geographic or environmental origin, selection for low density should not be restricted to particular environments. Preliminary field experience would suggest that many lines of R. minima are not eaten while actively growing but may become acceptable, to cattle, with increasing maturity in autumn. This can be a most useful trait,

since it is over the autumn-winter that high quality (protein) forage is in shortest supply. Anderson and Naveh (1968) consider that although R. sennaarensis, (syn R. verdcourtii) is less palatable than Neonotonia wightii, the leaves are readily eaten by cattle. It is abundant in Masailand, where it survives well under low rainfall and can be found on the more fertile soils in the driest areas. Crawford and Prins (1979) also reported R. sublobata to be freely grazed in Zambia at the break of the season.

Morphological characters dominated the analysis; agronomic characters such as flowering time were most significant in distinguishing between 'types' below the species level.

Figure 3 clearly shows the degree of variation within and between varieties of R. minima. The extent of this variation led Verdcourt (1971a) to comment on the difficulty of dividing the R. minima complex into sub-specific taxa. There does appear to be a pattern in the distribution of varieties of this species within Australia. All collections of R. minima from the Northern Territory were identified as R. minima var. nuda as were two accessions from south-east Queensland and northern New South Wales. All R. minima var. tomentosa were from a small region in north Queensland. R. minima var. eurycarpa, collected from Queensland, accounted for the majority of the remaining Australian collections.

Because of the presence of native R. minima on clay soils in northern Australia and elsewhere, there has been interest in evaluating accessions of this species on similar soils. An analysis of the collecting data shows that few other species have been collected from clay soils. Several accessions of R. minima are from clay or clay loams but no other species are predominantly from these soils. There are individual accessions of other species, such as R. senna, R. densiflora and R. caribaea collected from heavy soils. It is worth noting that a large number of R. minima accessions are from sands and sandy loams emphasising that the species should not be thought of as a 'clay soil' species exclusively.

The close proximity of other species to R. minima in figure 3 indicates that these are only marginally distinct from that species. Species such as R. micrantha, R. senna, R. schimperi should be included in any evaluation work with R. minima. In addition, care should be taken to include accessions which cover the range of variation of particular species or have originated in suitable environments. This is especially important in selecting accessions from the large and variable R. minima collection.

Despite the large number of collections of R. minima from the Americas, little morphological or agronomic variation was evident, suggesting that R. minima could be a recent introduction into that region, a view supported by both Verdcourt (1971b) and Grear (1978), the latter considering R. minima to be an early weedy introduction into the New World. The American collection, which spanned a latitudinal range from Argentina to Mexico, exhibited less variation than any one Australian variety. Consequently, this classification offers no help in defining morphologic/agronomic groups within the American R. minima collection and selection of accessions for evaluation studies can only be based on environmental data from the site of collection.

ACKNOWLEDGEMENTS

His fellow authors wish to acknowledge the major contribution made to this study by the late W.A.T. Harding. The thorough, conscientious manner in which data was collected and maintained made completion of the study following his unfortunate and unexpected death much easier than it otherwise might have been. The technical assistance of M.R. Meier and Miss F.T. Smith is also acknowledged.

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APPENDIX 1

Features Recorded for Classification of the Rhynchosia Collection

A. Qualitative Characters

1.	leaflet number	trifoliate	(1);	unifoliate	(0)
2.	perennial or annual	perennial	(1);	annual	(0)
3.	seeds/pod	two	(1);	one	(0)
4.	scented flowers	yes	(1);	no	(0)
5.	viscid hairs on stem	yes	(1);	no	(0)
6.	viscid hairs on pod	yes	(1);	no	(0)
7.	stoloniferous habit	yes	(1);	no	(0)
8.	petiolule hair colour	white	(1);	brown	(0)

B. Ordered Multistate

1. Petiole hair length, if present (1–5); if absent *
   1. very, very short hairs (0 – 0.25 mm) approximately
   2. very short hairs (0.25 – 0.5 mm) approximately
   3. short hairs (0.5 – 0.75 mm) approximately
   4. short to medium (0.75 – 1 mm) approximately
   5. medium (1 mm) approximately

2. Pod retention (1–4)
   1. pods shatter very quickly
   2. pods don't shatter so readily
   3. pods hold well (but still shatter)
   4. pods do not shatter

3. Stripe density of flower (anterior)
   1. absent
   2. very slight
   3. slight
   4. moderate
   5. strong
   6. very strong (almost complete cover)

4. Stripe density of flower (posterior)

   states as in 3. above.

C. Numeric

1. length of terminal leaflet (mm) (max. expanded)
2. width of terminal leaflet (mm) (max. expanded)
3. days to flowering from planting (except where early flowering was only sporadic)
4. floret numbers per inflorescence (maximum observed)
5. keel length
6. standard width
7. calyx/keel ratio
8. pod length
9. pod width
10. seed weight (g per 1 000)

D. Disordered Multistates

1. growth habit (8 types)
2. stem colours – immature (20)
3. stem colours – mature (13)
4. foliage colour (3)
5. leaflet shape (of the terminal leaflet only) (19)
6. petiolule colour (12)
7. petiolule hair density (3)
8. flower colour (wings) (19))) both hue and depth of
9. flower colour (standard) (19)) colour recognised
10. stripe colour (9)
11. bract colour (10)
12. pod colour (6)

Disordered Multistate Codes

1. Growth Habit

1. twining
2. trailing and twining
3. trailing and weakly twining

4. erect with twining branches
5. semi-erect with twining branches
6. semi-erect with weakly twining branches
7. semi-erect with trailing branches
8. prostrate/trailing

2. Stem Colours Immature

1. gpeen
2. light green
3. brown
4. purplish brown
5. reddish brown
6. light reddish brown
7. greyish green
8. green with brown tinge
9. green with brown flush
10. green with light brown tinge
11. green with red tinge
12. green with red flush
13. green with reddish brown tinge
14. green with reddish brown flush
15. green with brown tinge then green
16. green with brown flush then green
17. green with reddish brown tinge then reddish brown
18. green with reddish brown flush then reddish brown
19. red then brown
20. purplish brown then green with reddish brown flush
1, 14. green with reddish brown flush sometimes
1, 9. green with brown flush sometimes
21. green with reddish/purple flush
22. green with red spot at back of leaflets

3. Stem Colours Mature

1. green
2. brown
3. light brown
4. purplish brown
5. reddish brown
6. green with brown tinge
7. green with brown flush
8. green with red tinge
9. green with red flush
10. green with reddish brown tinge
11. green with reddish brown flush
12. grey
13. brown with lighten markings
1, 11. green uith reddish brown flush sometimes

4. Foliage Colour

1. dark green
2. dark greyish green
3. dark yellowish green

5. Leaflet Shape

1. ovate
2. deltoid
3. rhomboid
4. elliptic
5. obovate
6. orbicular
7. lanceolate
8. oblong
9. ovate tending to elliptic
10. ovate tending to deltoid
11. ovate tending to phomboid
12. ovate tending to lanceolate
13. rhomboid tending to obovate
14. rhomboid tending to opbicular
15. rhomboid tending to ovate
16. orbicular tending to ovate
17. obovate tending to orbicular
18. obovate tending to rhomboid
19. deltoid tending to ovate

6. Petiolule Colour

1. green
2. dark green
3. light green
4. greyish green
5. green then light green when mature
6. dark purple
7. green with red tinge
8. green with red flush
9. light bpown to green when mature
10. reddish purple then brown to green when mature
11. green with red band at base sometimes
1, 7. green with red tinge sometimes

7. Petiolule Hair Density

1. dense
2. sparse
3. almost hairless or glabrous

8 & 9. Flmwer Colours (Royal Horticultural Society 1966)

– for both wings and standard
– A B C indicates decreasing depth of colour

1. dark yellowish orange (17A)
2. " " " (17B)
3. " " " (17C)
4. yellowish orange (14A)
5. " " (14B)
6. " " (14C)
7. " " (14D)
8. dark yellow (13A)
9. " " (13B)
10. " " (13C)
11. bright yellow (12A)
12. " " (12B)
13. " " (12C)
14. yellow (9A)
15. " (9B)
16. " (9C)
17. yellow (10C)
18. cream (8D)
19. cream (4D)

10. Stripe Colours

1. absent
2. red
3. reddish purple
4. purple
5. orangey red
6. dark red
7. reddish brown
8. brown
9. pink

11. Bract Colours

1. green
2. green with red tinge
3. green with reddish purple flush
4. green with purple flush
5. green with red flush
6. green with purple tinge
7. brown
8. green with brown flush
9. red
10. green with brown tinge

12. Pod Colours

1. dark brown
2. brown
3. light brown
4. dark red
5. light pinkish brown with dark brown reticulation
6. dark grey
7. light brown with brown mottling

APPENDIX 2

Project numbers species and group numbers of the Rhynchosia collection arranged by accession numbers

Access.* No.	Project No.	Species (After L. Pedley)	Group** No.	Access. No.	Project No.	Species (After L. Pedley)	Group No.	Access.* No.	Project No.	Species (After L. Pedley)	Group No.
15458	105	R. minima	3u	51370	202	R. minima var minima	15r	55793	21	R. reticulata aff.	5
17838	193	R. kilamandsharica	15a	51419	203	R. micrantha	2a	55795	22	R. reticulata	5b
25449	43	R. schimperi	23a	51588	118	R. minima var minima	15r	55796	320	Eriosema edule	19c
29081	5	Eriosema edule	19a	52126	204	R. senna var texana	13b	56379	1	Eriosema edule	19b
30232	45	R. rothii	21a	52127	8	Eriosema edule	19b	58397	41	R. phaseoloides aff.	17a
32720	194	R. minima var nuda	2f	52129	16	R. balansae var psilantha	5a	58541	207	R. minima var minima	15r
32963	195	R. minima var minima	2r	52677	78	R. caribaea	22a	58642	189	R. minima var minima	15r
33827	196	R. minima var minima	2r	52677 B	132	R. minima var falcata	13s	60323	208	R. micrantha aff.	2
33828	15	R. americana	10a	52679	35	Chrysoscias sp	13	60329	236	R. caribaea	22a
33976	239	R. minima var minima	15r	52682	42	R. luteola var verdickii	17a	60331	71	R. totta	5a
33999	240	R. minima var minima	2r	52684	61	R. sublobata aff.	21b	60332	72	R. totta	22b
34131	11	R. densiflora ssp stuh.	6a	52687	316	R. caribaea aff.	22a	60335	119	R. minima var falcata	13
34132	197	R. micrantha	2a	52690	102	R. densiflora ssp stuh.	6a	60336	113	R. minima	1q
34133	186	R. verdcourtii	3a	52691	103	R. densiflora ssp stuh.	6a	60337	76	R. totta	22b
34875	243	R. minima var minima	15r	52692	106	R. densiflora ssp stuh.	6	60338	67	R. sublobata	20c
35464	160	R. minima var prostrata	3n	52696	317	R. hirta		60339	82	R. totta	22b
35794	40	R. phaseoloides	17a	52697	38	R. hirta	18a	60341	73	R. totta	5a
36145	53	R. caribaea	22a	52700	133	R. minima var minima	1q	60342	77	R. totta	22b
36250	95	R. minima var minima	15r	52701	187	R. minima var prostrata	1	60346	34	R. velutina	23a
36251	2	Eriosema edule	19b	52702	109	R. minima var nuda	1d	60626	161	R. minima var prostrata	3n
36542	46	R. pyramidalis	17a	52703	110	R. minima var falcata	13s	61164	190	R. minima var minima	2r
36544	47	R. pyramidalis	17a	52704	107	R. minima var prostrata	2m	61203	97	R. minima var minima	15r
36696	114	R. minima var minima	15r	52705	149	R. minima var minima	1q	61203	209	R. minima var minima	15r
36696	143	R. minima var minima	15r	52706	111	R. minima	1q	63458	136	R. minima var minima	15r
36696	198	R. minima var minima	15	52707	92	R. schimperi	2b	65480	62	R. sublobata	21b
36697	179	R. minima var minima	15	52708	93	R. schimperi	2b	65854	37	R. hirta	18a
37155	144	R. minima var minima	15r	52709	94	R. schimperi	2b	67324	282	R. totta var fenchelii	22b
37159	199	R. minima var minima	15r	52710	112	R. minima	1q	67641	44	R. schimperi	23a
37221	145	R. minima var minima	15r	52710 A	108	R. minima var minima	1q	68896	180	R. minima var minima	15r
37324	146	R. minima var minima	15	52710 B	188	R. minima var minima	2q	68897	153	R. minima var minima	15r
37333	245	R. minima var minima	15r	52711	134	R. minima var nuda	1d	69078	162	R. minima var minima	15r
37394	147	R. minima var minima	15r	52712	205	R. minima var nuda	2	69501	154	R. minima var prostrata	1q
37396	127	R. minima var minima	15r	52713	283	R. micrantha	2a	69502	63	R. sublobata	21b
37410	241	R. minima var minima	15r	52714	150	R. candida	2a	70355	210	R. minima var minima	15r
37595	246	R. minima var minima	15r	52716	284	R. minima var prostrata	3n	70356	168	R. minima var minima	15r
37617	247	R. minima var minima	2r	52717	252	R. minima var prostrata	3o	70357	169	R. minima var minima	15r
37634	128	R. minima var minima	15r	52718	135	R. micrantha	2a	71865	96	R. minima var minima	15r
37647	7	Eriosema edule	19b	52721	33	R. rufescens (Paracalyx sp)	4a	72979	83	R. totta	22b
38068	48	R. pyramidalis	17d	52724	151	R. verdcourtii	3a	73057	64	R. sublobata	20a
40225	242	R. minima var minima	15r	52726	152	R. verdcourtii	3a	73058	65	R. sublobata	20a
40226	250	R. minima var minima	2r	52727	57	R. sublobata	21b	75422	54	R. usambarensis var obt.	23
40227	251	R. minima var minima	15r	52728	55	R. sublobata	20a	76209	267	R. longeracemosa	16a
43784	148	R. minima var minima	2q	52729	59	R. sublobata	21b	76210	323	R. longeracemosa	16a
43785	60	R. sublobata	21b	52731	58	R. sublobata	21	76213	268	R. sp.	5
49792	115	R. minima	15r	52738	79	R. totta	22b	76214	324	A. longeracemosa	16a
49808	129	R. minima var minima	15r	52739	60	R. totta	22b	76215	325	R. longeracemosa	16a
50267	200	R. minima var minima	15r	52740	81	R. totta	22b	76218	279	R. longeracemosa	16a
50758	49	R. pyramidalis	17a	52742	70	R. totta	22b	76219	170	R. minima var minima	15r
50977	201	R. minima var nuda	13c	52743	56	R. sublobata	20a	76220	98	R. minima var minima	15r
51043	131	R. minima var minima	15r	55792	206	R. minima var minima	15r	76221	211	R. minima var minima	15r

Access.* No.	Project No.	Species (After L. Pedley)	Group No.
76223	99	R. minima var minima	15r
76224	100	R. minima var minima	15r
76225	101	R. minima var minima	15r
76226	212	R. minima var minima	15r
76227	120	R. minima var minima	15r
76228	213	R. minima var minima	15r
76229	171	R. minima var minima	15r
76230	191	R. minima var minima	15r
76231	214	R. minima var minima	15r
76232	215	R. minima var minima	15r
76233	121	R. minima var minima	2r
76235	181	R. minima var minima	15r
76236	183	R. minima var minima	15r
77003	66	R. sublobata	21b
77004	74	R. totta	22b
78172	84	R. totta	22b
78173	237	R. densiflora aff.	6b
78463	311	R. diversifolia var prost.	7a
78466	182	R. minima var minima	15r
78468	3	Eriosema edule	19a
78470	164	R. senna	5a
78473	216	R. minima var nuda	15r
78474	18	R. senna	5a
78475	269	R. balansae var psilantha	5a
78476	6	Eriosema edule	19a
79061	155	R. senna	5a
79069	29	R. aurea	12a
79668	172	R. minima var minima	15r
81305	24	R. burkartii	5a
81380	173	R. minima var minima	15r
81381	174	R. minima var minima	15r
81382	122	R. minima var minima	15r
81384	175	R. minima var minima	15r
81385	116	R. minima	15r
81386	156	R. minima var minima	15r
81387	176	R. minima var minima	15r
81388	50	R. pyramidalis	17a
81655	123	R. minima var minima	2p
81728	137	R. minima var minima	15r
81729	254	R. minima var minima	15r
82308	217	R. minima var minima	15r
82309	91	R. minima var minima	15r
82310	157	R. minima var minima	15r
82311	183	R. minima var minima	15r
84163	124	R. minima var nuda	2e
84522	218	R. minima var minima	15r
84953	184	R. minima var minima	15r
85831	219	R. minima var minima	15r
86151	125	R. minima var minima	15r
87534	13	R. longeracemosa	16a
87543	19	R. longeracemosa	16a
87555	220	R. minima var minima	15r
87853	10	R. longeracemosa	16a
89220	104	R. minima var nuda	2f
89221	165	R. minima var minima	5v
89294	285	R. minima var minima	15r
89309	30	R. (Nomismia) aurea	12a
90477	26	R. americana	10a
90761	75	R. sp	21
90835	221	R. minima var minima	15r
90855	224	R. minima var minima	15r
90860 A	222	R. minima var minima	15r
90860 B	86	R. minima var minima	15r
90871	51	R. pyramidalis	17a
90884	223	R. minima var minima	15r
90902	20	Eriosema edule	19a
90918	225	R. minima var minima	15r
91083	226	R. minima var minima	2
91091	227	R. minima var minima	15r
91104	229	R. minima var minima	15r
91137	228	R. minima var minima	15r
91159	230	R. minima var minima	15r
91170	178	R. minima var minima	15r
91440	231	R. minima var minima	15r
91955	185	R. minima var minima	15r
92334	39	R. volubilis	7a
92593	255	R. senna	5a
92648	27	R. diversifolia	5b
92943	312	R. minima var minima	15r
93010	313	R. minima var minima	15r
93017	314	Eriosema edule	19b
93022	315	Eriosema edule	19b
CQ717	258	R. minima var minima	15r
CQ795	138	R. minima var eurycarpa	9g
CQ998	4	Eriosema edule	19a
CQ1372	264	R. minima var eurycarpa	9i
P7102	140	R. minima var minima	15r
P7683	158	R. minima var nuda	13c
Q9850	87	R. minima var minima	15r
Q9851	139	R. minima var minima	15r
Q10038	89	R. minima var minima	15r
Q10041	88	R. minima var minima	15r
Q10074	52	R. oblatifoliata	5a
Q10121	256	R. minima var minima	15r
Q10122	257	R. minima var minima	15r
Q10629(N4)	261	R. minima aff.	5
Q17408	126	R. minima var tomentosa	81
Q17446	310	R. sublobata	20a
Q22181(N26)	289	R. minima var tomentosa	81
Q22182(N27)	290	R. minima var tomentosa	81
Q22183(N28)	291	R. minima var tomentosa	81
Q22184(N33)	296	R. minima var tomentosa	81
Q22185(N34)	297	R. minima var tomentosa	81
Q22186(N35)	298	R. minima var tomentosa	81
Q22187(N36)	299	R. minima var tomentosa	81
Q22188(N37)	300	R. minima var tomentosa	81
Q22189(N38)	301	R. minima var tomentosa	81
Q22190(N40)	303	R. minima var minima	81
Q22191(N41)	304	R. minima var tomentosa	81
Q22192(N42)	305	R. minima var tomentosa	81
Q22193(N43)	306	R. minima var tomentosa	81
Q22194(N45)	308	R. minima var minima	8
Q22195(N11)	142	R. minima var nuda	11a
Q22196(N10)	166	R. minima var nuda	11a
Q22197(N12)	167	R. minima var nuda	11a
Q22198(N19)	275	R. minima var? nuda	11a
Q22199(N20)	276	R. minima var? nuda	11a
Q22200(N21)	277	R. minima var nuda	11a
Q22201(N22)	278	R. minima var nuda	11a
Q22202(N14)	270	R. minima var nuda	11
Q22203(N17)	273	R. minima var nuda	3b
Q22204(N13)	235	R. minima var eurycarpo	9i
Q22205(N16)	272	R. minima var nuda	9b
Q22206(N15)	271	R. minima var eurycarpa	9i
Q22207(N9)	159	R. minima var eurycarpa	9k
Q22208(N29)	292	R. minima var eurycarpa	9g
Q22209	177	R. minima var minima	9h
Q22210(N6)	192	R. minima var minima	9h
Q22211(N7)	238	R. minima var eurycarpa	9h
Q22212(N32)	295	R. minima var eurycarpa	9g
Q22213(N8)	232	R. minima var nuda	13c
Q22214(N44)	307	R. minima var nuda	14f
Q22215(N31)	294	R. minima var nuda	13?
Q22216(N25)	288	R. minima var? nuda	2f
Q22217	90	R. minima var minima	2f
Q22309	253	R. minima var minima	15s
Q22311	85	R. totta	22b
Q22312(N23)	286	R. minima var nuda	13c
Q22313(N24)	287	R. minima var eurycarpa	14j
TPI 32(N1)	259	R. minima var eurycarpa	9w
TPI 49(N2)	14	R. minima var eurycarpa	9g
CQ2796(N5)	141	R. minima var nuda	11

The major groups established in the Rhynchosia collection, component accessions, their background details and agronomic characters

Access No. *	Proj. No.	Species (After L. Pedley)	ORIGIN Country, Province	Lat.	Alt. (m)	Rain fall	Soil Text +	pH	Re act. ##	Grow Hab. #	Resin Glands **	Viscid Stem #	Viscid Pod #	Pod Aroma	Pod Retn #	Seed Wt ***	Day to Flower
GROUP 1 (10 Members)																	
52700	133	R. minima var minima	Zimbabwe, Wankie	18.50S	1060	650				1	21	0	0	V. slight	1	13.28	128
52705	149	R. minima var minima	Zimbabwe, Urungwe	16.30S	600	600				1	5	0	0	V. slight	1	13.49	144
52706	111	R. minima	Zambia, Eastern	13.47S	630	750	S		A	1	9	0	0	V. slight	1	13.51	164
52710	112	R. minima var minima	Zambia, Eastern	13.00S			C			1	7	0	0	V. slight	1	14.32	143
52710 A	108	R. minima	Zambia, Eastern	13.00S			C			1	13	0	0	V. slight	1	13.66	155
60336	113	R. minima	Botswana, Central	21.34S	909	450	L		C	1	18	0	0	V. slight	1	13.76	122
52702	109	R. minima var nuda	Zimbabwe, Umtali	19.25S	900	600	Y			1	12	0	0	V. slight	1	11.38	143
52711	134	R. minima var nuda	Zimbabwe, Bikita	20.04S	1200	675	M			1	12	0	0	V. slight	1	17.86	136
69501	154	R. minima var prostrata	Zimbabwe, Nyamandhlovu	19.31S						1	9	0	0	V. slight	1	12.03	122
52701	187	R. minima var prostrata	Zimbabwe, Harare	17.40S						1	7	0	0	V. slight	2	14.59	81

A group of fine to medium sized, twining vines, almost glabrous, flowering in autumn, winter and spring. Seeds are bean shaped, beige to grey with lighter and darker marking 187 is a fine, small, twining vine, small leaved and glabrous. Flowers autumn and spring. Seeds bean shaped, dark brown to black with some lighter markings.

GROUP 2 (27 Members)																	
32720	194	R. minima var nuda	Tanzania, Dodoma	6.23S						1	11	0	0	Lightly	1	9.68	64
32963	195	R. minima var minima	Colombia, Valle	3.33N	1000		C			1	19	0	0	Yes	1	11.69	50
33827	196	R. minima var minima	Mexico, Vera Cruz							1	18	0	0	Yes	1	14.31	43
33999	240	R. minima var minima	Costa Rica, Puntarenas	9.06N	200					1	9	0	0	Yes	1	10.31	50
34132	197	R. micrantha	Tanzania, Arusha	4.00S						1	6	0	0	Yes	1	8.42	73
37617	247	R. minima var minima	Bolivia, Santa Cruz	17.42S	750					1	15	0	0	Yes	1	12.86	144
40226	250	R. minima var minima	Bolivia, Santa Cruz	17.20S	400					1	54	0	0	Yes	1	10.16	145
43784	148	R. minima var minima	Zambia, Southern							1	17	0	0	V. slight	1	16.72	148
Q22217	90	R. minima var minima	Unknown							1	22	0	0	Yes	1	18.62	52
51419	203	R. micrantha	Tanzania, Dar-es-Salaam							1	8	0	0	Lightly	1	9.04	50
52704	107	R. minima var prostrata	Zimbabwe, Nyamandhlovu	20.00S	1300	600	C		C	3	2	0	0	Lightly	1	11.29	150
52707	92	R. schimperi	India, Tamil Nadu	10.59N	360	600	L		B	3	6	0	0	Lightly	1	23.89	51
52708	93	R. schimperi	India, Tamil Nadu	11.00N	450	600	O			3	13	0	0	Lightly	1	21.34	51
52709	94	R. schimperi	India, Tamil Nadu	0.00N	360	600				3	7	0	0	Lightly	1	18.61	51
52710 B	188	R. minima var minima	Zambia, Eastern	13.00S						1	9	0	0	V. slight	1	14.99	162
52712	205	R. minima var nuda	Tanzania, Morogoro	7.00S	500	800				1	10	0	0	Lightly	1	9.32	43
52713	283	R. micrantha	Tanzania, Mara	2.23S	1500	750	S			1	29	0	0	Lightly	1	8.74	71
52714	150	R. candida	Angola, Benguela	12.27S	13					5	30	0	0	Strongly	1	6.73	73
52718	135	R. micrantha	Tanzania, Morogoro	6.48S	500	800	Y			1	15	0	0	Yes	1	7.46	71
60323	208	R. micrantha aff.	Kenya, Coast	3.37S	45	1125	S		C	1	16	0	0	Yes	1	7.67	80
61164	190	R. minima var minima	Venezuela							1	6	0	0	Yes	1	11.20	71
81655	123	R. minima var minima	Unknown							1	41	0	0	No	1	23.26	51
89220	104	R. minima var minima	Mali, Niono	14.18N			C		C	1	2	0	0	No	1	13.81	129
91083	226	R. minima var minima	Mexico, Sinaloa	24.20N	500	1000	L	6.0	A	1	26	0	0	Yes	3	14.83	82
Q22216	288	R. minima var nuda	Aust., Rockhampton, Q	23.20S					D	3	14	0	0	V. slight	1	11.08	49
84163	124	R. minima var nuda	India, Tamil Nadu	17.36N	10	900				3	1	0	0	Yes	1	15.18	46
76233	121	R. minima var minima	Mexico, Campeche							1	25	0	0	Yes	1	15.04	66

A rather variable group of mostly fine, twining, pubescent vines with both early and later flowering types. Many flower throughout the year but some only in autumn, winter and spring. Seeds small.

* Accession No. unless otherwise indicated is CPI No. # See Appendix 1 for keys ** Lower leaf surface density, per 1.5 mm^2
*** Seed Wt = 1 000 grain weight in grams
A = Acid; B = neutral; C = alkaline; D = saline; E = alkaline/saline; +C = clay; G = gravel; L = loam; M = clay loam; O = stony; S = sand; Y = sandy loam.

Access No. *	Proj. No.	Species (After L. Pedley)	ORIGIN Country, Province	Lat.	Alt. (m)	Rain fall	Soil Text +	pH	Re act. ##	Grow Hab. #	Resin Glands **	Viscid Stem #	Viscid Pod #	Pod Aroma	Pod Retn #	Seed Wt ***	Day to Flower
							GROUP 3 (9 Members)										
15458	105	R. minima	Sudan	13.23N			C			3	26	0	0	Strongly	2	19.54	184
35464	160	R. minima var prostrata	Unknown							5	25	0	0	Yes	2	18.18	+
52716	284	R. minima var prostrata	Zimbabwe, Victoria	20.27S	900	600	M			5	24	0	0	Strongly	2	13.52	116
60626	161	R. minima var prostrata	Sth Africa, Transvaal	23.05S						5	14	0	0	Yes	2	19.94	87
Q22203	273	R. minima var nuda	Aust., McArthur R, NT	16.40S						3	18	0	0	Yes	2	12.31	121
52724	151	R. verdcourtii	Tanzania, Kilimanjaro	3.21S						5	7	1	1	Strongly	2	11.54	66
52726	152	R. verdcourtii	Tanzania							5	8	1	1	Strongly	2	12.49	78
34133	186	R. verdcourtii	Tanzania, Arusha	3.21S						5	13	1	1	Strongly	2	15.39	66
52717	252	R. minima var prostrata	Unknown								20						

A group of medium sized semi-erect later twining plants with small pubescent leaves some sticky and highly aromatic. 252 has stems glabrous. Flowering throughout the year but pod set often sparse. Seeds bean shaped grey to dark grey with lighter and darker marking.

GROUP 4 (1 Member)

52721	33	R. rufescens (Paracalyx sp)	India, Coimbatore	11.00N	400	750	G			5	4	1	1	Yes	1	24.82	114

The one member of this group is a small semi-erect twining plant, small leaved, pubescent and very sticky. Seeds rounded, U shaped with aril, uniseeded pods. It flowers throughout the year. Probably belongs to genus Paracalyx.

GROUP 5 (16 Members)

52129	16	R. balansae var psilantha	Paraguay							4	37	0	0	Yes	1	15.44	123
55793	21	R. reticulata aff.	Panama, Cocle	8.27N	100	2500	C			1	34	0	0	Yes	1	13.91	207
55795	22	R. reticulata	Panama, Herrera	7.54N	320	1900	C			1	43	0	0	Yes	1	19.32	211
60331	71	R. totta	Mozambique, Mavalane	26.00S	30	700	L		B	1	13	0	0	Yes	1	16.86	81
60341	73	R. totta	Sth Africa, Transvaal	25.30S	76	550	Y		B	1	13	0	0	Yes	2	18.88	91
78470	164	R. senna	Argentina, Tucuman	26.06S	1000	700	Y	8.0	C	1	32	0	0	V. lightly	2	15.34	94
78474	18	R. senna	Argentina, Jujuy	23.57S	2100	500	Y	7.8	C	1	27	0	0	V. lightly	2	12.02	57
78475	269	R. balansae var psilanth	Argentina, Corrientas	28.00S	90	1100	Y	6.6	A	4	24	0	0	Yes	1	11.69	81
79061	155	R. senna	Unknown							1	51	0	0	V. lightly	2	14.65	87
81305	24	R. burkartii	Argentina, Salta							4	40	0	0	Yes	1	16.77	116
89221	165	R. minima var minima	Mali, Niono	14.18N						1	10	0	0	V. slight	1	19.30	128
92593	255	R. senna	Unknown							1	36	0	0	V. slight	1	15.17	80
92648	27	R. diversifolia	Colombia, Valle	3.33N	1700	800		8.5	C	4	45	0	0	Yes	1	16.41	81
Q10629	261	R. minima aff.	Aust., Collinsville, Q	20.40S						6	6	0	1		1	+	44
Q10074	52	R. oblatifoliata	Ethiopia, Addis Ababa	9.03N						8	2	0	0	Lightly	3	44.98	185
76213	268	R. sp.	Belize	20.50N	30	1450				1	21	0	0	Yes	2	29.28	127

A variable group from fine twining pubescent vines to more robust larger leaved types with hairy leaves and stems (21 and 22) mostly flowering and seeding throughout the year but some autumn winter flowering (21 and 22). Seeds mostly U shaped of variable colours mostly browns.

GROUP 6 (5 Members)

34131	11	R. densiflora spp stuhlmanii	Tanzania, Arusha	3.37S						3	19	0	1	Strongly	1	14.68	197
52690	102	R. densiflora spp stuhlmanii	Tanzania, Mara	2.30S	1500	750				4	16	0	1	Strongly	1	14.33	180
52691	103	R. densiflora spp stuhlmanii	Tanzania, Arusha	2.42S	1500	700	M			4	29	0	1	Strongly	1	12.66	191
52692	106	R. densiflora spp stuhlmanii	Tanzania, Shinyanga	2.30S	1500	750	M			4	25	0	1	Strongly	1	12.01	191
78173	237	R. densiflora aff.	Botswana, Ngwaketse	24.45S						3	10	0	1	Strongly	1	38.93	110

Small to medium sized, pubescent, trailing and twining plants with small to medium sized leaves. Flowered late in autumn and winter with 237 flowering in summer. Seed set in 237 poor. Seed varied from similar shaped, grey to greyish brown (11) through bean shaped very light beige to kidney shaped, brown with dark marking and green aril (237).

Access No. *	Proj. No.	Species (After L. Pedley)	ORIGIN Country, Province	Lat.	Alt. (m)	Rain fall	Soil Text +	pH	React. ØØ	Grow Hab. Ø	Resin Glands **	Viscid Stem Ø	Viscid Pod Ø	Pod Aroma	Pod Retn Ø	Seed Wt ***	Day to Flower
			GROUP 7 (2 Members)														
78463	311	R. diversifolia var prostrata	Argentina, Corrientes	29.15S	107	1170	Y		A	8	24	0	0		2	20.41	+
92334	39	R. volubilis	China, Kwangsi							2	32	0	0	Yes	4	39.09	135

R. volubilis is a medium sized, twining trailing, hairy vine, flowering in autumn or late spring. Seeds rounded black and shiny.

			GROUP 8 (15 Members)														
Q17408	126	R. minima var tomentosa	Australia, Parada, Q	17.08S	485	814				1	21	0	0	Yes	1	10.28	141
Q22181	289	R. minima var tomentosa	Australia, Mt Garnet, Q	18.11S	649	722				1	22	0	0	Yes	1	11.88	116
Q22182	290	R. minima var tomentosa	Australia, Mareeba, Q	16.45S	335	928				1	9	0	0	Yes	1	9.55	58
Q22183	291	R. minima var tomentosa	Aust., Irvinebank, Q	17.25S	755	839				1	17	0	0	Yes	1	10.93	115
Q22184	296	R. minima var tomentosa	Australia, The Lynd, Q	18.54S						1	34	0	0	Yes	1	12.80	106
Q22185	297	R. minima var tomentosa	Aust., Mt Surprise, Q	18.22S	453	799				1	14	0	0	Yes	1	12.08	123
Q22186	298	R. minima var tomentosa	Australia, Archer Ck, Q	17.39S						1	26	0	0	Yes	1	14.49	112
Q22187	299	R. minima var tomentosa	Aust., Tinaroo Ck, Q	17.05S	714	1260				1	22	0	0	Yes	1	9.54	126
Q22188	300	R. minima var tomentosa	Australia, Mareeba, Q	17.06S	335	928				1	23	0	0	Yes	1	11.10	66
Q22189	301	R. minima var tomentosa	Australia, Chillagoe, Q	17.08S						1	28	0	0	Yes	1	13.59	126
Q22190	303	R. minima var minima	Aust., Tinaroo Ck, Q	17.05S	714	1260				1	8	0	0	Yes	1	10.99	126
Q22191	304	R. minima var tomentosa	Australia, Petford, Q	17.20S						1	15	0	0	Yes	1	9.03	123
Q22192	305	R. minima var tomentosa	Australia, Almaden, Q	17.18S						1	27	0	0	Yes	1	8.86	126
Q22193	306	R. minima var tomentosa	Australia, Ravenshoe, Q	17.38S						1	17	0	0	Yes	1	12.15	102
Q22194	308	R. minima var minima	Australia, Walsh R., Q	17.08S	-	840				1	36	0	0	Yes	1	8.80	133

An even group of fine twining vines with small leaves (290 was densest and leafiest). Leaves and stems pubescent. Flowers autumn, winter, spring. Seeds bean shaped, grey to dark grey with slight beige and dark reddish-brown marking. Pod aroma is similar to those R. minima from the Americas and some from Africa. A regional group from the Atherton Tablelands and hinterland.

			GROUP 9 (13 Members)														
Q22204	235	R. minima var eurycarpa	Australia, Julia Ck, Q	20.14S	125	458				1	10	0	1	Yes	2	17.22	71
Q22205	272	R. minima var nuda	Australia, Julia Ck, Q	20.39S	125	458				1	13	0	1	Yes	2	13.64	75
CQ1372	264	R. minima var eurycarpa	Australia, Longreach, Q	23.25S	191	442				1	6	0	1	Yes	2	15.06	68
Q22207	159	R. minima var eurycarpa	Aust., Charleville, Q	26.24S	304	515				1		0	1	Lightly	1	13.74	43
TPI 49	14	R. minima var eurycarpa	Australia, McDonnel, Q	11.30S						2	11	0	1	Lightly	2	12.36	123
CQ795	138	R. minima var eurycarpa	Aust., Katherine, NT	14.29S	120	871				2	11	0	1	Lightly	2	20.41	142
Q22208	292	R. minima var eurycarpa	Australia, Dalby, Q	20.19S	342	673				2	8	0	1	Lightly	2	14.74	100
Q22206	271	R. minima var eurycarpa	Australia, Doomadgee, Q	18.00S						1	9	0	1	Yes	2	16.17	106
TPI 32	259	R. minima var eurycarpa	Aust., Charters Twrs, Q	19.50S	306	650				1	11	0	1	Yes	1	11.48	75
Q22209	177	R. minima var eurycarpa	Australia, Amberley, Q	27.37S	25	887				3	2	0	1	Lightly	1	10.64	96
Q22210	192	R. minima var minima	Australia, Biloela, Q	24.24S	173	699				3	7	0	1	Lightly	1	9.12	71
Q22211	238	R. minima var eurycarpa	Australia, Gayndah, Q	25.38S	104	786				3	9	0	1	Lightly	1	10.74	64
Q22212	295	R. minima var eurycarpa	Australia, Reid R, Q	19.49S	74	929				3	5	0	1	Lightly	1	9.18	58

Several groups of similar lines 14 and 138 from north Queensland. 177, 192, 238, 292 and 295 from central south-east Queensland. 235, 271, 264 and 159 from western Queensland that form a variable group of twining and trailing vines which flower most of the year with often rapid seed shattering.

			GROUP 10 (2 Members)														
33828	15	R. americana	Mexico, Vera Cruz	18.54N			Y			3	16	0	0	Yes	1	15.19	94
90477	26	R. americana	Mexico, San Luis Potosi	22.28N	1500	700	M	7.5	C	4	1	0	0	Yes	1	21.96	81

A unifoliate trailing and twining vine with medium to large leaves, pubescent. Flowers most of the year. Seeds are U shaped, 15 is light brown with lighter and darker markings and 26 pinkish grey with lighter greenish markings.

Access No. *	Proj. No.	Species (After L. Pedley)	ORIGIN Country, Province	Lat.	Alt. (m)	Rain fall	Soil Text +	pH	Re act. ##	Grow Hab. #	Resin Glands **	Viscid Stem #	Viscid Pod #	Pod Aroma	Pod Retn #	Seed Wt ***	Day to Flower
			GROUP 11 (9 Members)														
CQ2796	141	R. minima var nuda	Aust., Katherine, NT	14.29S	120	871				7	16	0	0		2	16.86	172
Q22196	166	R. minima var nuda	Aust., Wave Hill, NT	17.25S						7	10	0	0	Yes	2	17.08	123
Q22199	276	R. minima var nuda	Aust., Wave Hill, NT	17.29S						7	4	0	0	Yes	2	16.44	75
Q22195	142	R. minima var nuda	Aust., Top Springs, NT	16.38S						7	14	0	0	Yes	2	22.16	135
Q22197	167	R. minima var nuda	Aust., Top Springs, NT	16.20S						7	6	0	0	Yes	2	18.87	141
Q22198	275	R. minima var nuda	Aust., Top Springs, NT	16.38S						7	11	0	0	Yes	2	+	142
Q22200	277	R. minima var nuda	Aust., Mooloolo, NT	16.20S						7	21	0	0	Yes	2	18.63	130
Q22201	278	R. minima var nuda	Aust., Kidman Spr., NT	16.20S		635				7	11	0	0	Yes	2	20.84	116
Q22202	270	R. minima var nuda	Aust., Kimberley RS, WA	15.39S	46	787				7		0	0		2	+	171

An even group of Australian natives from the Northern Territory and Northern Western Australia. They are trailing, late summer, autumn and winter flowering.

GROUP 12 (2 Members)

79069	29	R. (Nomismia?) aurea	India, Haytnager	17.22N						8		0	0		4	22.51	171
89309	30	R. (Nomismia?) aurea	India, Hyderabad	17.32N	600					8	12	0	0		4	22.58	126

Prostrate annauls, small leaved, with hairy stems and leaves. Autumn/winter flowering before dying off. Pod set poor. Seeds elongated U shaped with aril. Greyish pink with brown markings.

GROUP 13 (10 Members)

52703	110	R. minima var falcata	Madagascar, Tulear	23.00S	450	600	Y			1	9	0	1	V. slight	2	14.17	114
52677 B	132	R. minima var falcata	Sth Africa, Cape	33.38S	150	550	S			1	14	0	1	V. slight	2	14.31	117
60335	119	R. minima var falcata	Sth Africa, Transvaal	25.35S	182	550	M		C	1	9	0	1	V. slight	2	14.18	71
52679	35	Chrysoscias sp	Sth Africa, Cape	32.46S						3	0	0	0	V. slight	1	17.89	94
52126	204	R. senna var texana	Paraguay, Charo Rio Verde							1		0	0	Strongly	2	12.50	96
Q22215	294	R. minima var nuda	Australia, Reid R, Q	19.43S	74	929				2	12	0	0	V. slight	1	10.13	46
P7683	158	R. minima var nuda	Aust., Warialda, NSW	29.33S	320	680			C	3	4	0	0		1	12.62	45
Q22213	232	R. minima var nuda	Aust., Harrisville, Q	27.48S	45	937				3	5	0	0	V. slight	1	11.54	64
Q22312	286	R. minima var nuda	Australia, Warwick, Q	28.03S	455	702				3	29	0	0	V. slight	1	11.40	39
50977	201	R. minima var nuda	Unknown							3	6	0	0	V. slight	1	9.04	43

A fine to medium sized group of twining to semi-erect vines similar to group 526 but with pods with enlarged glands with hairs which become sticky. Flowers and seed most of the year. Seeds bean to U shaped, grey to brown with lighter or darker marking.

GROUP 14 (2 Members)

Q22313	287	R. minima var eurycarpa	Australia, Dalby, Q	27.03S	342	673				3	5	0	1	Yes	1	14.78	89
Q22214	307	R. minima var nuda	Australia, Kalanga, Q	17.27S	899	1124				3	10	0	0	V. slight	1	14.42	66

Fine trailing and weakly twining lines, 287 summer flowering, 307 flowering most of the year.

GROUP 15 (100 Members)

17838	193	R. kilamandsharica	Kenya							1	12	0	0	Yes	1	8.61	204
Q9850	87	R. minima var minima	Brazil, Bahia	19.26S						1	21	0	0	Strongly	1	13.36	190
Q9851	139	R. minima var minima	Brazil, Pernambuco	7.50S						1	26	0	0	Strongly	1	14.30	196
Q10038	89	R. minima var minima	Brazil, Para	7.51S						1	30	0	0	Strongly	1	16.92	182
Q10041	88	R. minima var minima	Brazil, Para	7.22S		341	G			1	19	0	0	Strongly	1	20.18	198
Q10121	256	R. minima var minima	Peru, Piaui	5.15S						1	13	0	0	Strongly	1	12.92	169
Q10122	257	R. minima var minima	Peru, Piaui	5.15S						1	6	0	0	Strongly	1	11.96	169
P7107	140	R. minima var minima	Mexico, Oaxaca	16.45N						1	8	0	0	Strongly	1	14.62	192

Access No. *	Proj. No.	Species (After L. Pedley)	ORIGIN Country, Province	Lat.	Alt. (m)	Rain fall	Soil Text +	pH	React. ØØ	Grow Hab. Ø	Resin Glands **	Viscid Stem Ø	Viscid Pod Ø	Pod Aroma	Pod Retn Ø	Seed Wt ***	Day to Flower
				GROUP 15 (cont'd)													
36696	114	R. minima var minima	Mexico, Vera Cruz	18.55N	900					1	18	0	0	Yes	1	11.31	158
36696	143	R. minima var minima	Mexico, Vera Cruz	18.55N	900					1		0	0	Yes	1	11.71	158
36697	179	R. minima var minima	Mexico, Vera Cruz	18.45N	150					1	18	0	0	Yes	1	12.08	180
37155	144	R. minima var minima	Mexico, Vera Cruz	18.45N						1	25	0	0	Yes	1	12.52	78
37221	145	R. minima var minima	Mexico, Jalisco	20.40N	1550					1	17	0	0	Yes	1	16.42	158
37324	146	R. minima var minima	Honduras, Fran. Morazan	14.10N						1	10	0	0	Yes	1	12.94	208
37396	127	R. minima var minima	Nicaragua, Managua	12.19N	350					1	13	0	0	Yes	1	9.72	71
37410	241	R. minima var minima	Nicaragua, Managua	12.18N	100					1	32	0	0	Yes	1	11.23	141
37595	246	R. minima var minima	Bolivia, Santa Cruz	17.38S	450		S			1	8	0	0	Yes	1	11.04	116
37634	128	R. minima var minima	Bolivia, Santa Cruz	18.08S	600					1	15	0	0	Yes	1	10.94	150
40225	242	R. minima var minima	Bolivia, Santa Cruz	18.08S	600					1	29	0	0	Yes	1	11.20	131
40227	251	R. minima var minima	Bolivia, Santa Cruz	17.45S						1	21	0	0	Yes	1	10.32	148
49792	115	R. minima var minima	Brazil, Sao Paulo	21.68S	350	1100				1	20	0	0	Yes	1	9.91	110
50267	200	R. minima var minima	Unknown							1	17	0	0	Yes	1	12.59	197
51043	131	R. minima var minima	Unknown							1	29	0	0	Yes	1	13.62	87
51588	118	R. minima var minima	Venezuela, Sucre	110.48N						1	7	0	0	Yes	1	12.08	57
58642	189	R. minima var minima	Mexico, Tamaulipas	22.33N	60	700	M		C	1	28	0	0	Yes	1	14.17	46
63458	136	R. minima var minima	Brazil, Paraiba	7.05S		300				1	13	0	0	Yes	1	20.92	211
68896	180	R. minima var minima	Unknown							1	13	0	0	Yes	1	22.42	187
68897	153	R. minima var minima	Unknown							1	14	0	0	Yes	1	19.97	187
70356	168	R. minima var minima	Antigua, St George	17.07N						1	4	0	0	Yes	1	10.44	215
70357	169	R. minima var minima	Antigua, St George	17.08N						1	6	0	0	Yes	1	10.02	215
71865	96	R. minima var minima	Brazil, Sao Paulo							1	32	0	0	Yes	1	18.75	207
76221	211	R. minima var minima	Mexico, Yucatan	21.10N	5	666	S			1	9	0	0	Yes	1	12.04	64
76225	101	R. minima var minima	Mexico, Yucatan	21.22N	10	1050	C			1	19	0	0	Yes	1	10.57	147
76230	191	R. minima var minima	Mexico, Quintana Roo	20.05N	5	1350	C			1		0	0	Yes	1	11.91	66
78466	182	R. minima var minima	Argentina, Jujuy	24.17S	1250	650	L	7.7	C	1	36	0	0	Yes	1	13.96	113
81386	156	R. minima var minima	Mexico, Sinaloa	25.18N	200	450	M			1	18	0	0	Yes	3	17.63	51
82311	183	R. minima var minima	Cuba, Matanzas	23.10N	30	1400		8.0	C	1	5	0	0	Yes	1	13.45	46
85831	219	R. minima var minima	Mexico, Guerrero	18.22N	740	1040	C	7.2	B	1	24	0	0	Yes	1	17.04	155
90835	221	R. minima var minima	Mexico, Sonora	28.40N	400	400	L	8.5	C	1	15	0	1	Yes	1	16.37	71
90860 A	222	R. minima var minima	Mexico, Sonora	27.40N						1	6	0	0	Yes	3	18.40	82
91137	228	R. minima var minima	Mexico, Guerrero	18.27N	1450	1150	M	7.0	B	1	8	0	0	Yes	1	16.75	141
91170	178	R. minima var minima	Mexico, Geurrero	18.27N	1450	1000	L			1	6	0	0	Yes	1	14.65	161
CQ717	258	R. minima var minima	Unknown	27.30S						1	11	0	0	Strongly	1	8.02	73
33976	239	R. minima var minima	Costa Rica, Guanacaste	10.26N	70					1	23	0	0	Yes	1	13.33	53
34875	243	R. minima var minima	Mexico, Oaxaca	16.51N						1	12	0	0	Yes	1	16.34	164
36250	95	R. minima var minima	Brazil, Rio de Janeiro	22.51S						1	12	0	0	Yes	1	15.22	63
36696	198	R. minima var minima	Mexico, Vera Cruz	22.53S	900					1		0	0	Yes	1	12.26	148
37159	199	R. minima var minima	Mexico, Vera Cruz	18.45N	300					1	28	0	0	Yes	1	12.10	68
37333	245	R. minima var minima	Nicaragua, Managua	12.06N	15					1	13	0	0	Yes	1	9.12	43
37394	147	R. minima var minima	Nicaragua, Managua	12.19N	350					1	18	0	0	Yes	1	14.35	143
49808	129	R. minima var minima	Brazil, Bahia	12.00N						1	12	0	0	Yes	1	13.78	46
51370	202	R. minima var minima	Brazil, Bahia							1	27	0	0	Yes	1	13.45	56
55792	206	R. minima var minima	Panama, Panama City	9.03N			M			1	16	0	0	Yes	1	8.46	50
58641	207	R. minima var minima	Mexico, Tamaulipas	22.22N	280	1100	M		C	1	16	0	0	Yes	1	14.05	59
Q22309	253	R. minima var minima	Unknown							1		0	0	Yes	1	10.85	148
61203	97	R. minima var minima	Colombia, Magdalena	10.17N	200					1	25	0	0	Yes	1	10.46	56
61203	209	R. minima var minima	Colombia, Magdalena	10.17N						1		0	0	Yes	1	11.29	43
69078	162	R. minima var minima	Belize							1	3	0	0	Yes	1	14.01	45
70355	210	R. minima var minima	St Kitts	17.66N						1	7	0	0	Yes	1	9.68	64
76219	170	R. minima var minima	Unknown							1	5	0	0	Yes	1	14.79	45
76220	98	R. minima var minima	Mexico, Yucatan	21.01N	5	940	L			1	14	0	0	Yes	1	17.05	51
76223	99	R. minima var minima	Mexico, Yucatan	21.01N	10	900				1	11	0	0	Yes	1	12.64	63
76224	100	R. minima var minima	Mexico, Yucatan	20.44N	50	1150				1	20	0	0	Yes	1	10.17	63
76226	212	R. minima var minima	Mexico, Yucatan	20.27N	55	1150				1	11	0	0	Yes	1	14.45	71

Access No. *	Proj. No.	Species (After L. Pedley)	ORIGIN Country, Province	Lat.	Alt. (m)	Rain fall	Soil Text +	pH	React. ##	Grow Hab. #	Resin Glands **	Viscid Stem #	Viscid Pod #	Pod Aroma	Pod Retn #	Seed Wt ***	Day to Flower
							GROUP 15 (cont'd)										
76227	120	R. minima var minima	Mexico, Yucatan	20.11N	125	1150	C			1	6	0	0	Yes	1	15.61	46
76228	213	R. minima var minima	Mexico, Yucatan	20.11N	125	1150	G			1	11	0	0	Yes	1	16.11	38
76229	171	R. minima var minima	Belize	18.25N	5	1400	C			1	8	0	0	Yes	1	10.40	61
76231	214	R. minima var minima	Mexico, Campeche	19.47N	5	1000	G			1	14	0	0	Yes	1	13.35	59
76232	215	R. minima var minima	Mexico, Campeche	19.52N	50	1000				1	10	0	0	Yes	1	14.41	64
76235	181	R. minima var minima	Mexico, Campeche	19.42N	50	1000	G			1	21	0	0	Yes	2	15.26	66
76236	163	R. minima var minima	Mexico, Campeche	19.47N	50	1100	G			1	14	0	0	Yes	1	19.30	66
78473	216	R. minima var nuda	Argentina, Salta	24.46S	1325	690	M	6.3	A	1	30	0	0	Yes	1	14.15	121
79668	172	R. minima var minima	Cuba, Santiago de Cuba	20.00N	5	1000	L	7.0	B	1	13	0	0	Yes	1	9.86	46
81380	173	R. minima var minima	Mexico, Sinaloa	22.48N	2	1000				1	8	0	0	Yes	1	11.45	50
81381	174	R. minima var minima	Mexico, Sinaloa	23.00N	20	1000				1	24	0	0	Yes	1	13.94	171
81382	122	R. minima var minima	Mexico, Sinaloa	24.45N	50	450				1	23	0	0	Yes	1	13.47	63
81384	175	R. minima var minima	Mexico, Sinaloa	24.50N	30	450				1	18	0	0	Yes	3	15.00	68
81385	116	R. minima var minima	Mexico, Sinaloa	24.50N	30	450				1	13	0	0	Yes	3	18.05	114
81387	176	R. minima var minima	Mexico, Sinaloa	25.48N	15	310				1	20	0	0	Yes	3	13.36	57
81728	137	R. minima var minima	Colombia, Cauco	1.55N	750					1	11	0	0	Yes	1	11.62	63
81729	254	R. minima var minima	Ecuador, Manabi	1.05S	350					1	14	0	0	Yes	1	12.73	43
82308	217	R. minima var minima	Cuba, La Habane	23.06S	5	1300		8.5	C	1	8	0	0	Yes	1	13.02	43
82309	91	R. minima var minima	Cuba, Guantanamo	20.22N	250	1200		7.0	B	1	7	0	0	Yes	3	18.25	63
82310	157	R. minima var minima	Cuba, Santiago de Cuba	20.00N	50	1000		8.0	C	1	18	0	0	Yes	1	9.66	50
84522	218	R. minima var minima	Mexico, Sinaloa	24.42N	84	700	C	8.2	C	1	25	0	0	Yes	2	18.50	96
84953	184	R. minima var minima	Mexico, Morelos	18.30N	1100	1000	Y	7.0	B	1	11	0	0	Yes	1	19.02	151
86151	125	R. minima var minima	Mexico, Nayarit	21.20N	900	1000	L	6.5	A	1	10	0	0	Yes	1	11.81	78
87555	220	R. minima var minima	Mexico, Vera Cruz	18.28N	70	1400	L	6.0	A	1	7	0	0	Yes	1	14.25	56
89294	285	R. minima var minima	Mexico, Quintana Roo							1	9	0	0	Yes	1	15.15	43
90860 B	86	R. minima var minima	Mexico, Sonora	27.40N	500	700	L	6.5	A	1	15	0	0	Yes	2	18.67	52
90855	224	R. minima var minima	Mexico, Sonora	27.44N						1	8	0	0	Yes	3	17.78	59
90884	223	R. minima var minima	Mexico, Sinaloa	26.00N	150	300	D			1	13	0	0	Yes	3	17.31	96
90918	225	R. minima var minima	Mexico, Sinaloa	23.56N	10	700	L			1	9	0	0	Yes	3	13.45	124
91091	227	R. minima var minima	Mexico, Sinaloa	22.49N	10	1000	L	6.0	A	1	20	0	0	Yes	1	16.04	71
91104	229	R. minima var minima	Mexico, Sinaloa	23.00N	50	1000	L	6.5	A	1	28	0	0	Yes	1	15.96	106
91159	230	R. minima var minima	Mexico, Guerrero	18.26N	8000	9000	L			1	16	0	0	Yes	1	14.39	140
91440	231	R. minima var minima	Mexico, Campeche	19.48N	3	1094	L	8.0	C	1	18	0	0	Yes	1	13.96	50
91955	185	R. minima var minima	Cuba, Matanzas	23.10N						1	6	0	0	Yes	1	12.40	46
92943	312	R. minima var minima	Brazil							1	11	0	0	Yes	1	11.88	+
93010	313	R. minima var minima	Brazil, Parana	21.58S	500					1	18	0	0	Yes	1	10.21	+

A very large relatively even group of twining, medium to fine vines with small to medium sized leaves. Leaf and stem hair vary from almost glabrous to pubescent. Flowering generally continues throughout the year. Seeds are bean or kidney shaped, brown to dark grey with lighter and darker marking.

							GROUP 16 (8 Members)										
76209	267	R. longeracemosa	Belize	17.08N	140	1400	C			1	12	0	0	Yes	2	21.71	204
76218	279	R. longeracemosa	Mexico, Campeche	19.52N	50	1000	C			1	3	0	0	Yes	2	23.46	163
87534	13	R. longeracemosa	Mexico, Vera Cruz	18.30N	220	2300	M	6.5	A	1	10	0	0	Yes	2	20.26	239
87543	19	R. longeracemosa	Mexico, Vera Cruz	18.28N	200	2200	M	6.5	A	1	11	0	0	Yes	2	22.42	213
87853	10	R. longeracemosa	Mexico, Chiapas	16.51N	1000	1000	L			1	24	0	0		2	20.02	300
76210	323	R. longeracemosa	Guatemala, Peten	17.12N	150	2000		5.7		1	16	0	0		2	19.33	+
76214	324	R. longeracemosa	Mexico, Quintana Roo	20.59N	5	1500	G			1	10	0	0		2	20.19	+
76215	325	R. longeracemosa	Mexico, Quintana Roo	21.00N	5	1500	C			1	10	0	0		2	+	+

Robust, twining vines with hairy stems and medium to large hairy leaves. Racemes sometimes branched. Flowers in autumn and or winter with some light flowering in spring. Seeds U to scimitar shaped, grey to greyish brown with lighter and darker markings.

Access No. *	Proj. No.	Species (After L. Pedley)	ORIGIN Country, Province	Lat.	Alt. (m)	Rain fall	Soil Text +	pH	Re act. ØØ	Grow Hab. Ø	Resin Glands **	Viscid Stem Ø	Viscid Pod #	Pod Aroma	Pod Retn Ø	Seed Wt ***	Day to Flower
			GROUP 17 (9 Members)														
36542	46	R. pyramidalis	Unknown							1	11	0	0	Strongly	4	79.35	158
36544	47	R. pyramidalis	Unknown							1	9	0	0	Strongly	4	76.98	171
38068	48	R. pyramidalis	Unknown							1	7	0	0	Strongly	4	76.81	168
50758	49	R. pyramidalis	Unknown							1	20	0	0	Strongly	4	72.24	171
81388	50	R. pyramidalis	Mexico, Sinoloa	25.33N	20	460	M			1	15	0	0	Strongly	4	78.68	140
90871	51	R. pyramidalis	Mexico, Sonora	27.03N	350	540	L	8.0	C	1	17	0	0	Strongly	4	87.12	122
35794	40	R. phaseoloides	Brazil, Matao							1	35	0	0	Strongly	4	40.43	203
58397	41	R. phaseoloides (aff.)	Brazil, Sao Paulo							1		0	0	No	4	38.34	213
52682	42	R. luteola var verdickii	Zambia, Eastern	13.47S	630	750	S		A	1		0	0	Yes	3	64.86	182

Robust, large leaved pubescent vines. Flowering autumn, winter and spring (except 40 and 41 winter). Seeds large, rounded, black and red. (42 light to dark brown). Stem hairs sticky in 42 which is very large and robust.

			GROUP 18 (2 Members)														
52697	38	R. hirta	Zimbabwe, Melsetter	19.31S	1200	900				1		0	0	No	3	70.10	+
65854	37	R. hirta	Unknown							1		0	0	No	3	73.96	309

A very robust, large leaved hairy vine, the stem hairs lightly sticky. Winter flowering, seeds large, rounded, dark blue.

			GROUP 19 (12 Members)														
CQ998	4	Eriosema edule	Unknown							1	8	1	1	Yes	1	27.32	72
29081	5	Eriosema edule	Unknown							1	6	1	1		1	25.34	72
36251	2	Eriosema edule	Brazil, Sao Paulo	23.00S						1	23	1	1	Yes	1	13.09	163
37647	7	Eriosema edule	Bolivia, Santa Catarina	18.08S	630					1	5	1	1	Yes	1	33.47	123
52127	8	Eriosema edule	Paraguay							1	6	1	1	Yes	1	31.65	100
56379	1	Eriosema edule	Brazil, Sao Paulo							1	11	1	1	Yes	1	26.97	115
78468	3	Eriosema edule	Argentina, Cordoba	31.24S	800	1100	G	8.0	C	1	11	1	1	Yes	1	38.82	52
78476	6	Eriosema edule	Argentina, Corrientas	28.16S	75	1100	S	6.0	A	1	19	1	1	Yes	1	25.93	63
90902	20	Eriosema edule	Mexico, Sinaloa	26.48N	1150	800	Y	6.0	A	1	1	1	1	Yes	1	35.87	63
93017	314	Eriosema edule	Brazil, Sao Paulo	21.40S	600		Y			1	8	1	1	Lightly	1	27.21	+
93022	315	Eriosema edule	Brazil, Sao Paulo	21.14S	525		L			1	7	1	1	Lightly	1	23.51	+
55796	320	Eriosema edule	Brazil, Bahia	10.31S	550		L			1	8	1	1		1	+	+

A group of South American plants that are medium sized twining vines with medium sized, hairy and sticky leaves and stems. Many new shoots originate from underground (but may not be rhizomatous). Racemes sometimes branched. Flowers throughout the year as a rule. Seeds scimetar shaped, brown and dark brown with lighter markings as a rule.

			GROUP 20 (6 Members)														
52743	56	R. sublobata	Madagascar, Andranovory	23.10S	300	550	Y			1	3	1	0	Yes	2	39.00	+
Q17446	310	R. sublobata	Unknown							1	1	1	0	Yes	2	40.40	134
52728	55	R. sublobata	Zambia, Northern	13.47S	600	750	L		A	1	4	1	0	Yes	2	43.55	140
73057	64	R. sublobata	Malawi, Southern	16.33S						1	3	1	0	Yes	2	51.16	+
73058	65	R. sublobata	Malawi, Southern	16.33S						1	3	1	0	Yes	2	53.17	147
60338	67	R. sublobata	Kenya, Coast	4.04S	30	1250	S		C	1		1	0	Yes	2	58.78	115

These were a group of medium to large vines with large leaves. Stems sticky and leaves hairy and usually sticky. Once flowering commenced it continued throughout the year. Seeds large and rounded tending to bean shaped and were dark grey, black or very dark brown with slight lighter markings.

Access No. *	Proj. No.	Species (After L. Pedley)	ORIGIN Country, Province	Lat.	Alt. (m)	Rain fall	Soil Text +	pH	React. ØØ	Grow Hab. Ø	Resin Glands **	Viscid Stem Ø	Viscid Pod Ø	Pod Aroma	Pod Retn Ø	Seed Wt ***	Day to Flower
			GROUP 21 (10 Members)														
52731	58	R. sublobata	Tanzania, Morogoro	7.10S	500	800				1	4	1	0	Yes	2	52.64	165
52729	59	R. sublobata	Zambia, Northern	13.47S	600	750	Y			1	8	1	0	Yes	2	59.54	176
65480	62	R. sublobata	Zimbabwe, Nyamandhlovu	19.31S						1	7	1	0	Yes	2	58.25	169
69502	63	R. sublobata	Zimbabwe, Nyamandhlovu	19.31S						1	7	1	0	Yes	2	73.23	128
52727	57	R. sublobata	Zambia							1	1	1	0	Yes	2	57.00	197
43785	60	R. sublobata	Zambia, Southern							1	6	1	0	Yes	2	60.00	203
77003	66	R. sublobata	Zambia, Central	15.39S						1	1	1	0	Yes	2	58.27	218
52684	61	R. sublobata aff.	Tanzania, Mara	2.30S	1500	750				1	1	1	0	Yes	2	68.81	181
90761	75	R. sp	Mexico, Chihuahua	28.29N	1900	350	L			1	57	0	1	No	2	108.33	129
30232	45	R. rothii	India							1	7	0	1	Strongly	3	73.25	100

A very similar group to 21 with again medium to large vines with large leaves. Stems and leaves were hairy and both usually sticky. Mainly autumn, winter and spring flowering. 45 summer flowering. Seeds large rounded tending to bean shaped, mostly dark grey, black and very dark brown (45 light yellowish green with dark brown markings).

			GROUP 22 (17 Members)														
67324	282	R. totta var fenchelii	Namibia, Ovamboland	19.00S						1	8	0	0	Yes	2	50.83	64
78172	84	R. totta	Sth Africa, Orange	28.13S						1	1	0	0	Yes	2	38.21	81
52742	70	R. totta	Zambia, Northern	11.50S	1200	1150	C			1	9	0	0	Yes	2	36.33	163
77004	74	R. totta	Zambia, Central	15.39S						1	16	0	0	Yes	2	39.40	161
60339	82	R. totta	Sth Africa, Transvaal	22.23S	485	350	L		B	1	2	0	0	Yes	2	26.01	56
60342	77	R. totta	Botswana, Central	20.10S	818	450	S		B	1	11	0	0	Yes	2	42.69	69
Q22311	85	R. totta	Unknown							1		0	0	Yes	2	38.26	72
60332	72	R. totta	Zimbabwe, Nyamandhlovu	19.22S	1121	550	L		B	1	2	0	0	Yes	2	37.05	72
60337	76	R. totta	Namibia, Ovamboland	19.49S	1318	400	Y		B	1	4	0	0	Yes	2	39.59	69
52738	79	R. totta	Zimbabwe, Wankie	19.00S	1060	650	S			1	1	0	0	Yes	2	35.80	72
52739	80	R. totta	Botswana, Ghanzi	21.38S	1100	450				1	1	0	0	Yes	2	37.99	72
72979	83	R. totta	Zimbabwe, Nyamandhlovu	19.31S			Y			1	1	0	0	Yes	2	37.07	81
52740	81	R. totta	Sth Africa, Transvaal	26.06S	1600					1	3	0	0	Yes	2	26.27	91
36145	53	R. caribaea	Unknown							1	24	0	1	No	3	37.16	147
52677	78	R. caribaea	Sth Africa, Cape	33.38S	150	700	S			1	16	0	1	No	3	39.04	93
60329	236	R. caribaea	Sth Africa, Cape	33.55S	152	800	S		B	1	27	0	0	No	2	34.66	113
52687	316	R. caribaea aff.	Sth Africa, Transvaal	23.01S	1000					1		0	0		2	+	+

A group of fine to medium sized vines with small to medium sized leaves, leaves and stems usually hairy. Seeds were elongated, kidney shaped with aril, grey or light grey with both dark brown and lighter pinkish-grey markings. Most accessions flowered throughout the year, a few only autumn, winter and spring.

			GROUP 23 (4 Members)														
25449	43	R. schimperi	India							4	17	0	0	No	2	86.28	81
67641	44	R. schimperi	India							4		0	0	No	2	77.91	81
60346	34	R. velutina	Kenya, Coast	2.38S	30	750	S		A	4		0	0		2	41.50	240
75422	54	R. usambarensis var obtusif.	Kenya, Coast	3.23S						5		0	1		+	51.85	231

A group of small semi-erect later twining plants with small pubescent leaves. Seeds variable, mainly large rounded to U-shaped (34), to bean shaped (54). Flowers throughout the year (44-43), autumn and winter (34) and winter with poor seed set (54).