

SAPIA NEWS

SOUTHERN AFRICAN PLANT INVADERS ATLAS

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Rubus species—brambles, blackberries and others

In support of **2011: International Year of Forests** this edition of SAPIA News focuses on the *Rubus* species which occur in moist habitats along forest margins, in plantations and adjacent grasslands. Most people know *Rubus* species as either blackberries or raspberries because of their edible fruits, or as brambles, that are thicket-forming problem plants.

There is no readily available information on the various *Rubus* species in South Africa and how to distinguish them. This edition of SAPIA News provides some background to the genus in South Africa and includes a short key, descriptions and photos of the major species. It is hoped that this newsletter will assist the public in distinguishing between indigenous and invasive alien species.

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R. cuneifolius (a & c), *R. fruticosus* (b), *R. niveus* (d)

There are at least 13 *Rubus* species in South Africa, about five indigenous species, eight naturalised alien species, and several natural hybrids between indigenous species and between indigenous and alien species.

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The Weeds and Invasive Plants website: www.agis.agric.za/wip is currently not being managed due to ongoing operational problems on AGIS.

Requests for information from the SAPIA database and submission of records of invasive plants should be sent directly to Lesley Henderson at L.Henderson@sanbi.org.za.

SAPIA newsletters are posted at the ARC website: www.arc.agric.za under 'News Articles'.

Rubus species—morphology, taxonomy

Rubus is a large genus of about 250 species, belonging to the Rose Family, Rosaceae, and occurs in most parts of the world, but predominantly in northern temperate regions. Most species are shrubs or low shrubs with erect, scrambling, trailing or prostrate stems that are woody and prickly. Leaves are deciduous or evergreen, entire, lobed or divided into 3–many leaflets which are usually toothed. Flowers are produced in terminal or axillary clusters or sometimes are solitary. Petals 5, alternating with sepals, white, pink, red or purple. Stamens are numerous, carpels 5–many; fruit is a ‘berry’ composed of 5–many fleshy drupelets. Many species produce edible fruits and some are grown commercially. The blackberries, and some other species with mounding or rambling growth habits, are known as **brambles**.



In many of the species the shoots (stems, canes) are biennial, bearing leaves during their first year (primocanes), and leaves and inflorescences (floricanes) in the second year. The floricanes arise from the axils of the first-year leaves. Primocanes are easily recognised by their lush and robust growth. Leaves of the first and second year often differ considerably in degree of division and lobing, e.g. pinnate-palmate (lateral leaflets re-divided) on primocanes, and 3-foliolate on floricanes.

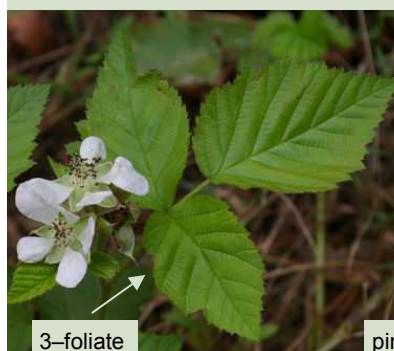
pinnate-palmate leaf on primocane

3-foliolate leaves and flowers on floricane

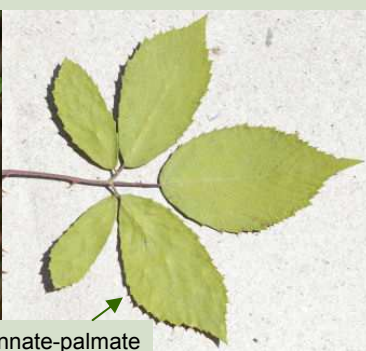


The genus *Rubus* comprises 12 subgenera of which two are represented in South Africa: subgenus *Rubus* (= *Eubatus*) and subgenus *Idaeobatus*. Subgenus *Rubus* is particularly difficult to identify because their tendency to produce seed without fertilization (apomixis), their ability, when fertile, to hybridise easily, and the occurrence of polyploidy all leads to a vast amount of variation with hundreds and possibly thousands of microspecies.

In South Africa the **subgenus *Rubus*, or true brambles or blackberries**, includes only alien species; whereas ***Idaeobatus*, or raspberries**, contains a few alien species and all the indigenous species.



3-foliolate



pinnate-palmate



pinnate



Subgenus *Rubus*—petals much larger than sepals, leaves 3–5 or more foliate (pinnate-palmate). **Alien spp.**

Subgenus *Idaeobatus*—petals equal to or smaller than sepals, leaves 3–5–7–9 foliate (pinnate). **Some alien and all indigenous spp.**

Morphological and cytogenetic studies by taxonomists of the former Botanical Research Institute in the 1980s revealed that the genus *Rubus* in South Africa ‘is a taxonomist’s nightmare’. Problems with *Rubus* taxonomy in South Africa are caused by the occurrence of apomixis, hybridization among indigenous species and between indigenous and alien species, the variation produced by breeding programmes with subsequent escape from cultivation and inadequately collected herbarium material.

A key to 13 *Rubus* species in South Africa is provided on page 4. Short descriptions and diagnostic features are also provided. A few obscure and little-known species are excluded.

Rubus species in South Africa

Habitats, distribution.

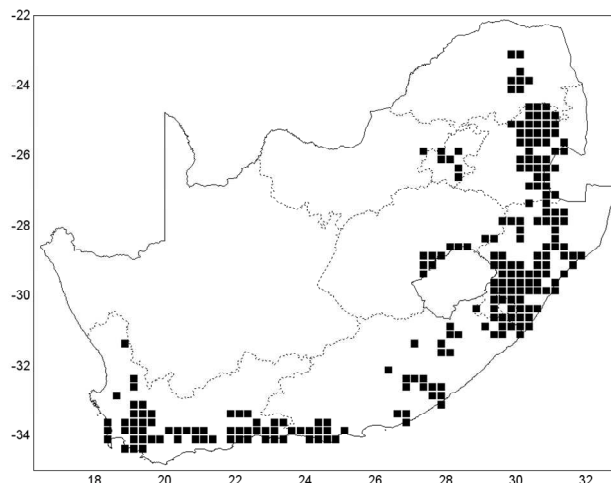
Rubus spp. occur mainly in the cool, moist, eastern parts of South Africa in grassland and along the margins of forests and plantations.



Problem species and control

All *Rubus* spp. are thorny and can form thickets, however, it is only the alien species that form extensive thickets and that cause serious problems in grazing lands, in forestry plantations, and along roadsides. Currently only two species and a hybrid are declared invaders under the Conservation of Agricultural Resources Act (CARA)—*R. cuneifolius*, American bramble, and its hybrid *R. x proteus*, and *R. fruticosus*, European blackberry. A further two species have been proposed for listing—*R. flagellaris*, American dewberry, and *R. niveus*, Ceylon or Mysore raspberry. All of these species are illustrated on pages 7–9.

Several herbicides have been registered for use against *Rubus* species, mainly as foliar applications to actively growing plants. Mechanical control alone might help to suppress *Rubus* species but will not eradicate the plants. Parts of stems and roots have the potential to grow into new plants and therefore a single mechanical operation might actually promote spread. There are no biological control agents (insects or pathogens) available for any of the *Rubus* species in South Africa.



Distribution of alien *Rubus* spp. (SAPIA database)

Rubus species reproduce from seed, root suckers and stem-tip-rooting. Control methods should aim to prevent the growth of new stems from root buds on the extensive root system—by starving the roots of nutrients (with repeated cutting, burning, browsing) and killing the roots by applying a systemic herbicide that will be translocated from the leaves and stems to the roots. (Denny 2005).

Guidelines for collecting herbarium specimens of *Rubus* spp. (Stirton 1981a)

It is important to collect:

1. One 10 cm section, with leaves, selected from the middle of a first-year cane of vegetative growth (primocane).
2. One 10 cm section, with leaves, from the middle of a flowering cane (floricane).
3. A complete inflorescence with flowers, and fruits if these are available.
4. A few petals dried separately—petals can get lost during drying process.

Accompanying notes should include: colours of petals, young and old fruits, primocanes and floricanes; whether canes are erect, arching or drooping.



Key to the identification of *Rubus* species

Compiled by Lesley Henderson from a study of herbarium specimens in the Pretoria National Herbarium, published papers and unpublished notes (see references) and personal communication with C.H. Stirton.

* = alien species

Whole plant covered with long, red, glandular hairs1. **R. phoenicolasius*

Not as above

Petals much longer than sepals (flowers large and showy)

leaves 3–5 or more pinnate-palmate; mature fruits black, shiny.....2. **R. fruticosus* agg.,
3. **R. cuneifolius* A, 4. **R. cuneifolius* B, 5. **R. flagellaris*, 6. **R. x proteus*

Petals ~ same length or shorter than sepals

leaves 5–7–9 pinnate-palmate on primocanes.....6. **R. x proteus*

leaves 5–7–9 pinnate, ~ smooth (lower surface may be slightly hairy), slightly discoloured (paler lower surface) 7. **R. rosifolius*, 8. *R. pinnatus*

leaves 3–5–7 pinnate; downy/velvety

leaves discoloured, white or grey downy beneath..... 9. *R. ludwigii*, 10. **R. immixtus*,
11. **R. niveus*, 12. *R. rigidus*, 13. *R. longepedicellatus*

leaves ~ concolorous (one colour on both surfaces), densely brownish velvety.....14. *R. apetalus*

1. **Rubus phoenicolasius*, Japanese wineberry, wine raspberry

Description: Erect shrub to 2 m tall, with arching stems; all parts covered with long, red, glandular hairs. **Stems:** Round with straightish, red or orange thorns and long, glandular, red hairs. **Leaves:** Usually 3-foliolate; leaflets large (terminal up to 100 x 60 mm), discoloured; upper surface green, lower surface densely white velvety; petioles covered in long, glandular, red hairs. **Flowers:** Petals white, much shorter than sepals; sepals large, glandular hairy. **Fruits:** Red, shiny, 10–20 mm long. **Invades:** Grassland, wasteland. **Distribution:** EC, KZN.

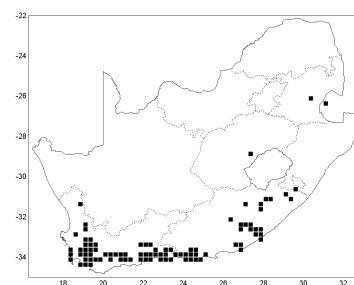
2. **Rubus fruticosus* agg., European blackberry; an extremely variable and complex aggregate of plants with about 2000 microspecies recognised.

Description: Shrub 1–2 m high with strongly arching stems; tip-rooting. **Stems:** Round or angled. **Leaves:** 3-foliolate and 5-foliolate (pinnate-palmate / lateral leaflets re-divided), the latter on both floricanes and primocanes, discoloured—upper surface green, lower sometimes grey-downy, lower surface strongly veined. **Flowers:** Petals white or pink, many in much-branched, very prickly, terminal flowerheads to 200 mm long. **Fruits:** Red turning black, fleshy, shiny. **Invades:** Grassland, forest edges, fynbos, plantations, roadsides, riverbanks. **Distribution:** WC, EC, KZN, FS, Swa, M. **CARA:** Category 2 (allowed only in demarcated areas under controlled conditions).

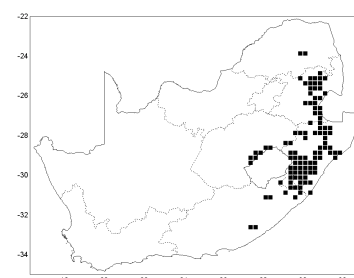
3. **Rubus cuneifolius* (Taxon A), American bramble

Description: Erect to sprawling shrub 0.5–1.5 (–2.0) m high. **Stems:** Strongly ridged. **Leaves:** Usually 3-foliolate; sometimes also 5-foliolate (pinnate-palmate) on primocanes, discoloured, green, sometimes densely grey-downy beneath, terminal leaflet of primocane leaves usually wedge-shaped (cuneate) and entire at the base. **Flowers:** Petals white, rarely pink, few, 2–5 (–10), at the ends of short leafy shoots, either axillary or terminal. **Fruits:** Red turning black, fleshy, shiny. **Invades:** Grassland, forest edges, plantations, roadsides, riverbanks. **Distribution:** EC, KZN, FS, Swa, M, L. **CARA:** Category 1 (prohibited)

Two growth forms of *R. cuneifolius* (Taxon A) occur in KZN—an approximate dividing line is that the erect type grows above 1000 m and the sprawling one below 1000 m. Both types grow side by side at Cedara, Hilton and Ixopo. The roads around Bulwer, Underberg and Mooi River are lined with the former and the latter sprawling type is concentrated around Richmond, Pietermaritzburg and New Hanover.



Distribution of *R. fruticosus*



Distribution of *R. cuneifolius* (Taxon A and B)

4. **R. cuneifolius* (Taxon B) (Mpumalanga form)

Description: Shrub 1–2 m high. **Leaves:** 3-foliolate on floricanes; 5-foliolate (pinnate-palmate) (some very large—up to 300 x 330 mm) on primocanes; slightly discoloured—not marked as in some specimens of typical *R. cuneifolius* (Taxon A); dentition slightly different to *R. cuneifolius* Taxon A—not as deeply incised. **Invades:** Grassland, forest edges, plantations, roadsides, riverbanks. **Distribution:** M, L. **CARA:** Category 1 (prohibited).

Spies *et al.* 1987: The Mpumalanga form of *R. cuneifolius* may be conspecific with *R. pascuus*. However cytogenetic information would argue against recognising *R. pascuus* at the species level. Until its status is resolved we will refer to it as *R. cuneifolius* Taxon B.

5. **Rubus flagellaris*, American dewberry

Description: Prostrate creeper, trailing and rooting at some or all shoot-tips. **Stems:** Round, slender, creeping; thorns small, slender, straight. **Leaves:** Usually 3-foliolate, leaflets large; sometimes 5-foliolate (pinnate-palmate) on both floricanes and primocanes, slightly discoloured; slightly velvety beneath, margins very coarsely serrated. **Flowers:** Petals white, very large (up to 20 mm long and 10 mm wide); flowers few (1–5), in terminal inflorescences. **Fruits:** Black, shiny; produces very little fruit. **Invades:** Forest edges, roadsides. **Distribution:** WC, M. **CARA:** Proposed category 1 (prohibited).

6. **Rubus x proteus*, natural hybrid between *R. longepedicellatus* (indigenous) and *R. cuneifolius* Taxon B.

Description: Erect to sprawling shrub; thicket-forming. **Stems:** Round to strongly ridged, smooth to hairy, thorns straight or recurved. **Leaves:** 3–5-foliolate (pinnate and pinnate-palmate) on floricanes; 5–7–9 pinnate-palmate on primocanes, concolorous or discoloured, leaflets often very large on both floricanes and primocanes (> 100 mm long). **Flowers:** Petals white or pink; petal length may be greater than, equal to or less than sepal length, inflorescence short to long, slightly or very prickly. **Fruits:** Yellow, turning red or black. **Invades:** Grassland, roadsides, edges of forest, plantations and streams. **Distribution:** KZN, M, L. **CARA:** Category 1 (prohibited).

R. x proteus was named by C.H. Stirton in the 1980s but it has never formally been described. The parent species are clearly separated morphologically with a continuous bridge of morphological characters spanning the gap between them in the form of the very variable hybrid species *R. x proteus*. Subsequent backcrosses and intercrosses between the hybrid and the parent species has resulted in a continuous variable hybrid swarm which is centred in the Graskop/Sabie area of Mpumalanga.

Table of features separating the hybrid complex *R. x proteus* from similar *Rubus* species in Mpumalanga

Character	<i>R. cuneifolius</i>	<i>R. longepedicellatus</i>	<i>R. x proteus</i>	<i>R. fruticosus</i>
inflorescence length	short to medium	medium to long	short to long	long and much-branched
petal length	longer than the sepals	~ same length or shorter than sepals	longer than sepals to shorter than sepals	longer than sepals
petal colour	white	pink	deep or pale pink or white	pink
primocane leaves	*pinnate-palmate	#pinnate	Pinnate-palmate	Pinnate-palmate

* pinnate-palmate: lower leaflets re-divided; # pinnate: leaflets in opposite pairs

The parent species of *R. x proteus* can be separated mainly on inflorescence length, petal length and colour, and whether the leaves on the primocane are pinnate or pinnate-palmate. *R. fruticosus* can be distinguished by its much-branched, long, and very prickly inflorescence.

7. **Rubus rosifolius*, rose-leaf bramble, raspberry

Description: Low, straggling, perennial herb or shrub; leaves and stems usually covered with glistening sessile greenish-yellow glands. **Stems:** Round, brownish/reddish, sparsely prickly; prickles straight to slightly recurved. **Leaves:** 5–7–9 pinnate, ~ smooth, slightly discoloured, paler green and slightly hairy below, leaflet margins with jagged double serration. **Flowers:** Petals white, ~ same length or shorter than sepals, numerous carpels (“in hundreds”), solitary. **Fruits:** Yellow to red when mature, with many drupelets, up to 20 mm long. **Invades:** Grassland, riverbanks and forest edges. **Distribution:** WC, KZN, M, L.

8. *Rubus pinnatus*, South African raspberry

Description: Erect to scandent shrub with strong, arching stems. **Stems:** Round, dark brown, with few to many small, strong recurving thorns. **Leaves:** 5–7–9 pinnate, ~ smooth, young leaves characteristically bronze-coloured, older leaves green, one colour or slightly discolourous, upper surface smooth, lower may be slightly velvety on the veins, margins finely serrated. **Flowers:** Petals pink, occasionally white, petals about same length as sepals; inflorescence usually much longer than leaves. **Fruits:** Yellow to orange or red. **Habitats:** High rainfall areas, along forest margins and riverbanks. **Distribution:** WC, EC, KZN, M, Swa, L.

9. *Rubus ludwigii*, wild raspberry

Description: Erect to sprawling shrub, averaging 1 m high. **Stems:** Round, reddish with white, powdery bloom. **Leaves:** ~ 7 pinnate, very deeply veined, discolourous; markedly white-downy beneath, margins deeply serrated. **Flowers:** Petals pink, very small. **Fruits:** Red, white downy. **Habitats:** High altitude grassland among rocky outcrops, edges of woodland, forest and streams. **Distribution:** WC, EC, FS, Les, KZN, M

10. **Rubus immixtus*

Description: Erect to sprawling shrub. **Stems:** Round, purplish with white powder, smooth to weakly armed. **Leaves:** 3–5 pinnate, discolourous, markedly white-velvety beneath, upper surface deeply veined. **Flowers:** Petals pink, about the same length as sepals, flowers fairly large (10–15 mm or more across). **Fruits:** Red, downy. **Invades:** Grassland, fynbos, forest edges, stream edges and roadsides; the commonest bramble in the Hogsback area of the Eastern Cape. According to Stirton (1981a) it seems quite probable that this species is either European or a hybrid with *R. rigidus* in its ancestry. **Distribution:** EC, KZN

11. **Rubus niveus*, Ceylon or Mysore raspberry or Java bramble

Description: Scandent shrub up to 2 m high, stems arching, tip-rooting. **Stems:** Round, rusty brown with white, powdery bloom on primocanes, thorns large, straightish to recurved. **Leaves:** 3–5–7 pinnate; mostly 3–5-foliolate on floricanes and 7-foliolate on primocanes, markedly discolourous, dark yellow-green above and velvety white below, deeply veined on both surfaces; side veins almost parallel, closely spaced. **Flowers:** Petals bright pink, shorter than sepals, numerous carpels. **Fruits:** Orange turning red and finally greyish purple, white-downy, small, with many drupelets. **Invades:** Grassland, wooded streambanks and among rocks in tall herb communities; seems to favour higher altitudes between 1000 m and 1 600 m. **Distribution:** Swa, M, L. **CARA:** Proposed category 1 (prohibited)

Emerging weed? This species was described by Stirton (1981b) as a recent arrival in the Barberton area of Mpumalanga. He predicted that it could become a menace in forests and that its eradication should begin immediately, while infestations were still small and economically controllable. Sadly, his advice does not appear to have been heeded, and *R. niveus* has spread as far afield as Sabie, Lydenburg and even to Gauteng.

Similar to *R. immixtus* but leaves up to 7 pinnate, thorns larger and more numerous, flowers and fruit smaller.

12. *Rubus rigidus*

Description: Very variable, erect to scrambling shrub up to 3 m high. **Stems:** Strongly ridged, light green, velvety. **Leaves:** Usually 3-foliolate, sometimes 5 pinnate, usually white or grey velvety beneath, coarsely serrated; sometimes leaves are re-divided—these could be hybrids with *R. cuneifolius*. **Flowers:** Petals pink, erect, much smaller than sepals, inflorescence many-flowered, much longer than wide. **Fruits:** Red, turning almost black when ripe. **Habitats:** Grassland, edges of forest and streams, vleis. **Distribution:** WC, EC, FS, Les, KZN, M, Swa, G, NW, L.

13. *Rubus longepedicellatus*

Description: Scrambling shrub very similar to *R. rigidus*. **Stems:** Strongly ridged, light green, velvety. **Leaves:** 3–5–7 pinnate; according to Stirton (1984) consistently 3-foliolate on floricanes and 7-foliolate on primocanes—but this is not evident on PRE specimens; discolourous, white or grey velvety beneath, margins coarsely serrated. **Flowers:** Petals pink, as long as sepals, or shorter than sepals, very long side shoots (pedicels) to inflorescence, inflorescence longer than wide, much-branched and more open than in *R. rigidus*. **Fruits:** Yellow turning red. **Habitats:** High rainfall grassland, margins of forests and plantations. **Distribution:** KZN, M, L.

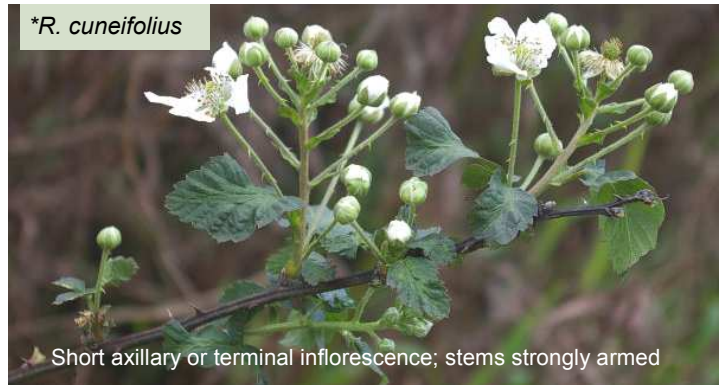
Specimens with re-divided leaves (pinnate-palmate) are most likely to be hybrids with *R. cuneifolius* (Taxon B), named *R. x proteus*.

14. *Rubus apetalus* (= *R. ecklonii*, *R. exsuccus*, *R. adolfi-friederici*)

Description: Erect to scrambling shrub or climber. **Stems:** Very velvety, round, purplish-red (thick stems). **Leaves:** 3–5–7 pinnate, brownish, very densely velvety, one colour or slightly discolourous. **Flowers:** Petals pink or white, very small, shorter than sepals. **Fruits:** Orange-pink to red to blackish red, downy, sometimes galled i.e. few are very large and hairy. **Habitats:** Grassland amongst rocks, edges of forests, plantations, streams. **Distribution:** WC, EC, KZN, S, M, NP, NW

Subgenus *Rubus*:

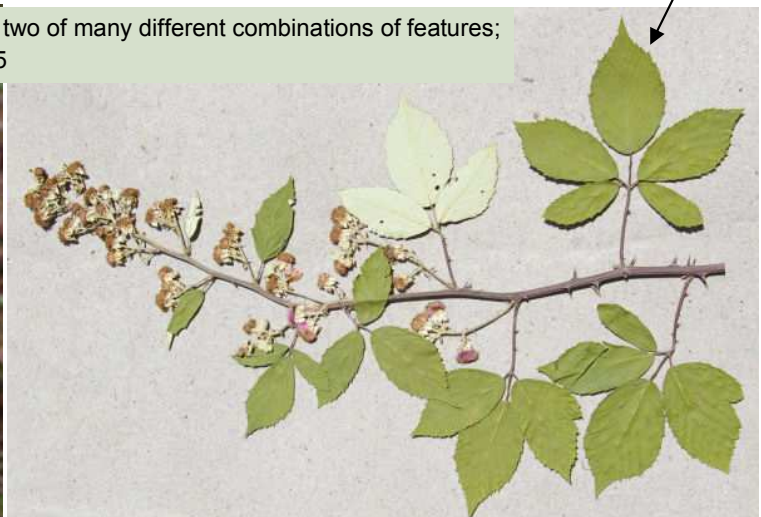
Petals much larger than sepals; flowers large and showy; leaves 3—5 or more pinnate-palmate; mature fruit black, shiny



Subgenus *Rubus x Idaeobatus*: Petal length variable, leaves variable but some leaves pinnate-palmate, fruits variable

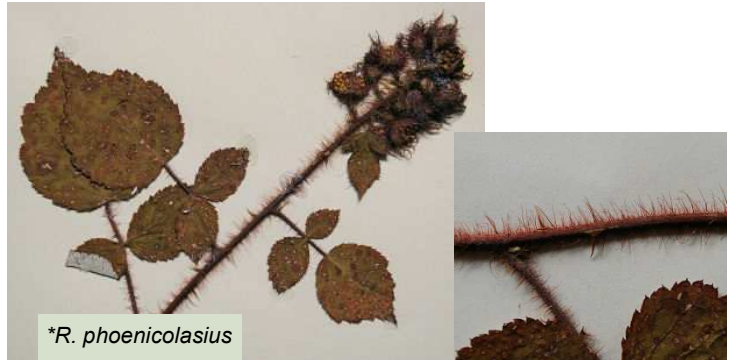


**R. x proteus*—just two of many different combinations of features; see table on page 5



Subgenus *Idaeobatus*

whole plant covered in long, red, glandular hairs



**R. phoenicolasius*

leaves **5–7–9 pinnate, ~ smooth, not downy beneath**



**R. rosifolius*

Stems & leaves with glistening, greenish-yellow glands

Photos: D Ramsden



Young leaves bronze-coloured

R. pinnatus

leaves **3–5–7 pinnate; leaves bicoloured, white downy beneath**



Flowers on long stalks (pedicels) and inflorescence more open than in *R. rigidus*

R. longepedunculatus



R. rigidus

Petals small, held erect and inflorescence much longer than wide



Leaflet margins deeply serrated

R. ludwigii



Stems powdery white; leaves up to 7 pinnate

**R. niveus*

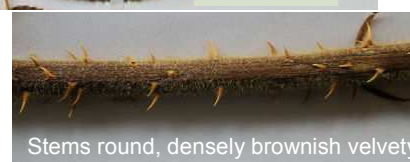
leaves 3–5 pinnate; leaves bicoloured, green above, white downy below



leaves 3–5–7 pinnate; leaves ~ one colour, densely brownish velvety



These are dried herbarium specimens and do not show their true leaf colour



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The Weeds Research Programme of the ARC-Plant Protection Research Institute is responsible for research on the ecology and control of invasive alien plants in South Africa. .

- Biological control
- Chemical control
- Bioherbicides
- Integrated control
- Monitoring the emergence and spread of invasive alien plants



We are on the Web:

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see Plant Protection News

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