
NOTES

Common problems with identification in *Conyza*: Norfolk experience

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Much has been written in these pages, and in *Watsonia*, on the arrival and spread of the various alien fleabanes over the last thirty years (Wurzell, 1988; McClintock & Marshall, 1988; Wurzell, 1994; Crawley, 1995; Stanley, 1996; Mundell, 2001; Rand, 2008). Many of these accounts give detailed descriptions of the plants found, on the assumption that the various characters found would help botanists to recognise these plants as they spread across the country.

Unfortunately, the great majority of the characters chosen in these articles, as well as those in standard descriptions, (Sell & Murrell, 2006; Stace, 2010), are so extremely variable, so difficult to interpret, or, in the case of floral characters, so transient, that the majority of botanists not taking a special interest in the genus seem stuck on *Conyza canadensis* (Canadian Fleabane)! Some are getting to grips with *C. sumatrensis* (Guernsey Fleabane), now quite abundant for a decade or two in south and central England, but few seem to be distinguishing *C. floribunda* (Many-flowered Fleabane), also becoming fairly frequent, from *canadensis*. *Conyza bonariensis* (Argentine Fleabane) remains only a very occasional casual, and is probably not so seriously under-recorded.

Problems with nomenclature

The particular confusion over *C. floribunda* is compounded by the fact that the two standard treatments differ fundamentally in their nomenclature, Sell recognising two taxa (*C. floribunda* and *C. bilbaoana* (Bilbao's Fleabane)), and Stace only one (*C. floribunda*). In the second edition of his flora, Stace only described *bilbaoana* under *canadensis*, but in his third edition he has now given it a taxon number under the name of *C. floribunda*. Most of the 12 or so examples of *floribunda*/

bilbaoana found in Norfolk by the Norfolk Flora Group have fitted with *C. bilbaoana sensu* Sell, showing purple tips to some of the mature outer flowers and strikingly broad phyllaries with obtuse tips. The populations without purple in the outer flowers, in this way resembling Sell's *C. floribunda*, did not have obviously narrower or more acutely tipped phyllaries.

Sell also recognised a fifth species, *C. daveauiana* (Small-headed Fleabane), which is said to very closely resemble *C. sumatrensis* but with straight inflorescence branches from near ground level, and smaller capitula. Martin Rand has found and photographed *sumatrensis*-like plants with 'daveauiana habit' but reported that these plants did not have regularly smaller capitula or different phyllary measurements to separate them from *C. sumatrensis* (Rand, 2008). Sell's assertion that *C. daveauiana* was common round Santon in West Norfolk (v.c.28) has never been confirmed and to date we have not seen any *sumatrensis*-like fleabanes with smaller capitula, or distinctly different inflorescences, to suggest a different taxon.

Thermophilous annuals of ruderal or urban habitats near the north of their range can, of course, be very transient in appearance and Sell's *C. daveauiana* may just have disappeared in Norfolk, at least for now. However, as will be discussed below, when *sumatrensis* is well grown it always produces potential inflorescence branches down to near ground level in the form of axillary leaf bundles, and the level at which these potential branches actually develop is associated with vigour of growth – the tallest plants tend to have inflorescence branches starting nearer the ground. Sell's description of *daveauiana* mentions a maximum height of 300cms, as opposed to

200cms for *sumatrensis*, and it seems likely that his ‘*daveauiana*’ were just unusually well grown *sumatrensis* plants.

Previous accounts

Tony Mundell attempted to clear up the *Conyza* problem using his field experience in Hampshire, and by examining specimens of all four generally recognised British taxa at Kew, including a new type specimen of *C. sumatrensis*, producing a useful table of characters for *canadensis*, *bilbaoana* and *sumatrensis* (Mundell, 2001).

The problem is that herbarium specimens show virtually none of the important ‘floral’ characters except for phyllary hairiness, although even here the phyllary hairs, best observed in silhouette, are difficult to see and tend to be obscured by spiral twisting of the phyllaries as they dry. In order to identify fleabanes, they have to be seen in the field, or kept only for a matter of hours in an airtight polythene bag, preferably in the fridge. They show little change kept overnight in this way, but as soon as they are exposed to the air for examination the capitula divaricate and lose most of their diagnostic features within a few hours. Rapid pressing does not prevent this process.

Martin Rand, again in Hampshire, did examine fresh material (“roughly 100 plants on the bench”, as well as tens of thousands of plants in the field (Rand, 2008)). He produced a “draft for a working key” to identify *canadensis*, *bonariensis* and what he called the *C. bilbaoana* and *sumatrensis* groups. However, this still to my mind relies overmuch on inflorescence outline, leaf shape and leaf colour, all very variable characters.

Experience in Norfolk

Over the last 10 years I have examined in the field hundreds of specimens of *C. canadensis* and *C. sumatrensis*, six solitary plants and two populations of *C. floribunda* and one solitary plant of *C. bonariensis*, in the field and in NWH. I have also looked at specimens of *C. bonariensis* from Düsseldorf, Germany, and from Faenza, Modena and Ravenna in Italy. Hundreds of drawings have been made, mainly of inflorescence shape and, intact, fresh capit-

ula, but also of lower stem leaves, dissected out florets, and stem and leaf indumentum. A few photographs and scans have also been taken of fresh material.

As will be described later, and as shown in the drawings (see pp. 14-15), I have found five different inflorescence types in only eight populations of *floribunda*, five inflorescence types in *sumatrensis*, two in *bonariensis* and five in *canadensis*. These arbitrarily defined inflorescence types grade into each other, and inflorescence shape seems almost infinitely variable. In all these plants the important ‘floral’ characters of capitulum size, capitulum shape, phyllary shape and hairiness, and flower/pappus colour remained unvarying and showed no atypical or intermediate features to suggest any extra taxa or hybrids.

My main conclusion must be that inflorescence outline is misleading as a key character except in the case of *canadensis*, where the long, narrowly cylindrical shape, with very short inflorescence branches, is diagnostic. If the scarcer fleabanes are to be recognised, any plants with a non-*canadensis* inflorescence shape need to be examined in the field for the characteristic capitulum characters, which are actually very distinct but not to be found in standard descriptions, herbarium specimens or drawings. The main purpose of this article is to describe and illustrate these capitulum characters.

Capitulum characters

In practice I have found that inflorescence type is only useful as a spotting character to identify a fleabane that needs a closer look. Any fleabane that does not have the typical, densely flowered, very narrowly cylindrical inflorescence of *canadensis* should be examined carefully for the following capitulum characters, using *canadensis* as comparator:

Capitulum size: this character is thoroughly confusing if one attempts to use the measurements given in standard descriptions (see Rand, 2008). I would suggest a rough comparison with *canadensis*. *Sumatrensis* and *floribunda* (2.5–5mm max. diameter) are both much the same size, and *bonariensis* very noticeably larger, approaching twice the width, though

comparatively short (6–8(11)mm maximum diameter).

Capitulum shape: the descriptive terminology here is difficult and another source of confusion. I would again suggest a comparison with *canadensis*, where the capitulum can be described as narrowly flask shaped, with a pronounced bulge in the lower half and a long, well defined, and narrow ‘neck’. The *sumatrensis* capitulum is less distinctly flask shaped and tending towards cylindrical, with less of a bulge at the base, and a shorter, poorly defined and broader neck. In *floribunda* the capitulum is distinctly flask shaped as in *canadensis* but more broadly so and often with a more distinct bulge in the lower half, again with a well-defined, fairly long and narrow neck. In *bonariensis* the capitulum is very broadly flask shaped to cylindrical (hardly longer than wide) with a poorly defined and short neck.

In all species the capitulum becomes transiently more bulging and flask-shaped just before divarification of the phyllaries and fruit dispersal. This stage, presumably due to sideways swelling of the achenes, is usually, miraculously brief and seems to be coordinated across the whole inflorescence, with all capitula then quickly divaricating and releasing their achenes – a process somehow accelerated by picking, though here divarification occurs without achene detachment.

Phyllary (or involucrel bract) shape: here it is *floribunda* that is most distinctive. In the other three taxa the phyllaries are very narrowly triangular, attenuating steadily from the base to a narrowly acute tip (i.e. awl-shaped or subulate). In *floribunda* the phyllaries are strikingly broad and strap shaped, far fewer in number and much more parallel sided, with very little attenuation until a very blunt tip (obtuse to rounded, occasionally subacute). (See drawings (pp. 14-15) and colour photographs (inside front cover); also photos in Mundell, 2001; Rand, 2008).

Phyllary number: this again defines *floribunda*, which has only 5–6(7) very broad phyllaries countable across the widest part of the capitulum – the other three taxa have (6)8–12(14). Phyllary number and phyllary shape

are the best diagnostic features for *floribunda* (again see drawings and colour photographs, plus photos in Mundell, 2001; Rand, 2008).

Phyllary colour and red tipping: descriptions of colour, especially if they attempt to be too exact, can be positively misleading, mostly of course because different botanists use different descriptive terms for the same colour. In *canadensis* and *floribunda* the phyllaries are a shiny pale to mid green, whereas in *sumatrensis* they are a dull mid green, and in *bonariensis* a dull grey green. More helpful in identification is the presence or absence of dark red/purple tips to the phyllaries, and at what level these are to be found. *C. canadensis* never has red tips to the phyllaries at all, and *sumatrensis* virtually never (I have seen one otherwise typical plant with occasional deep red tips to the upper / inner phyllaries). Both *floribunda* and *bonariensis* frequently have red tipped phyllaries, but at different levels. In *floribunda* the red tips are on the lower and middle phyllaries, and are often frequent on the capitulum “buds” before formation of the neck. However, they are never on all capitula in any one plant, and can be absent from a whole plant or population. In *bonariensis* red tips can again be totally absent, but if present they are in my experience virtually confined to the upper/inner phyllaries, sometimes forming a conspicuous red ring just below the exposed brilliant white floral parts (*not* as shown in *Illustrations of Alien Plants*, Clement Smith & Thirlwell, 2005).

Phyllary hairiness: the phyllary indumentum character in the two ‘subglabrous’ taxa can be made semi-quantitative by counting the number of bristly hairs visible on each side of the capitulum viewed in silhouette. Whereas in *sumatrensis* and *bonariensis* there are uncountable numbers of long hairs nearly to the phyllary tips, in the two subglabrous species the hairs are shorter, more bristly and in countable numbers, mainly restricted to the basal half of the phyllaries. In *canadensis* there are (0)2–8(10) moderately long translucent bristles on each side, easily visible at $\times 10$. In *floribunda* the capitulum looks glabrous at $\times 10$, but at $\times 20$ – 30 one can sometimes see an

occasional extremely short bristle. On the underside of the capitulum, beneath the origin of the phyllaries, there can be a good number of bristles in both these ‘subglabrous’ taxa, as there are on the peduncle.

Ligule length and flower exposure: there has been some dispute as to whether species other than *canadensis* have a ligule, but in practice only *canadensis* has a ligule worthy of the name. All four species have zygomorphic corollas on the outer flowers (as opposed to actinomorphic corollas on the disc florets) and in all four cases there is one shorter, rounded corolla lobe from behind which the bifid stigma protrudes, and a longer limb, nearly always with two lobes at its tip (occasionally unlobed). This bifid, longer limb is the ‘ligule’, but only in *canadensis* is it really long enough to see without dissection under a microscope. In *canadensis* it is only the shiny very pale lavender or white ligules that are above the phyllary tips, whereas in the other taxa it is the upper part of the corolla *tubes* that one is looking at, sometimes mixed with the pappus. Some authorities insist that *bonariensis* has actinomorphic outer florets without any ligule, but my drawings of the Düsseldorf and Ravenna specimens show an extremely short ligule with two pointed lobes.

Flower/pappus protrusion: the floral parts project beyond the involucre in the mature capitulum to a variable degree, usually most in *canadensis*, *bonariensis* and *floribunda*, least in *sumatrensis*. However, the degree of protrusion of the flowers and pappus is very variable and some capitula can often be found with incompletely lengthened phyllaries resulting in more protrusion of the flowers than is usual for the taxon.

Flower and pappus colour: Also helpful is the colour of the protruding flower tips and pappus. In *canadensis* one sees only the broad, bluntly bifid ‘true ligules’, often said to be very pale lavender in colour but shiny white to my eye. In *sumatrensis* the protruding floral

parts are pale buff and in *bonariensis* brilliant white. The colour of the protruding flower parts in *floribunda* is much more variable. Early in maturation only the tiny, pointedly bifid ligules may protrude above the phyllary tips, and these are sometimes dark purple in colour. Later the outer flowers elongate and their exposed corolla tubes are either a pale cream or pale purple colour – these pale purple, exposed outer flowers are especially characteristic of *floribunda* (see photographs inside front cover and in Mundell, 2001), but are not present in a good number of populations. On occasions the protruding corolla tubes of *floribunda* go a very dark purple when fully mature, but these conspicuous dark purple flowers usually occur only in a minority of capitula and again may be absent altogether. After picking, more or less every capitulum in any one plant can show these dark purple flower tips within a few hours, and this seems to be diagnostic when present.

A key for field identification of the British *Conyza* using ‘floral’ characters

The capitula of the four taxa generally recognised are actually extremely different and quite easy to distinguish, but the differences are difficult to describe and the descriptive terminology confusing. Few good drawings exist even of *canadensis*. I have attempted to remedy this situation by illustrating mature capitula and the ‘bud stage’ for all four taxa. Using these illustrations and the descriptions for each floral character, the following key can be used without being misled by inflorescence outline, leaf shape, colour or other highly variable vegetative characters.

The key uses *C. canadensis* as comparator and should be used whenever a fleabane is encountered without the typical inflorescence, leaf shape or colour of that species – but note that many plants will still turn out to be *canadensis*! The main key characters are illustrated in the drawings (Figs. 1a, b (p. 14) & Figs. 2a, b (p. 15).

1. Phyllaries (involucral bracts) near glabrous to subglabrous, with (0)2–8(10) very short to medium long bristly hairs countable @ ×10 magnification on each side of the capitulum, viewed in silhouette..... 2
1. Phyllaries densely hairy, with uncountable numbers of long soft hairs visible @ ×10 magnification on each side of the capitulum, viewed in silhouette 3
2. Capitula narrowly flask shaped with a long, well-defined neck; phyllaries a shiny pale-mid green, never with red-purple tips, very narrowly triangular with very acute tips, (7)8–10(12) countable across the widest part of the capitulum; (0)2–8(10) medium long bristles visible @ ×10 on each side in silhouette, confined to lower half or so of the phyllaries; ligules bright white or a very pale lavender, bluntly bifid, petal like and the only floral parts exposed above the phyllary tips..... *C. canadensis*
2. Capitula more broadly flask shaped, around the same size as *canadensis*, with a well defined and fairly long neck; phyllaries a shiny pale-mid green, sometimes with dark red tips to some lower and mid zone phyllaries on a few capitula, broadly strap shaped, with almost parallel sides and very blunt (subacute) obtuse –rounded tips; only 5-6(7) phyllaries countable across the widest part of the capitulum; phyllaries completely glabrous @ ×10, but sometimes with a very few extremely short bristles visible on each side, usually near the base, @ ×20 – 30; exposed corolla tubes cream to pale purple, on occasion turning to a dark purple when fully mature; (all of the exposed corollas may turn a very deep purple after picking)..... *C. floribunda*
3. Capitula flask shaped to cylindrical, with little bulge in the lower part and only a slight constriction into a poorly defined and short neck, slightly larger than in *canadensis*; phyllaries mid green, narrowly triangular with very acute tips much as in *canadensis*; (6)7-10(12) phyllaries countable across at the widest point, with uncountable number of short hairs visible in silhouette over their whole length; exposed corolla tubes pale buff and often only slightly protuberant..... *C. sumatrensis*
3. Capitulum noticeably short and broadly flask shaped to cylindrical, hardly longer than wide, with an almost flat ± subcordate base and a fairly short, poorly defined neck, much larger and getting on for twice the width of the capitulum of *canadensis*; phyllaries mid grey-green, usually with pale pink to deep red-purple tips to some of the inner/upper phyllaries when mature; phyllaries narrowly triangular much as in *canadensis*; 10–12(14) across at the widest point and with uncountable numbers of short hairs visible in silhouette over their whole length. Floral parts broadly exposed and brilliant white in colour *C. bonariensis*

In late flowering plants (October – December) capitula are smaller and the number of phyllaries countable across the capitulum will be less, giving some overlap, as shown. However, this character remains very useful for separating *floribunda*, from *canadensis* even late in the year.

Counting the lobes on the disc florets *more or less* separates *canadensis* (4) from *floribunda* (5), but *canadensis* can on occasion show 5 lobes, and the lobes are in any case very difficult to count – one seldom sees all of them at once even under a microscope!

Vegetative characters

Leaf edge and stem indumentum are the most diagnostic vegetative characters. Leaf shape can also be useful, but it is important to realise that well lobed lower stem leaves, resembling rosette leaves, tend to occur only on tall and vigorously growing plants and may not be found at all on depauperate or late growing individuals. The lower stem leaves in such plants are frequently simple and oblanceolate in shape and this type of leaf can occur in all 4 taxa. An example in *canadensis* is shown in the colour section – it can be seen that the

leaves in this plant also lack the usual long narrow petiole section found in *canadensis*.

Colour is also helpful, but again can be misleading. Stressed plants of *floribunda*, or plants going over, may take on a pale yellow-green colour much like *canadensis*, and *canadensis* may show a darker, slightly grey hue when growing late in the year.

Long ciliate hairs at the base of the leaf are not diagnostic of *canadensis*, and occur frequently in all the other three taxa.

The following descriptions relate mainly to well grown plants early in the season:-

C. canadensis is usually strikingly pale yellow-green in colour; the lower stem leaves are oblanceolate, usually with an extremely long, narrow, winged petiole bearing numerous regularly spaced ciliate hairs without short hairs in between; the edge indumentum of the lamina is of antrorse hairs that are spreading rather than appressed; most distinctively there are usually only 1-2 triangular forwardly directed lobes on each side, but on occasions the lobes are narrower, more acutely pointed, and up to 5 per side; the stem indumentum is of sparse, long, narrow bristles without bulbous bases.

C. floribunda is usually grey-green in colour and the leaves can be a very strikingly dark, shiny grey-green colour; the rosette leaves and lower stem leaves are normally strap shaped or oblanceolate, without much of a parallel sided petiole section; usually 1–5 forward pointed mammiform lobes, but sometimes the lobes are longer narrower and \pm hooked inwards; the leaf edge indumentum is mostly bulbous based, with a separate low domed cell at the base of the hair, antrorse and strongly appressed except near the base of the leaf: there are usually at least 1 or 2 long ciliate hairs also at the leaf base, but with short dense hairs in between; the stem indumentum is of thickish bristles, here with an elongate separate cell at the base.

C. sumatrensis is usually a rich mid green colour; the rosette leaves are especially striking, much broader and often with more lobes than in the other species, broadly oblanceolate – elliptic, obovate or even suborbicular, without much of a petiole section; lobes (0)3–6(12) on each side,

crenate-serrate or serrate, or sometimes with long forwardly directed lobes which are round tipped; the lower stem leaves are similar but rarely quite so broad and usually with 3-6 lobes; the edge indumentum is of antrorse appressed hairs without bulbous bases, except at the base where the hairs are not so appressed and may be mixed with long ciliate hairs; the stem is characteristically covered with dense, soft fine hairs rather than bristles.

C. bonariensis is a grey-green colour; overwintering rosette leaves do not seem to occur in the British Isles; the lower stem leaves in the Norwich specimen (NWH) are simple and narrowly oblanceolate and those in the Düsseldorf plant simple and linear; in contrast the 3 populations found in Italy had very distinctive narrowly strap shaped lower stem leaves with extremely long, spreading, parallel sided lobes with mammiform tips; the indumentum in the Norwich, Düsseldorf and Italian specimens was very similar and would seem also to be very distinctive: on the leaf edge antrorse and spreading rather than appressed, mixed with one or two sometimes many long ciliate hairs near the base; on the main stem a mixture of antrorse and strictly appressed hairs (not present in the other 3 taxa) mixed with sparse, long patent bristles.

Inflorescence outline

It is customary to try and define various inflorescence shapes for identification purposes but to my mind this is a rather unprofitable endeavour. Only the narrowly cylindrical inflorescence of *canadensis* and the broad kite shaped inflorescence of *C. sumatrensis*, increasingly scarce in our region, are diagnostic. The other inflorescence shapes grade into each other, but I would define 8 very artificial shapes in all (see Fig. 3, p. 17):

- 1 **Narrowly cylindrical:** parallel sided and densely flowered, with very short, even length near patent inflorescence branches from upper third to two-thirds of the stem: *C. canadensis*.
- 2 **Long and broadly elliptic** – obovate: fairly long, ascending inflorescence branches from upper third to two thirds of the stem:

C. canadensis, *C. sumatrensis*, *C. floribunda*, *C. bonariensis*.

This inflorescence is now the main inflorescence shape found in *sumatrensis* in our region, having become more common than the kite shape. It is also becoming more frequent in *canadensis*, and plants with this shape are usually taller than the typical forms.

- 3 **Short and narrowly elliptic–obovate:** short, ascending, sparsely flowered inflorescence branches from only the top third or less of the stem:

C. canadensis, *C. sumatrensis*, *C. floribunda*.

This shape is usually in shorter plants, but not always.

- 4 **Kite shaped:** many closely spaced and extremely long, ascending inflorescence branches arising from roughly half way up, sometimes much below half way up, the tips of the lowest and longest branches being overtopped by the shorter ones produced from the end of the main stem :

C. sumatrensis.

This shape only occurs in tall or very tall plants, often 200 – 250 cms high.

- 5 **Corymbose:** like 4 but with curved branches and a flat top, not so tall:

C. floribunda, *C. bonariensis*.

- 6 **Open, no main stem:** with very few, long, sparsely flowered branches arising from near the base:

C. floribunda, (occasionally *C. canadensis* and *C. sumatrensis*, especially late in year).

- 7 **Regenerative inflorescences:** several large inflorescence branches diverging from more or less the same point just above ground level (the main stem sometimes having been obviously cut off just above, with an identifiable stump, sometimes not). The inflorescence shape produced on each regrowth branch is usually elliptic or obovate in shape:

C. canadensis, *C. sumatrensis*, *C. floribunda*.

- 8 **Leafy pompom:** an extraordinarily leafy form, usually with completely obscured capitula; taller than typical *canadensis* with unbranched stem bearing closely spaced

long leaves and even longer inflorescence leaves (bracts) forming a dense pompom within which are hidden the capitula:

C. canadensis

An example of the open, few flowered inflorescence shape without a main stem, occurring in *canadensis* is illustrated on the inside front cover. I have found very similarly structured and shaped forms in *sumatrensis*, again only c.20cms high. Both these forms had simple oblanceolate leaves on the lowermost stem. It is forms such as this that often cause uncertainty in identification, but, if the capitulum characters remain typical and show no intermediacy, I see no reason to suspect a new taxon or hybrid.

Hybridisation

Since its arrival in Norwich about 10 years back *C. sumatrensis* has become at least as common in the city as *C. canadensis*, a situation mirrored in other urban areas in Norfolk. At the same time what seems to be just a tall form of *canadensis* with a broadly obovate (rather than narrowly cylindrical) inflorescence shape has become increasingly frequent. This form might, on inflorescence shape, be suspected of being a *sumatrensis/canadensis* hybrid, but I have been unable to find any convincing intermediacy in capitulum or floral characters to support this notion. These plants have the usual 1mm long ligule and phyllary indumentum of *canadensis*. Moreover, I have never found in these or any other atypical fleabanes, the abortive capitula or barren ultimate inflorescence branches described for the *bonariensis/canadensis* hybrid in the *Hybrid Flora* (Stace, Preston & Pearman, 2015; Wurzell, 1994)

In May 2016, I found a fleabane with convincing intermediacy between *sumatrensis* and *floribunda*, with a kite shaped inflorescence and profusely hairy capitula much like *sumatrensis*, but with few, rather broad, strap shaped and blunt phyllaries, and purple tips to the outer flowers. I sent it to the referee who agreed that it showed good intermediacy for these two taxa, but was not necessarily a hybrid (M. Rand, pers. comm.).

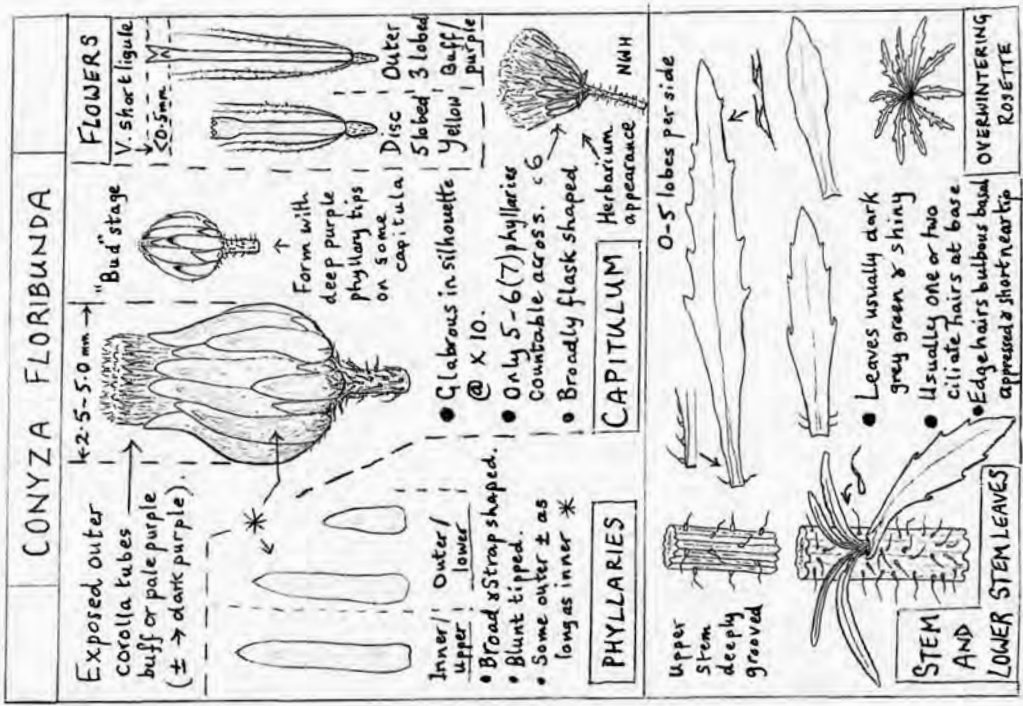


Fig 1b

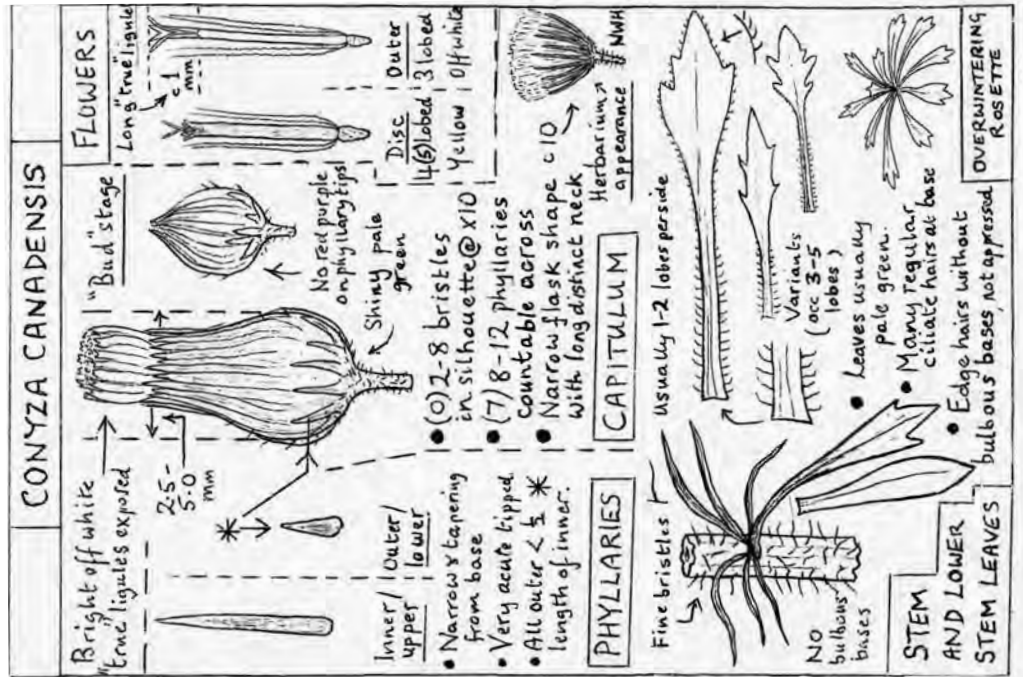


Fig 1a

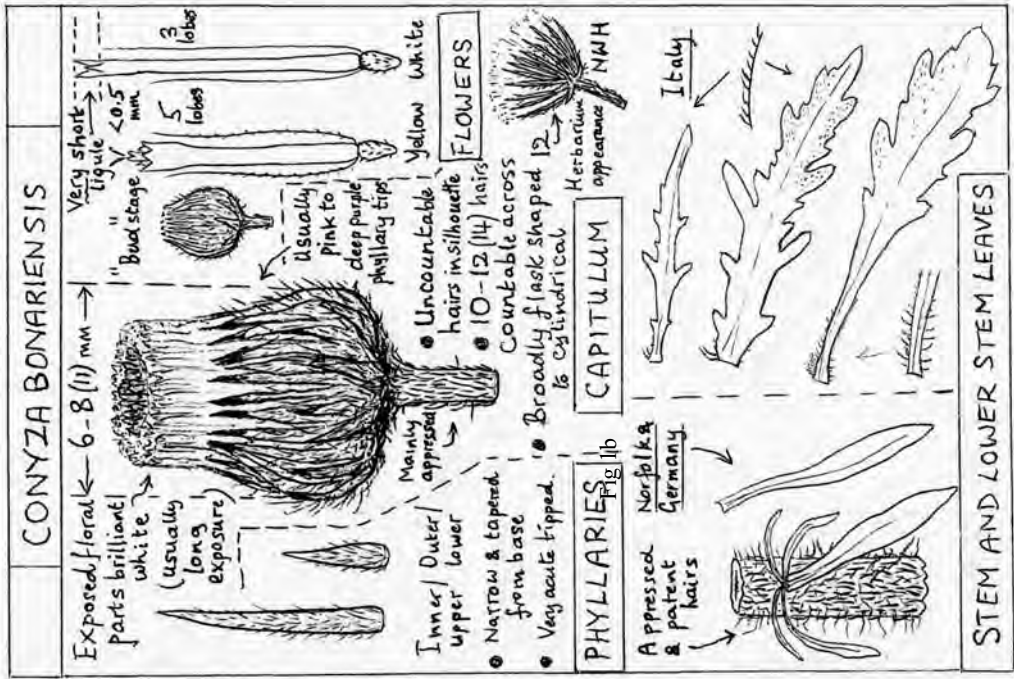


Fig 2b

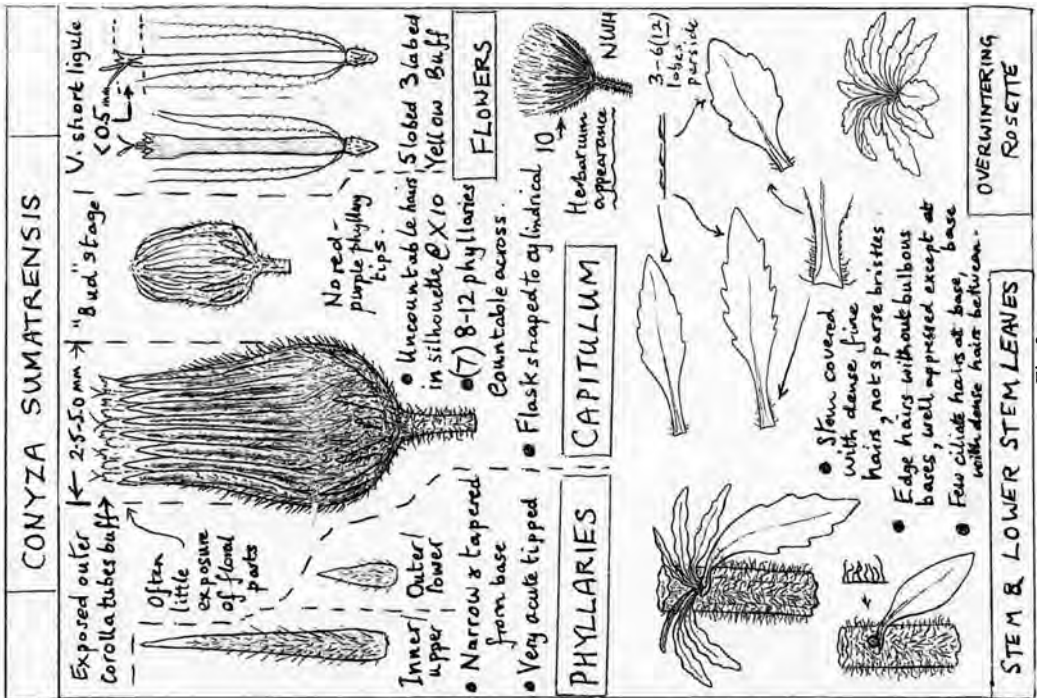


Fig 2a

Conclusion

As can be seen, variations in inflorescence shape are far too frequent to be of much use in identification, and the same goes for characters such as leaf shape and colour. Using these vegetative characters tends to distract botanists from recognizing possible *C. sumatrensis*, *C. floribunda* or *C. bonariensis* in the field. A better approach is to examine the capitulum with a lens on any fleabane that does not have the typical narrowly cylindrical *canadensis* inflorescence.

With a $\times 10$ lens it is quite easy to distinguish between the two fleabanes with subglabrous phyllaries using the number of bristly hairs visible on each side of the capitulum (in silhouette but against a dark background), the shape of the phyllaries, and the number of phyllaries countable across the capitulum. The two taxa with profusely hairy phyllaries can be separated by capitulum size (about twice the size of *canadensis* in *bonariensis*, not much bigger in *sumatrensis*), capitulum shape, and the degree of protrusion and colour of the flowers and pappus above the phyllaries. A field key and drawings using these characters are presented above.

Having said this, with experience, vegetative characters can be of use, especially the indumentum of stem and leaf edge. The bulbous based hairs in *floribunda*, with a separate basal cell, and the appressed as well as patent stem hairs in *bonariensis*, seem to be diagnostic, at least as regards the usual 4 taxa. The degree to which the hairs on the distal leaf edge are appressed is also helpful.

Forms with grossly atypical inflorescence structures which are typical in all other respects, do not, I feel, warrant more than varietal status, if that. Any one of the 4 usual taxa can show between 2 and 6 inflorescence shapes (see illustration) and still show absolutely typical capitulum, indumentum and leaf shape characters. Even tiny plants with simple oblanceolate lower stem leaves and with an inflorescence showing no main stem, have entirely typical capitulum and indumentum characters. Such a form, around 20cm high is illustrated on the inside front cover for *canadensis*, but also occurs in *sumat-*

rensis – in the latter case I have found such plants on wall tops only around 5cm high!

The main findings from my study relate to *floribunda*. The dozen or so examples of this taxon in Norfolk have all had very few, very broad, blunt tipped and strap shaped phyllaries, with only 5–6(7) countable across the capitulum (8–14 in the other taxa except in small, late developing capitula). These characters are found in all photographs previously published in these pages and are shown in the present inside front cover. They are preserved in pressed material, as shown in the drawings of specimens from NWH, and correspond to Sell's description for *C. bilbaoana*. However, these features are *not* shown in the illustrations from the original description of *C. bilbaoana* in the British Isles (Stanley, 1996). The drawings here are more like Sell's *floribunda* description, showing very narrow, awl-shaped acute tipped inner and upper phyllaries, with 9–10 countable across the capitulum.

Although we have found no evidence of 'new taxa' in Norfolk, Martin Rand feels that there may be another taxon close to, but separable from, Stace's *C. floribunda* (Sell's *C. bilbaoana*), though not with the characters of Sell's '*floribunda*' (pers. comm.). On the assumption that differences in inflorescence and leaf shape are not enough to designate a different taxon, at specific or subspecific level, without associated differences in indumentum and capitulum characters, this has not been our experience in Norfolk. It is true that all recent finds of *C. floribunda* have lacked purple in the outer flowers or on the phyllary tips, and this may show that another genotype has been arriving of late. However, these features, though present in nearly all our earlier finds, did not occur on all capitula, and not even on all plants within the population. I'm not sure that this single character, the expression of which seems to depend on growth conditions, merits even varietal status.

I hope that these descriptions and illustrations will help botanists recognise *sumatrensis*, *floribunda*, or *bonariensis*, either newly arrived in their vice-county, or previously overlooked. They might also help botanists

already familiar with these fleabanes to recognise possible new taxa.

In reporting finds to the referee adhere of course to the instructions in the *Yearbook*, but in *Conyza* good colour close-up photos of mature, intact capitula are especially important.

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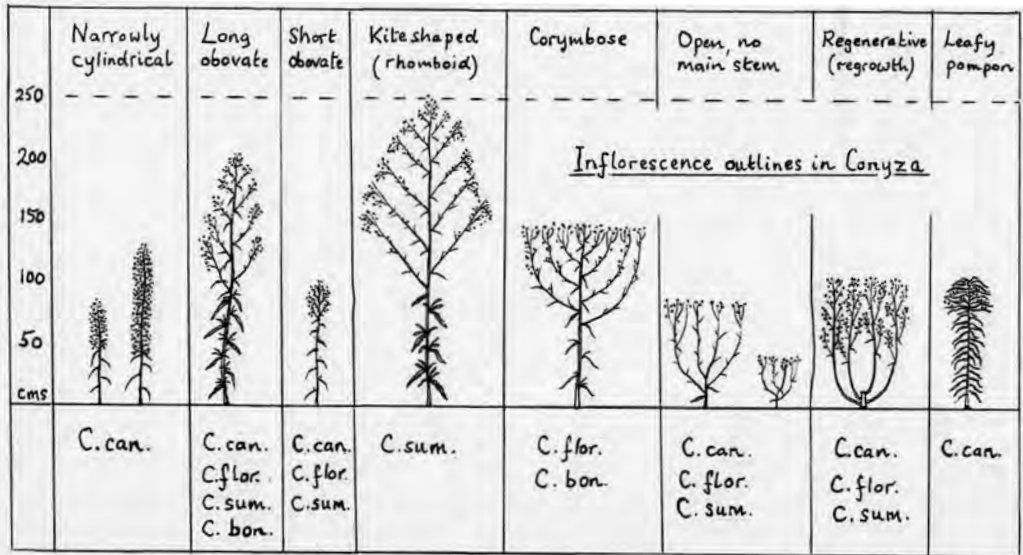


Fig. 3



Tiny form of *Conyza canadensis* (c.20 cm high) with atypical inflorescence structure and simple lower stem leaves. Wroxham, Norfolk (v.c.27).
Photo Bob Leaney © 2006 (p. 7)



Small form of *Conyza floribunda* with corymbose inflorescence and near simple main stem leaves. Sprowston, Norfolk (v.c.27).
Photo Bob Leaney © 2012 (p. 7)