Below are all (or at least most) of the *Dactylorhiza* species in Europe and North America according to iNaturalist, excluding hybrids and infraspecies. As of June 21st, the groups detailed in this document are still tentative and may be changed to better accommodate the most widely accepted phylogenies. After all, the number of accepted species worldwide varies from 12-75 between authors! **Edit: this document now includes all known species of *Dactylorhiza*, including those known from Asia.**

A note to identifiers: don't be afraid to leave to disagree with an ID without suggesting a species-level alternative, and embrace the fact that some plants may not be identifiable from morphology alone. Sometimes leaving a vague identification (e.g. "this is something in the realm of D. majalis… maybe D. alpestris?" or "I'm not sure what species this is, but I'm confident that it's not *D. incarnata*") is far better than trying to be specific.

Karyological information regarding these species and their subspecies (subspecies sometimes having different values for 2n than the nominate subspecies!) will be added towards the end of this project. I'll try to color code the ploidy of each taxon accordingly, starting with diploid (2n=40) being green. Aneuploid variants can occur in diploid species, and may produce infertile hybrids (review). For understanding some of the documented hybrids and their parentage, I recommend page 181 of the link presented earlier in this paragraph.

Updates

Update (7/3/20): found a dichotomous key covering the identification of some species! Find it here.

Update: (7/13/20): the document is essentially complete, but I will add some information on *D. amblyoloba* despite it not being accepted by iNaturalist or KEW (which will be noted in its description). Additionally, I have put off researching the infraspecies of *D. traunsteinieri* for an undetermined amount of time.

D. viridis/iberica group (very straightforward)

D. viridis (syn: *C. viride*): lip forked; petals and sepals forming a galea (hood); nectaries short, almost spherical; flowers green, brown-yellow, and/or tinged with red.
Var. *viridis*, var. *longibracteata*

D. iberica: lip paddle-shaped; petals and sepals forming a galea (hood); flowers pink, purple and/or white.
Note that *D. iberica* was named for a region in Georgia where it was first found, not the Iberian Peninsula. *D. viridis* and *D. iberica* constitute the earliest divergent lineages in the genus, and are thus the most straightforward to identify.

D. aristata group (straightforward)

D. aristata: sepals appearing awned (aristate); flowers pink, purple, and/or white; known from east China to Alaska (distribution).

- var. *aristata*: lip marked; leaves immaculate; known from the Alaskan mainland to parts of Asia (distribution unavailable from POWO due to synonymy).
- var. *kodiakensis*: lip unmarked; leaves spotted; primarily known from Kodiak Island (distribution unavailable from POWO due to synonymy).

The distribution of *D. aristata* separates it from the other species mentioned in this post, to the extent where this species may only overlap with *D. viridis*.

D. sambucina/romana group (straightforward)

D. sambucina: lip marked with fine red-brown spots; nectaries transverse-down curved; flowers pink-purple or yellow.

D. insularis: Lip generally marked with 2-4 red markings in its central region; nectaries transverse-down curved; flowers yellow; plants of Southern Europe and parts of France (distribution).

D. romana **(syn. *D. markusii*)**: Lip immaculate; nectaries upward curved; flowers pink-purple or yellow (very, very rarely red).
Subsp. *romana*, georgica, guimaraesii

D. incarnata/euxina group (difficult)

D. incarnata: lip generally appearing rhomboid or with small sinuses, lateral lobes typically strongly recurved; flowers relatively small, purple-pink, brick red-magenta, incarnadine, yellow, or sometimes white; leaves typically unmarked, with the exception of ssp. *cruenta* and potentially some populations of ssp. *pulchella*; known from throughout Europe and Asia (distribution).

- ssp. *incarnata*: flowers generally incarnadine to light pink in color, not purple or otherwise; known throughout Europe and central Asia (distribution).
- ssp. *cungsii*: Flowers generally appearing light purple or pink; leaves bright green and particularly broad; plants known from Kiemreech, Luxembourg (distribution).
- ssp. *coccinea*: flowers brick red; plants generally somewhat stout; endemic to Ireland and Great Britain (distribution).
- ssp. *pulchella*: flowers purple, rather large; bracts suffused with purple; inflorescences short and few-flowered; plants slender; somewhat scattered across Europe (distribution).

- ssp. *gemmana*: similar to ssp. *Incarnata*, but distinguished by having the following characteristics… flowers comparatively large, labella spotted (not marked with lines); more than five leaves present; plants to 50(80) cm tall; known from western Europe (distribution). **Note that this species is of uncertain status and has been neglected by recorders, so distribution may or may not be accurate.**
- ssp. *jugicrucis*: similar to ssp. *incarnata*, but distinguished by having the following characteristics… flowers comparatively large, pale, and somewhat devoid of markings; plants compact, leaves shorter and wider; plants of Damp meadows and spring slopes of montane to subalpine locations; known only from the Transcaucasus (distribution).
- ssp. *lobelii*: flowers incarnadine, light pink, or sometimes somewhat magenta (not to be confused with ssp. *coccinea*); plants particularly stout; seemingly known from regions bordering the North Sea (distribution).
- ssp. *ochroleuca*: flowers distinctly white to yellow; Europe (distribution).
- *ssp. cruenta*: flowers generally purple; leaves distinctly marked with numerous dark spots, often converging at the tips to form a purple wash; plants known from Europe to China (distribution).

D. salina: similar to *D. incarnata,* but distinguished by having the following characteristics… lip of moderate size, marked with two white patches with their shape and positioning relatively similar to kidneys; flowers relatively large, purple-white; nectaries particularly long; leaves apparently variable; known from the Caucuses to Amur (distribution). **Hybridogenous species resulting from *D. incarnata* and *D. umbrosa*.**

D. kulikalonica (no visuals found!): lip more-or-less orbicular in shape (unlike *D. kafiriana*, which is very similar in terms of slender appearance and lax, few-flowered inflorescences); inflorescence lax, few-flowered; flowers small; plant diminutive, stem thin; leaves "quite well developed" and only numbering 2-3; known from Central Asia (distribution), apparently steno endemic. ***Note that *D. umbrosa* and *D. hatagirea* have labella of a similar shape to this species, and may be used as references specifically for ruling out *D. kafiriana*.**

D. czerniakowskae (no visuals found!): lip more-or-less orbicular in shape (unlike *D. kafiriana*, which is very similar in terms of slender appearance and lax, few-flowered inflorescences) inflorescence lax; leaves widest at or above the middle, upper leaves not reaching the base of the inflorescence; occurring in Central Asia at altitudes of 3000-3300 m (distribution). ***Note that *D. umbrosa* and *D. hatagirea* have labella of a similar shape to this species, and may be used as references specifically for ruling out *D. kafiriana*.**

D. kafiriana: similar to *D. umbrosa* and *D. hatagirea,* but separated by having the following characteristics… plants slender; Leaves usually crowded towards base of stem, often arched and folded, narrowly lanceolate; inflorescence usually loose; labellum narrow when seen from above, rose colored (eFloras); known from Afghanistan, Pakistan, and the Western Himalayas (distribution).

D. hatagirea: Similar to *D. umbrosa*, but distinguished by having the following... leaves broadest in the middle or above; lip typically wider than long; nectaries straight, shorter than the ovary in length. **Distinguished from *D. kafiriana* by being robust, having dense inflorescences, and straight leaves** (eFloras); known from Mongolia to the Himalayas (distribution).

D. graggeriana: similar to *D. hatagirea* (presumably), and differing in unknown ways; plants from the Western Himalayas (distribution) or perhaps endemic to Kashmir. **Information regarding this species has proven exceptionally difficult to obtain. Commonly regarded as a synonym of *D. hatagirea*.**

D. umbrosa: Similar to *D. hatagirea*, but distinguished by having the following... leaves broadest below the middle; lip typically longer than wide; nectaries slightly curved, close to equaling the ovary in length. **Distinguished from *D. kafiriana* by being robust, having dense inflorescences, and straight leaves** (eFloras); known from western and central Asia to Siberia (distribution). **Note that both this species and *D. umbrosa* are genetically indistinguishable, and may therefore be classified as one taxon (*D. incarnata* var. *kotschyi*).**

D. magna: similar to *D. umbrosa* (the parent species), but apparently differing with regard to altitudinal zone differentiation. **Information regarding this species has proven exceptionally difficult to obtain. Commonly regarded as a synonym of *D. umbrosa*.**

D. osmanica: flowers generally purple; nectaries relatively short; leaves broadly lanceolate; plants sturdy; endemic to central Anatolia (distribution). **Note that both this species and *D. umbrosa* are genetically indistinguishable, and may therefore be classified as one taxon (*D. incarnata* var. *kotschyi*).**

- var. *anatolica* is taller than the nominate variety, presumably less sturdy.
- var. *osmanica*, the nominate variety, is sturdy and shorter than var. *anatolica*.

D. euxina: similar to *D. urvilleana,* but distinguished by having the following characteristics… lip broader than long, appearing wrinkled, and with lateral margins erose; leaves generally maculate (often with streaks and/or spots) on both surfaces (if spotted at all); plants from Turkey to the Caucasus (distribution).

D. armeniaca **(syn. *D. euxina* ssp. *armeniaca*)**: similar to *D. euxina* but distinguished by having the following characteristics… lip lateral margins (sub)entire; leaves unspotted; plants of northeastern Turkey and central Georgia (distribution, excluding populations from Georgia).

D. maculata/fuchsii group (difficult)

Lip index: (Heslop-Harrison [1954]) = 2A / (B + C), where A, B, C are the distances, measured parallel to the axis of the lip, between the base of the labellum and the tip of the central lobe, the tip of the lateral lobe and the summit of the sinus, respectively

D. maculata: lip often broad with small sinuses (spaces between lobes), lateral lobes exceeding central lobe in length; acidophilus; lowermost sheathing leaf narrower, broader in the proximal half, with an acute tip; known from Iceland and elsewhere.

- ssp. *battandieri*: similar to *D. elata*, but seemingly distinguished by having the following characteristics… inflorescences comparatively short, bearing fewer flowers; bract length reduced; plants generally of smaller stature, perhaps more stout; plants known only from a few coastal localities between the cities of Tizi Ouzou and Bejaïa (distribution).
- ssp. *caramulensis*: similar to the nominate subspecies, but distinguished by having the following characteristics… plants larger, more robust; nectaries seemingly inflated (like with *D. saccifera*, which is also a meridional vicariant); plants of southwestern Europe (distribution). Find more about identifying this taxon (perhaps better classified as *D. caramulensis*) here.
- ssp. *elodes*: similar to ssp. *ericetorum*, but distinguished (tentatively) by having the following characteristics… lip more slender, markings more frequently forming rings and/or streaks; flowers pale pink (almost white) to nearly reddish in color; leaves often wider, not necessarily linear or linear-lanceolate; known from throughout Europe (distribution).
- ssp. *ericetorum*: similar to ssp. *maculata* and ssp. *elodes,* but distinguished from both subspecies by having the following characteristics; lip broad, with particularly large lateral lobes, and marked with small flecks and short streaks(rarely ever forming loops); plants particularly spindly, with slender leaves; known from western Europe (distribution).
- ssp. *islandica*: lip broad, marked with loops and streaks; flowers white to purple; plants rather stout; leaves marked; endemic to Iceland (distribution).
- ssp. *maculata*: lip relatively broad, marked with loops, streaks, and/or flecks/spots; flowers white to purple; plants ranging from being rather short to somewhat tall; leaves marked, or rarely unmarked; known from Europe to Siberia (distribution).
- ssp. *podesta*: lip broad, marked with strong loops and streaks; flowers white to purple; plants rather stout; leaves strongly marked; thought to be endemic to the island of Terschelling (distribution).
- ssp. *savogiensis*: lateral lobes exceeding central lobe in length; flowers generally dark purplish red; 3-5 leaves present, which are spotted and linear-lanceolate; plants of acidic habitats (not alkaline as seen with *D. fuchsii*); known from the Pyrenees to the western Alps (distribution). **Since the shape of the labella on this species is intermediate between *D. maculata* and *D. fuchsii*, one must be cautious to avoid confusion between it and the latter.**
- ssp. *transsilvanica*: lip around 16 mm wide, white (or sometimes light purple-pink), and immaculate; nectaries up to 12 mm long; plants known throughout eastern and southeastern Europe (distribution).

D. fuchsii: lip with large sinuses, lateral lobes equal to or shorter than central lobe; spur thinner than ovary; leaves spotted; markings generally consisting of solid streaks and loops; lowermost sheathing leaf short, broader in the distal half, tip rounded to acute; calciphilous; known throughout the range of *D. maculata* with the exception of Iceland.

- ssp. *carpata*: very similar to the nominate subspecies, but (tentatively) distinguished by having the following characteristics (note lack of information explaining differences between this taxon and ssp. *sooana*)... flowers dark violet; inflorescence more cylindrical and elongated; plants slimmer, taller, and more delicate; leaves heavily tipped with violet; known in parts of the Carpathians (distribution).
- ssp. *fuchsii*: flowers ranging from nearly white to almost dark magenta; plants generally relatively tall and slender; leaves typically spotted; known from Europe to Mongolia (distribution).
- ssp. *hebridensis*: flowers particularly dark; plants stout, similar to dwarfed forms of the nominate subspecies; leaves with high anthocyanin levels (or not!); known from Western Ireland to Great Britain (distribution). Since most aspects of the morphology of this subspecies is controversial, reading this publication (starting at page 340) is advisable.
- ssp. *okellyi*: lobes generally particularly narrow, lip markings absent or present only faintly; flowers white; leaves generally immaculate; known from western Ireland to western Great Britain (distribution).

- ssp. *psychrophila*: similar to the nominate subspecies, but (somewhat tentatively) distinguished by having the following characteristics… labellar markings generally stronger; plants generally smaller in size; leaves fewer in number; known from Europe to Siberia (distribution).
- ssp. *sooana*: lip striped and/or spotted with purple; flowers white (save for markings; stem up to 60 cm; 7-12 leaves present; known from the Carpathians (distribution).

D. sudetica: lip with well-marked and protuberant central lobe, occasionally rhomboidal in shape; flowers small and variable, purple, pink, or white; inflorescences short; plants small and delicate, leaves oblong to spatulate; rare, known from Europe to Siberia (distribution). More information can be found here.

D. cyrnea: similar to *D. fuchsii* but distinguished by having the following characteristics… plants tetraploid (rather than diploid); leaves lightly spotted or immaculate; plants endemic to Corsica.

D. saccifera: similar to *D. fuchsii* but distinguished by having the following characteristics... spur thicker than ovary; markings often consisting of slender, discontinuous streaks; found primarily in Southern Europe (distribution).

- ssp. *gervasiana*: morphological characteristics not yet understood by me, but the delimitation of this taxon has been described as superfluous, which explains why it is so frequently synonymized with the nominate subspecies; plants known from Sicily, to southern Italy and Algeria (distribution).
- ssp. *saccifera*: morphological characteristics not yet understood by me, due mostly to the dubious nature of ssp. *gervasiana*; plants known from throughout the Meditteranean (distribution).

D. durandii: similar to *D. maculata* and *D. saccifera* but distinguished by having the following characteristics… spur thicker than ovary; leaves immaculate; plants of Morocco and Northern Algeria (distribution).

D. foliosa: lip generally quite broad; lateral sepals slightly spreading; leaves unspotted; flowers purple-pink; endemic to Madeira.

D. nieschalkiorum: lip appearing broad and marked with streaks (in some ways similar to that of *D. elata*); flowers large; leaves immaculate or lightly spotted; endemic to northwestern Turkey. The plants are robust with usually non-spotted leaves and have large flowers. (distribution data and synonymy unavailable on Kew). Sometimes treated as a subspecies of *D. majalis*, and may be moved to that group (in this document) on a later date.

D. majalis group (quite convoluted)

D. praetermissa: lip generally longer than wide, diamond-shaped or somewhat tri-lobed; flowers purple-pink, often relatively pale in color; labellar markings generally consisting of relatively faint, fragmented streaks (except in var. *junialis*); leaves immaculate, or, in var. *junialis*, bearing prominent annular markings; plants relatively tall, often robust, and with strongly keeled leaves; primarily found in the southern U.K. and in coastal areas close to the North Sea, but also known as an alien in some parts of Canada (distribution). **Not to be confused with the superficially similar *D. incarnata*, which has stronger markings consisting of more developed loops and streaks.**

- *ssp. osiliensis*: apparently very similar to *ssp. schoenophila*, but known from the Baltic Islands (distribution).
- ssp. *praetermissa*: lateral lobes more weakly folded; inflorescence relatively dense; leaves seemingly wide; plants stately; known from western and northwestern Europe (distribution).
    - var. *junialis*: leaves with annular markings; known from western Europe and parts of North America (distribution).
    - var. *praetermissa*: leaves immaculate; known from western and northwestern Europe (distribution).
- ssp. *schoenophila*: similar to *D. praetermissa* and *D. traunsteinierioides*, but distinguished from the former by having the following characteristics… lateral lobes more strongly folded; inflorescence lax; leaves narrow; plants small; seemingly known from areas below an imaginary boundary between the Severn to the Wash? (distribution).

D. purpurella: lip generally diamond-shaped (less so in var. *cambrensis*/var. *maculosa*), or with underdeveloped lobes; flowers intense purple or magenta; leaves immaculate (except in var. *cambrensis*); plants generally appearing relatively short and robust; plants encountered mostly in the more northern regions of the U.K., Denmark, and the neighboring regions in Norway and Sweden (distribution). For more information on spotted plants, see this publication.

- var. *maculosa*/*cambrensis*: lip (at least in var. *cambrensis*) more deeply lobed; leaves spotted; known from the northern British Isles (distribution).
- var. *purpurella*: lip diamond-shaped or with small sinuses; leaves immaculate; known from the northern British Isles, parts of Norway, and (despite the error on Kew) Denmark (distribution).

D. vadorum: similar to *D. purpurella*, but distinguished by having the following characteristics…labella slightly broader, more deeply tri-lobed, and lateral lobes somewhat recurved; flowers generally lighter than *D. purpurella*, but darker than most *D. praetermissa*; plants less compact, leaves more flexible, spotted (sometimes with annular rings) or unspotted; known from Southern Denmark and the island of Schiermonnikoog, possibly also present in Lauwersmeerpolder and the intermediate German Wadden islands (distribution). **The potential for confusion between this species and the maculate form (var. *picturata*) and *D. praetermissa* var. *junialis* is to be noted while making identifications.**

- var. *picturata*: leaves with annular markings (not to be confused with *D. praetermissa* var. *junialis*); known from southern Denmark to the northwestern Netherlands (distribution).
- var. *vadorum*: leaves immaculate; known from Schiermonnikoog (distribution).

D. kerryensis: lip relatively broad, sinuses present to some extent (not diamond-shaped or rhomboid), sides weakly recurved or reflexed; inflorescence dense; leaves generally maculate; endemic to Ireland, or alternatively, known from various parts of the British Isles (distribution).

D. majalis: lip moderately sized relative to orifice, marked with dots, streaks, and sometimes loops; flowers typically dark purple, violet, or magenta (sometimes white or paler shades of the

aforementioned); leaves generally spotted; inflorescences dense, rarely lax to the same extent as *D. lapponica*; known from Europe to Siberia and western Turkey (distribution data from Kew incompatible with this taxonomy, although close enough for most scenarios [distribution])

- ssp. *calcifugens*: similar to ssp. *sphagnicola*, but distinguished by having pure white flowers; plants endemic to northwestern Denmark (distribution data seemingly unavailable from Kew!).
- ssp. *baltica*: lip appearing small relative to orifice, heavily marked, with well-developed sinuses and rather flat lateral lobes; leaves generally spotted; plants known from Finland to central Asia (distribution).
- ssp. *majalis*: lip moderately sized relative to orifice, with typically flat lateral lobes and variable sinuses (although always more shallow than that of *D. fuchsii*) that contribute to its somewhat broad appearance; flowers purple or magenta, rarely white; leaves generally spotted, sometimes strongly so (distribution).
- ssp. *sphagnicola*: lip marked with spots and lines; lateral lobes recurved, spreading, or (rarely) incurved; flowers pink, purple, or rarely white; leaves erect and lightly spotted; known from northern and western Europe (distribution).

D. kalopissii: lip shallowly to moderately tri-lobed, widest above the middle, gradually narrowed towards the base (*Field Guide to the Orchids of Europe*), marked with dots and broken lines; leaves unspotted; (for the distribution of this taxon, combine distributions of its subspecies).

- ssp. *kalopissii*: lip shallowly to moderately tri-lobed, widest above the middle, gradually narrowed towards the base (*Field Guide to the Orchids of Europe*), marked with dots and broken lines; lateral sepals finely dotted (*Field Guide to the Orchids of Europe*); leaves unspotted (distribution, not available on Kew!).
- ssp. *macedonica*: similar to ssp. *kalopissii*, but distinguished by having the following… lip with fainter markings, central lobe extended; sepals unmarked; (distribution data seemingly unavailable from Kew!).
- ssp. *pythagorae*: lip shallowly to moderately tri-lobed, widest above the middle, gradually narrowed towards the base (*Field Guide to the Orchids of Europe*), marked with dots and broken lines; flowers pale mauve; leaves unspotted; endemic to Mount Ambelos (distribution data unavailable from Kew!).

D. sibirica: similar to *D. majalis* ssp. *baltica*, but distinguished by having the following characteristics… lip appearing somewhat longer, with a more slender lobes; leaves immaculate; endemic to Siberia (distribution).

D. alpestris: similar to *D. majalis*, but distinguished by having the following characteristics… lip very slightly tri-lobed or occasionally entire; area around orifice generally bright white; markings covering a broader area, spreading outwards from the central region; Lower leaves elliptical or obovate, widest at or above the middle, plants generally more 'thick-set'; populations generally encountered between 1500 to 2600 m asl (versus *D. majalis*, which is found from 0 to 1800 m asl); plants known from the Pyrenees, Alps, and Carpathians (distribution).

D. cordigera: lip shallowly tri-lobed, with spreading to somewhat recurved lateral lobes; flowers pink to purple (often rather dark and intense); leaves typically spotted; central region of the lip often clearly white, with markings that may be more-or-less restricted to that region (not always true, but sometimes simplifies identification); known from southeastern Europe to Ukraine (distribution).

- ssp. *bosniaca*: lip abruptly cuneate at its base, more-or-less suborbicular in shape; known from the northern Balkan Peninsula (distribution).
- ssp. *cordigera*: lip widest at its base, rhombic; known from southeastern Europe to Ukraine (distribution).
    - var. *cordigera:* morphological characteristics not yet understood by me; distribution unclear.
    - var. *rhodopeia*: morphological characteristics not yet understood by me (distribution).

D. baumanniana: similar to *D. cordigera*, but distinguished by having the following characteristics… lip relatively broad, markings generally consisting of dots and streaks, not well-defined loops and streaks; inflorescences comparatively lax; leaves more-or-less slender, lanceolate in shape; plants known from Bulgaria to Northern Greece (distribution).

D. elata: lip generally broad (sometimes with recurved lateral lobes), markings variable; flowers pink-purple, sometimes white; leaves immaculate; plants generally tall and slender (?), with lax inflorescences; found in Western Europe and some regions bordering the Mediterranean (distribution).

- ssp. *elata*: lip as long or longer than wide; flowers smaller; spur saccate-cylindrical; known from southwestern Spain and northwestern Africa (distribution).
- ssp. *sesquipedalis*: lip wider than long; flowers larger; spur not as described; known from western and southwestern Europe (distribution).

D. atlantica: lip entire or tri-lobed, marked with loops and streaks; flowers purple, often dark in color; leaves spotless with violet-red tips or streaks, very wide, strongly keeled; leaves reaching inflorescence; plants vigorous; known from Morocco (distribution).

D. urvilleana: similar to *D. euxina,* but distinguished by having the following characteristics… lip lateral margins not erose; leaves generally only maculate on the upper surface (if spotted at all); plants known from Turkey to Iran (distribution).

D. phoenissa: similar to *D. saccifera*, but distinguished by having the following characteristics… lip more shallowly lobed; leaves spotted to a lesser extent; differences between this taxon and *D. amblyoloba* (which is not present on iNaturalist, and is known from the Caucasus) unclear; plants of the Levant, while *D. urvilleana* is known from the Pontic area (distribution).

D. lapponica/traunsteineri group (extremely convoluted)

D. lapponica similar to *D. traunsteineri* and *D. russowii,* but distinguished from the former by having the following characteristics (read the section on *D. russowii* if the plants in question are within range for that species)… leaves shorter and more broad, leaves seemingly more frequently spotted than not, held in closer proximity along the stem; flowers smaller with relatively slender (?) labella; inflorescence lax (much like *D. traunsteineri*… in most cases), floral bracts shorter than flowers in length; known from Fennoscandia and parts of Europe (distribution). See Table 1. (page 19) in 'Dactylorhiza traunsteineri (Saut. ex Rchb.) Soó: an unexpected record in the Romanian flora, with a discussion on other critical records of dactylorchids from Romania' for additional information. Note that the table contains morphological information pertaining to this species, *D. lapponica*, and *D. majalis*. **Note that some authorities consider the following three species to be synonymous with *D. lapponica*.**

- ssp. *lapponica*: morphological characteristics unknown to me; known from north and central Europe to the Carpathians (distribution).
- ssp. *angustata*: morphological characteristics unknown to me; known from France (distribution).

D. traunsteineri (distribution [excluding Great Britain and Ireland]) similar to *D. lapponica* and *D. russowii,* but distinguished from the former by having the following characteristics (read the section on *D. russowii* if the plants in question are within range for that species)… leaves longer and more narrow, spotted or unspotted, well-spaced along the stem; flowers larger with relatively broad, tri-lobed labella; inflorescence lax (much like *D. lapponica*), floral bracts roughly equal to or exceeding flowers in length; known from Europe to Siberia (distribution [according to Kew]). See Table 1. (page 19) in 'Dactylorhiza traunsteineri (Saut. ex Rchb.) Soó: an unexpected record in the Romanian flora, with a discussion on other critical records of dactylorchids from Romania' for additional information. Note that the table contains morphological information pertaining to this species, *D. lapponica*, and *D. majalis*.
Subspecies: *irenica, curvifolia, rhaetica, schurii, traunsteineri, turfosa, vosagiaca*.

D. russowii: **note that all existing characteristics applied to this species are highly controversial! The source material regarding *D. russowii* can be found by clicking on the name (specifically on page 66), as can herbarium specimens. The following are the characteristics seemingly most consistent among authorities which accept the species (rather than including it as a synonym of *D. traunsteinieri* ssp. *curvifolia*)…** central lobe of the labella acute, general lip shape seemingly variable, lip supposedly flat; flowers typically larger than *D. traunsteineri*, with debated coloration; leaves generally agreed upon as wide, likely spreading (patent), and possibly arcuately recurved (hopefully to a lesser extent than *D. traunsteineri* ssp. *curvifolia*) ; plants generally robust; known from Central Europe to Central Siberia (distribution). **Confusion may occur with *D. traunsteineri* (especially ssp. *curvifolia*) and *D. lapponica*. In some cases, identification may prove nigh impossible. Unsurprisingly, many authorities do not regard *D. russowii* as a valid species.**

D. isculana: similar to *D. lapponica*, but distinguished by having the following characteristics… stem green, not suffused with dark purple towards the top; plants known only from around Bad Ischl (distribution).

D. traunsteinierioides: (distribution [only known from Great Britain and Ireland]) similar to *D. traunsteineri* (and to a lesser extent *D. lapponica*), but distinguished from the latter morphologically by having the central lobes of the labella being greater than ⅓ the length of the lip (versus less than ⅕ the length of the lip; see the description of *D. irenica* [considered a subspecies of *D. traunsteineri* by Kew] for more information); separated from populations of *D. traunsteineri* and *D. lapponica* by its distribution, which is explained earlier in this section. **Some populations may be referable to *D. praetermissa,* perhaps deserving recognition similar to *D. praetermissa* ssp. *schoenophila* (which is known for appearing intermediate between the two).**
More information regarding *D. traunsteineri,* and (somewhat indirectly) *D. traunsteinerioides* (publication).

Apparently *D. ruthei* is synonymous with the nominate variety of *D. traunsteineri* on iNat, synonymous with *Dactylorhiza* × *kerneri* according to Kew, and a distinct species according to Delforge. It's tetraploid (2n=80).

“It is thus possible that the original few populations of Dactylorhiza ruthei disappeared since1903, and that the plants rediscovered in another site almost one century later constitute hybrid swarms in which hardly any traces of D. ruthei are present anymore. As explained above, in the Estonian population, on the other hand,the about 50 plants blooming each year seems very stable, with features in com-plete adequation with both description and herbarium specimens of Orchisruthei”. -Delforge. It turns out the last true population may be in Estonia. According to *Field Guide to the Orchids of Europe* “It (*D. ruthei*) is reminiscent of *D. majalis* subsp. *eliator*, but clearly differs in having deeply lobed lips with much reduced, often obscure markings.” There’s evidently a relationship between *D. ruthei*, *D. majalis* subsp. *elatior*, and *D. praetermissa* subsp. *osiliensis*—they may all refer to the same taxon.

The main diagnostic characters of D. traunsteineri are: long narrow leaves, a lax, few-flowered inflorescence with relatively large flowers, each having a relatively broad trilobed labellum and spotted or unspotted leaves, which are well-spaced along the stem (REINHARD 1985).

'a more hollow stem, more frequently spotted leaves, an inflorescence that is denser on average, flowers that are on average smaller, more numerous and redder. strongly arched leaves, which should be a characteristic of "curvifolia", apparently constitute an extreme variation without evolutionary significance'. (D. russowii)

Note that a new species of *Platanthera* (*P. muelleri*) has been described and is accepted by POWO, and appears very similar to *P. ×hybrida.* However, the former can exist in stable populations, is generally much taller. Despite appearing very much like the aforementioned hybrid and *P. bifolia*, *P. muelleri* is said to be quite genetically distinct. The possibility of more species being split from *P. bifolia* remains.

“Position of anthers varies between parallel, trapezoidal and rarely v-shaped, further apart than those at P.bifolia, less trapezoidal than those of P. chlorantha; distance of anthers at the top (0,5) 1,4-1,5 (2) mm, further apart than those at P. bifolia, narrower than those at P. chlorantha; distance of anthers at the bottom (0,5) 1,5-2,1 mm, further apart than those at P. bifolia, narrower than those at P. chlorantha; anther length 3-5 mm, longer than those of P. bifoliaand P. ×hybrida, shorter than those of P. chlorantha. Pollinarium length 2,5-4 mm (longer than those at P.138Journal Europäischer Orchideen 49 (1): 2017.bifoliaabout the same length as P. ×hybrida, shorter than those at P.chlorantha). Pollinium length 1,2-2,1 mm (shorter than those at P. chlorantha);pollinium width 0,5-1 mm (between P. bifolia(more widely) and P. chlorantha(smaller)). Caudicle length 0,5-1,1 mm (longer than those at P. bifolia0,3-0,7 mm) about the same length as P. ×hybrida(0,6-0,9 mm), shorter than those of P. chlorantha(1,4-2,0 mm). Viscidium round to oval; P. bifoliaoval, P.chlorantharoundish. Lateral stigma lobes not covering spur entrance (in contrast to P bifolias.str.).”