

# Gentianaceae (Gentian Family) Traits, Key, & Comparison Charts

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## Gentianaceae Family Traits

- Stems and leaves glabrous (without hairs); stems often 4–5-angled.
- Cauline leaves opposite, sessile, with entire margins; blades usually linear to ovate or oblanceolate, except for *Bartonia* (screwstem) which has small scale-like leaves less than 7 mm long that can be alternate or opposite.
- Flowers solitary or in terminal and axillary cymes of few to several 4–5-merous flowers.
- Calyx 4–5-lobed, often 4–5-angled and keeled; *Gentiana* species have thin translucent tissue, called intracalycular membranes, between the calyx lobes.
- Corolla cylindric (tubular), salverform (with a slender tube and 5 spreading lobes), or rotate (wheel-shaped, short tubular only at the base, with 4–5 spreading lobes); corollas of various colours, often blue or purple.
- Corolla lobes often convolute in bud, with one edge of each lobe overlapping the edge of the adjacent lobe (except in *Bartonia*); corolla of *Gentiana* species also with short appendages (flaps of tissue) between the corolla lobes.
- Nectaries are present at the base of the corolla lobes in *Lomatogonium* and at the base of the spurs in *Halenia*.
- Stamens 4–5, filaments adnate (fused) to the sides or base of the corolla lobes.
- Pistil 1, ovary superior, ellipsoid, sessile or stalked; with 2 carpels, style often absent (except in *Centaurium* and *Bartonia*), stigma often large and 2-lobed, with hemispheric lobes (except in *Bartonia*, *Halenia*, and *Lomatogonium*).
- Fruit a 2-valved capsule, usually dehiscent (splitting) at the apex; often extending beyond the persistent dead corolla.

## Key to Gentianaceae species in Newfoundland and Labrador

- 1a. Plants to 3.7 dm tall, with erect stems, sometimes twining or twisting; leaves opposite or alternate, small, scale-like, <1–4.2 mm long, subtending flowering branches, often appearing leafless; corolla small, about 2.5–6 mm long, 4-lobed, whitish, yellow-green, reddish, or purplish (*Bartonia*). ..... **2**
- 1b. Plants to 7 dm tall, with erect stems; basal and or cauline leaves present; cauline leaves opposite, with linear, lanceolate, oblanceolate, or ovate blades, <1–7.5 cm long; corolla <1–5.5 cm long, 4–5-lobed, of various colours. .... **3**
- 2a. Stems purplish, angled, often twining; corolla white, reddish, or purplish, 2.7–6.3 mm long; anthers usually purple. ....  
     ..... *Bartonia paniculata* subsp. *iodantha* (twining screwstem)
- 2b. Stems yellowish-green, rarely twining; corolla greenish-yellow or straw-coloured, 2.5–4 mm long; anthers yellow. .... *Bartonia virginiana* (yellow screwstem)
- 3a. Corolla green, bronze, or purple, with 4 divergent basal spurs; corolla broadly tubular at the base, tapering to a pointed apex with 4 short recurved lobes; leaves lanceolate to ovate, with 3–5 veins. .... *Halenia deflexa* (spurred gentian)
- 3b. Corolla pink, purple, blue, or white tinged with blue, lacking basal spurs; corolla either deeply 4–5-lobed or tubular, open or closed at the throat, with lobes spreading, ascending, or overlapping; leaves linear, lanceolate, ovate, or oblanceolate, with 1–7 veins. .... **4**
- 4a. Corolla pink, salverform (trumpet-shaped), with a tubular base and 5 spreading lobes, or corolla white, tinged with blue, rotate (wheel-shaped), deeply cleft into 4–5 spreading lobes; stamens clearly visible, extending beyond the end of the corolla tube; style present or absent, stigmas not 2-lobed; leaves with 1–5 veins. .... **5**
- 4b. Corolla blue, purple, or lavender, 4–7 mm long, tubular, the tube longer than the relatively short lobes, which are erect, overlapping, or spreading at maturity; stamens not noticeable, included within the corolla tube; style absent, stigmas 2-lobed; leaves with 3–7 veins. .... **6**
- 5a. Cauline leaves lanceolate, up to 2.5 cm long by 10 mm wide, with 3–5 veins; calyx 4–6 mm long, tubular in the lower third to half, with 5 linear-lanceolate lobes; corolla pink, salverform; with a tube 7–9 mm long and 5 blunt, oblong to elliptic lobes, 4–7 mm long, spreading at maturity; nectaries absent; anthers spirally twisted after pollen is shed; style 2-branched near the tip, each branch bearing an unlobed stigma. ....  
     ..... *Centaurium erythraea* {pink centaury}

- 5b. Cauline leaves narrowly lanceolate, up to 2 cm long by 3 mm wide, with 1 prominent vein; calyx and corolla lobes fused only at the base; calyx lobes linear, 5–15 mm long; corolla whitish, often tinged with blue, about 1–2 cm across; divided nearly to the base into 4 or 5 elliptic lobes; fringed nectaries present at the base of each corolla lobe; anthers not spirally twisted after pollen is shed; style absent, stigmatic tissue extending downward (decurrent) along the suture lines of the 2 carpels (not forming a 2-lobed stigma). .....  
 ..... ***Lomatogonium rotatum*** (marsh felwort)
- 6a. Corolla purple, lavender, pale blue-violet, or whitish, 1–2 cm long, tubular, with 4–5 short lobes; calyx 5–12 mm long, with 4–5 lobes of slightly to distinctly different sizes; plants simple or branching mainly from the base, flowers on lateral branches smaller than the terminal flowers; cauline leaves <1–3.5 cm long. .... **7**
- 6b. Corolla purple, blue-violet, deep blue, or sky blue, 1–5.5 cm long, tubular below the erect, overlapping, or spreading lobes; calyx <1–3 cm long; stem often unbranched or sparsely branched; cauline leaves 1–7.5 cm long. .... **8**
- 7a. Plants to 5 dm tall, usually unbranched or with short lateral branches; leaves 1–3 cm long, with 3–7 veins; corolla 1–1.5 cm long, tubular, 4–5-lobed, fringed at the throat with 8–10 slender hair-like segments (fimbriae) attached at the base of each blunt to pointed lobe, and about as long as the lobes; calyx 5–7 mm long, with 4–5 lobes of slightly different lengths; capsule equal in length to slightly longer than the persistent dried corolla. ....  
 ..... ***Gentianella amarella*** subsp. ***acuta*** (northern gentian)
- 7b. Plants to 3.5 dm tall, often with long branches curving upward from the base; leaves <1–3.5 cm long, with 3–5 veins; corolla 1.2–2 cm long, tubular, with 4 lanceolate to ovate lobes ending in a slender bristle, lacking fringes at the throat; calyx 5–12 mm long, with 4 lobes of 2 alternating, different widths and lengths; capsule to 2.5 cm long, longer than the persistent dried corolla. .... ***Gentianella propinqua*** (four-part gentian)
- 8a. Plants of limestone barrens in insular Newfoundland; stems to 2 dm tall (usually <1.2 dm tall); leaves mostly clustered near the stem base, blades lanceolate to oblanceolate, apices blunt to rounded, or the uppermost pair of cauline leaves often with pointed apices; corolla and calyx 4-lobed; corolla lobes rounded and spreading at maturity, lobe margins irregularly and minutely toothed (erose); calyx without translucent tissue between the lobes. ....  
 ..... ***Gentianopsis detonsa*** subsp. ***nesophila*** (island gentian)
- 8b. Plants of western or northern Labrador; stems to 7 dm tall; leaves ± evenly distributed along the stem, blades linear to lanceolate, apices blunt to sharply pointed; corolla and calyx 5-lobed, the corolla lobes pointed and spreading or overlapping at maturity, lobe margins entire; calyx with thin translucent tissue (intracalycular membranes) between the base of each lobe (*Gentiana*). .... **9**

- 9a. Plants to 1.5 dm tall, leaves ovate to lanceolate, less than 1 cm long; flowers solitary on terminal and axillary branches, not subtended by involucre bracts; calyx lobes 5, keeled, marked with dark purple along the keels, the sinuses narrow and V-shaped; corolla 1.5–2.5 cm long, tubular and white below, without longitudinal folds; terminating in 5 elliptic, spreading, sky blue lobes, alternating with short, 2-toothed, sky blue appendages, each bearing a narrow white crest that extends vertically to the throat of the corolla; plants of north coastal Labrador (Makkovik area and northward). ..... ***Gentiana nivalis*** (snow gentian)
- 9b. Plants 1.5–7 dm tall, leaves narrowly lanceolate, 3.5–7.5 cm long; flowers several, in terminal and often upper axillary clusters, subtended by several narrow involucre bracts; calyx lobes 5, narrow, not keeled, separated by broad, flat (truncate) sinuses; corolla 3–5.5 cm long, tubular, blue, blue-violet, or purple, with longitudinal folds (pleats); lobes short, overlapping across the throat of the corolla tube and alternating with short, triangular appendages of similar colour; plants of western Labrador (Lake Winokapau area and westward). ..... ***Gentiana linearis*** (narrowleaf gentian)

## Gentianaceae Comparison Charts

<b>Gentianaceae Chart 1 (of 4): <i>Centaurium</i>, <i>Halenia</i>, &amp; <i>Lomatogonium</i></b>			
	<i>Centaurium erythraea</i>	<i>Halenia deflexa</i>	<i>Lomatogonium rotatum</i>
	European centaury	spurred gentian	marsh felwort
<b>Plant</b>	<1–5 dm tall; annual	<b>0.3–9 dm tall; annual or biennial</b> (winter annual)	<1–3 dm tall; annual
<b>Leaves</b>	basal rosette with oblong to obovate leaves, 1.5–4 cm long; cauline leaves elliptic to lanceolate, 1.0–2.5 cm long × 0.3–1.2 cm wide; veins 3–5	<b>lower leaves petiolate</b> , oblong-spatulate, 1–2 cm long; mid to upper cauline leaves sessile, lanceolate to ovate, 1–5 cm long × 0.5–2 cm wide, veins 3–5	basal rosette with elliptic to spatulate leaves 0.4–3 cm long; cauline leaves sessile, <b>narrowly-lanceolate</b> , 0.5–2.0 cm long × <b>1–3 mm wide</b> ; with <b>1 conspicuous midvein</b>
<b>Inflorescence</b>	in dense, terminal, flat-topped cymes; flowers sessile. <b>usually 5-merous</b> (seldom 4-merous)	In terminal and axillary cymes, flowers pedicelled, sometimes solitary; <b>flowers 4-merous</b>	<b>solitary</b> or in terminal cymes, with or without solitary axillary flowers; <b>flowers 5-merous</b>
<b>Calyx</b>	4–6 mm long; <b>tubular in the lower 1/4 to 1/3</b> , with 4–5 lobes, linear to linear-lanceolate	<b>short tubular at the base</b> , the 4 lobes 4–8 mm long, oblanceolate, with acute to acuminate apices	<b>very short tubular at the base</b> , the 5 lobes 5–15 mm long, narrowly lanceolate, exceeding the corolla lobes
<b>Corolla</b>	<b>pink, salverform; the tube 7–9 mm long</b> , the 4–5 oblong lobes obtuse at the apex, 4–7 mm long × 2.5–3 mm wide	<b>greenish, bronze, or purple</b> ; 0.8–2 cm long, tubular below, <b>with 4 basal spurs, divergent</b> , 3–5 mm long; with 4 ± reflexed lobes at the acute apex	<b>pale blue, or white tinged with blue or purple</b> , rotate, 0.8–2 cm wide; the <b>tube very short</b> ; lobes elliptic to ovate, acute, each with a <b>fringed basal nectary</b>
<b>Stamens</b>	4-5; <b>anthers spirally twisted after pollen is shed</b>	<b>4</b> ; anthers not spirally twisted after pollen is shed	<b>5</b> ; anthers not spirally twisted after pollen is shed
<b>Pistil</b>	<b>style 2-branched</b> at the top, extending beyond the corolla tube; <b>stigmas 2</b>	style absent, <b>stigmas 2</b>	style absent; <b>stigmatic tissue decurrent along 1/2 to 3/4 of the fused upper margins of the 2 carpels</b>
<b>Habitat &amp; Range</b>	disturbed coastal meadows; naturalized in Stephenville, wNfld.	coastal meadows, turfey barrens, and wooded slopes over limestone; w/sw/w/nw/eNfld., seLab.,	limestone barrens, turfey or sandy coastal shores; nwNfld., N along the coast to nLab.

## Gentianaceae: Chart 2 (of 4): *Gentianopsis* and *Gentiana*

Species:	<i>Gentiana linearis</i>	<i>Gentiana nivalis</i>	<i>Gentianopsis detonsa</i> subsp. <i>nesophila</i>
	narrowleaf gentian	snow gentian	island gentian
<b>Plants</b>	<b>1.5–7 dm tall; perennial</b>	to about 1.5 dm tall; annual	to about 2 dm tall; usually <1.2 dm tall; annual or biennial (winter annual)
<b>Leaves</b>	<b>cauline leaves in 7–12 pairs along the stem; 4–7.5 cm long × &lt;1 cm wide; linear to lanceolate; tapering to the pointed (acuminate) apex</b>	basal rosettes with elliptic to obovate blades; <b>cauline leaves, ovate, 0.3–1 cm long × 2–4 mm wide</b> , blunt (obtuse) at the apex	<b>cauline leaves clustered near the base</b> , <1–5 cm long × up to 1.5 cm wide, <b>oblong to oblanceolate</b> , blunt (obtuse) to rounded at the apex
<b>Inflorescence</b>	<b>terminal and axillary clusters (cymes) of sessile flowers, subtended by several involucreal leaves; flowers 5-merous</b>	<b>solitary</b> ; terminal and axillary; <b>flowers 4- or 5-merous</b>	<b>solitary</b> ; terminal and axillary; <b>flowers 4-merous</b>
<b>Calyx</b>	1.4–2.7 cm long; calyx tube 1.0–1.5 cm long; the 5 narrow, lanceolate lobes, not keeled, with <b>broad sinuses and translucent tissue</b> (intracalycular membranes) <b>between each lobe</b>	0.6–1 cm long, tubular, with 4–5 narrow lobes less than 1/2 the length of the tube, <b>keeled</b> and often purple along the midrib; <b>V-shaped sinuses with translucent tissue</b> (intracalycular membranes) <b>between each lobe</b>	0.7–3 cm long; calyx tube about 1–1.4 mm long; the 4 lobes 4-angled, <b>keeled</b> and often purple along the midrib; the lobes unequal, <b>with 2 wider and longer than the adjacent lobes</b> ; V-shaped sinuses, lacking translucent tissue between each lobe
<b>Corolla</b>	tubular, 3–5.5 cm long, blue, purple, or blue-violet, with longitudinal <b>pleats present</b> along the tube; the <b>5 ovate lobes, 0.5–1.0 cm long, curve inward and overlap at the throat</b> ; short triangular appendages occur between each lobe	<b>1–1.5 cm long</b> , greenish-white and <b>tubular below, with 5 spreading, sky blue lobes</b> , 0.7–1 cm long; short, <b>2-toothed, sky blue appendages</b> , with a white crest along the centre, occur between each corolla lobe	about 1–5 cm long × 0.8–1.5 cm wide, the broadly cylindrical tube is white, veined with blue; the 4 oblong, rounded lobes, about 1–1.5 mm long, are light to deep blue-violet, spreading at maturity; <b>margins are minutely and irregularly toothed (erose)</b>
<b>Habitat &amp; Range</b>	bogs and wetlands on acidic substrates; wLab., Lake Winokapau westward	alpine habitats on calcareous substrates; coastal nLab.	limestone barrens; w/nwNfld.

### Gentianaceae Chart 3 (of 4): *Gentianella*

	<i>Gentianella amarella</i> subsp. <i>acuta</i>	<i>Gentianella propinqua</i>
	northern gentian	four-part gentian
<b>Height</b>	0.5–5.5 dm tall; stems somewhat 4-angled	0.2–3.5 dm tall; stems somewhat 4-angled
<b>Leaves</b>	<b>basal rosettes with</b> elliptic, oblanceolate, or spatulate leaves, 1–3 cm long × 3–8 mm wide; <b>cauline leaves</b> lanceolate to ovate, 1–6 cm long × 0.3–2 cm wide; <b>leaves have 3–7 veins</b>	<b>basal rosettes with</b> elliptic to spatulate leaves, 0.5–3.5 cm long × 2–8 mm wide; <b>cauline leaves</b> in 2–5 pairs, blades lanceolate, oblong, to ovate, 0.5–3.5 cm long × 0.2–1 cm wide; <b>leaves have 3–5 veins</b>
<b>Branching</b>	simple or branched; upper branches shorter than lower branches	simple or branched from the base; the lateral branches curving upward
<b>Inflorescence</b>	Flowers in simple or aggregate cymes, or solitary and axillary; <b>terminal flowers about equal in length to laterals; flowers 5-merous</b>	Flowers in simple or aggregate cymes, or solitary and axillary; <b>the terminal flower conspicuously larger than the laterals; flowers 4-merous</b>
<b>Calyx</b>	<b>usually 5-lobed</b> ; the lobes 5–7 mm long, somewhat unequal	<b>Usually 4-lobed</b> , the lobes 5–12 mm long, <b>very unequal in size</b>
<b>Corolla</b>	tubular, light purple to pale blue-violet, seldom white, 1–1.5 cm long, <b>fringed in the throat; the 5 corolla lobes 1/4–1/3 as long as the tube</b> ; lobes acute to obtuse at the apex	tubular, lavender to pale blue or whitish, 1.2–2 cm long, without fringes at the throat; <b>the 4 corolla lobes 1/3 to 1/2 as long as the tube; lobes acuminate and apiculate (bristle-tipped)</b> at the apex
<b>Capsule</b>	to 1.5 cm long	to 2.5 cm long
<b>Habitat &amp; Range</b>	turfy limestone barrens and shores; w/nwNfld. and c/e/seLab.	turfy limestone barrens and shores; nwNfld and seLab.

### Gentianaceae Chart 4 (of 4): *Bartonia*

	<i>Bartonia paniculata</i> subsp. <i>iodandra</i>	<i>Bartonia virginica</i>
	twining screwstem	yellow screwstem
<b>Height</b>	0.7–2.2 dm tall	1.2–3.7 dm tall
<b>Stems</b>	erect, angled, somewhat stout, <b>usually purple, sometimes twining</b> ; branches simple, mostly 2–6 cm long	erect, slender, <b>yellowish-green</b> , often purple at the base, <b>rarely twining</b> ; branches simple, mostly 0.5–4.5 cm long
<b>Leaves</b>	scale-like, greenish-yellow to purple, about 0.5–3 mm long, <b>usually alternate</b> , with $\geq 2$ –9 leaves/plant	scale-like, yellowish-green, about 1.8–4.2 mm long; <b>opposite or nearly so</b> , with $\geq 13$ –28 leaves/plant
<b>Inflorescence</b>	simple or compound cymes, or solitary; axillary flowers solitary	simple or compound terminal cymes; axillary flowers solitary
<b>Calyx</b>	calyx tube <1 mm long, lobes about 2–4 mm long $\times$ 0.5–1.1 mm wide	<b>calyx tube &lt;0.3 mm long</b> , lobes about 2–2.7 mm long $\times$ 0.7–1 mm wide
<b>Corolla</b>	<b>white to purplish or reddish</b> , 2.7–6.3 mm long, with lobes <b>often tipped in purple</b> and less than 1/2 the length of the corolla	<b>greenish-yellow to straw-coloured</b> , <b>2.5–4.0 mm long</b> , with lobes occasionally tipped in purple and about 2/3 the length of the corolla
<b>Stamens</b>	about 1–1.7 mm long; filaments yellow to purplish; <b>anthers usually purple</b> , sometimes yellow	1.5–2 mm long; filaments yellow; <b>anthers yellowish</b>
<b>Pistil</b>	style short, 0.7–1 mm long, with the stigma spreading slightly bilobed	style elongate, 0.5–1.7 mm long, with 2 connivent (touching, but not fused) stigmas
<b>Capsule</b>	3.5–4.7 mm long; splitting from the apex downward	2.8–3.4 mm long; splitting below the persistent style
<b>Habitat &amp; Range</b>	peatlands or sandy soils; sw/w/s/e/seNfld.	bogs, coastal barrens; swNfld.

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