

Rubiaceae (Bedstraw Family) Key

Key to species in Newfoundland and Labrador

© Susan J. Meades, *Flora of Newfoundland and Labrador* (2019)

(Revised May 27, 2022)

Rubiaceae Traits	1
Rubiaceae Key	2
Comparison Charts (4)	3
References	7

Rubiaceae Traits (in our area)

- Represented in our area by 2 genera: *Galium* (12 bedstraw species) and 1 species of *Mitchella*: *M. repens* (two-eyed berry).
- Perennial herbs, erect to matted, or evergreen and trailing.
- Stems of *Galium* are 4-angled and often scabrous, usually with downward-pointing (retorse) barbs.
- Leaves of *Galium* are whorled (4–12 leaves per whorl) and sessile; leaf margins are entire or often scabrous, with backward-facing (retorse) or forward-facing (antrorse) barbs or stiff hairs; leaf apices often end in mucronate or cuspidate tips.
- Leaves of *Mitchella repens* are opposite, petiolate, dark green with paler veins, and persist over winter; leaf blades are ovate to nearly orbicular, with entire margins.
- Flowers occur in pairs (*Mitchella repens*), or few to many in branched, terminal or axillary inflorescences (*Galium*).
- Sepals are reduced to 4 minute teeth (*Mitchella repens*) or absent (*Galium*).
- Petals are connate at the base, forming a tubular or flat corolla, the corolla lobes are valvate in bud.
- The corolla of *Mitchella repens* is campanulate, with a white to pink-tinged tube and 4 pointed (acute) lobes; the inner surface of the corolla bears numerous white hairs.
- The corolla of *Galium* species is small, 3–4-lobed, white, and rotate (flat).
- The pistil has an inferior ovary of 2 carpels, slightly connate in *Galium*, but nearly completely connate in *Mitchella*, and bearing 2 separate corollas, 1 attached to each carpel.
- Stamens are 4 (*Mitchella*) or 3–4 (*Galium*).
- The fruit is either a red berry-like drupe with 2 'eyes' – the persistent calyx lobes (*Mitchella repens*), or a schizocarp of 2 spherical mericarps (*Galium* spp.), which may be glabrous or covered in small hooked bristles.

Rubiaceae Key

- 1a. Leaves opposite, blades broadly ovate to orbicular; flowers with 2 campanulate corollas attached to a 2-carpelled ovary, the fruit a red berry-like drupe with two 'eyes' (the persistent calyx lobes of the 2 flowers). ***Mitchella repens*** (two-eyed berry)
- 1b. Leaves whorled, 4–12 leaves per whorl; blades linear, elliptic, oblanceolate, or obovate; flowers with small rotate corollas in simple 3-branched panicles, or multi-flowered cymes or panicles; fruit a dry schizocarp with 2 spherical mericarps (*Galium*). **2**
- 2a. Ovary and fruit with a bristly surface. **3**
- 2b. Ovary and fruit smooth (glabrous)..... **4**
- 3a. Plants to 2 dm tall, weak, ascending, with 2–4 nodes; leaves 4 per whorl, blades elliptic to obovate, 3-veined, rounded at the apex; leaf margins with forward-facing (antrorse) bristle-like hairs. ***Galium kamtschaticum*** (northern wild licorice)
- 3b. Plants to 1 m long, weak, trailing, with several to many nodes; leaves usually 6 per whorl; blades oblanceolate, with 1 vein, apices acute, cuspidate; leaf margins with forward-facing (antrorse) bristle-like hairs. ***Galium triflorum*** (fragrant bedstraw)
- 4a. Leaves of main stem 4–6 per whorl, apices blunt to rounded, lacking a cuspidate tip. **5**
- 4b. Leaves of main stem 6–12 per whorl; apices pointed, ending in a cuspidate tip. **8**
- 5a. Leaf margins entire, lacking scabrous barbs or stiff hairs; flowers numerous, cymes arranged in many-branched panicles. ***Galium palustre*** (marsh bedstraw)
- 5b. Leaf margins scabrous, with backward-facing (retorse) or spreading to forward-facing (antrorse) barbs; flowers in simple to few-branched cymes. **6**
- 6a. Leaves usually 5–6 per whorl; stems, pedicels, and leaf margins scabrous, with backward-facing (retorse) barbs. ***Galium tinctorium*** (dyer's bedstraw)
- 6b. Leaves usually 4 per whorl; stems and pedicels glabrous or scabrous. **7**
- 7a. Stems and pedicels glabrous; leaf margins spreading to forward-facing (antrorse) stiff hairs, flowers with 4 white corolla lobes. ***Galium labradoricum*** (Labrador bedstraw)
- 7b. Stems, pedicels, and leaf margins with backward-facing (retorse) barbs; flowers with 3 white corolla lobes. ***Galium trifidum*** (threepetal bedstraw)
- 8a. Flowers yellow; leaves 8–12 per whorl; stems finely hairy; leaves linear, with revolute margins and white pubescence. ***Galium verum*** (yellow bedstraw)

- 8b. Flowers white; leaves 6–8 per whorl on main stems; stems glabrous or scabrous, but not hairy; leaves with scabrous margins. **9**
- 9a. Stems glabrous, lacking barbs or stiff hairs. ***Galium mollugo*** (smooth bedstraw)
- 9b. Stems scabrous, with backward-facing (retorse) barbs..... **10**
- 10a. Plants 5–18 dm tall, stems very clingy; leaves 6 per whorl; leaves to 1.5 cm long, margins scabrous with backward-facing (retorse) barbs.
..... ***Galium asprellum*** (rough bedstraw)
- 10b. Plants 1–3 dm tall; leaves 6–8 per whorl; leaves to 2.5 cm long; margins scabrous with forward-facing (antrorse) barbs; plants restricted to open heaths in the Trepassey area, southern Avalon Peninsula.***Galium saxatile*** (heath bedstraw)

Rubiaceae Comparison Chart

Genera:	<i>Mitchella</i>	<i>Galium</i>
	two-eyed berry	bedstraw
Stems	trailing, glabrous	erect to decumbent, 4-angled, glabrous or scabrous
Leaves	opposite , blades broadly ovate or obovate to orbicular; with white markings above the veins; petioles short	in whorls of 4–12 ; blades linear, lanceolate, elliptic, to ovate; sessile
Flowers	2 separate tubular white corollas , 4-lobed, attached to a common 2-carpelled ovary; corolla tube densely pubescent inside	white corollas, rotate , with 3–4 lobes, each with a 2-celled inferior ovary; corollas not pubescent
Fruit	a red berry-like drupe with 2 calyx scars, providing the common name 'two-eyed berry'	a schizocarp, composed of a pair of spherical mericarps ; smooth or bristly

Galium (Rubiaceae) Comparison Charts

<i>Galium</i> Chart 1 (of 3): Species with bristly fruit		
<i>Galium</i> species:	<i>G. kamtschaticum</i>	<i>G. triflorum</i>
	northern wild licorice	fragrant bedstraw
Stems; Stem Angles; Plant Size	perennial, erect; smooth; to 2 dm	perennial, weak, slightly scabrous with retrorse barbs; to 1 m
Leaves/Whorl	4/whorl; with only 2–4 whorls	6/whorl; 4–5 on branches
Leaf Shape	broadly elliptic, ovate, or obovate	narrowly elliptic to oblanceolate
Leaf Size	1–3.5 cm long	2–8.5 cm long
Leaf Apex; Venation	obtuse to rounded , minutely cuspidate; veins 3	acute , cuspidate; veins 1
Leaf Margins	ciliate with ascending (antrorse) hairs	ciliate with ascending (antrorse) hairs
Peduncles	1–3, terminal, 2–3 forked; longer than the leaves	terminal and axillary, 3-forked; longer than the leaves
Flowers	1–3, all pedicelled; corolla yellowish- white, usually 4-lobed	3, all pedicelled, corolla greenish-white, 4-lobed
Fruit Surface; Size	finely bristly; the pair \pm 4 mm across	densely bristly; the pair 3–4 mm across
Range	native (N)	native (LN)

Galium Chart 2 (of 3): Species with smooth fruit and 4–6 blunt leaves				
Galium species:	<i>G. palustre</i>	<i>G. labradoricum</i>	<i>G. tinctorium</i>	<i>G. trifidum</i>
	marsh bedstraw	Labrador bedstraw	dyer's bedstraw	threepetal bedstraw
Stems; Stem Angles; Plant Size	erect to weak; slightly scabrous ; 1–5 dm	erect or ascending; glabrous ; 0.5–4 dm tall	ascending; retrorsely scabrous ; 1–4.5 dm	weak, often matted; retrorsely scabrous ; to 0.5–2.5 dm
Leaves/Whorl	6/whorl; spreading	4/whorl; spreading to reflexed	usually 5–6/whorl ; spreading	4/whorl ; spreading
Leaf Shape	linear-elliptic to spatulate or obovate	linear-oblong-ovate	broadly oblong-ovate-oblong-spatulate	linear to linear-oblong-ovate
Leaf size	to 1 cm long	0.5–1.5 cm	0.6–2 cm long	0.7–2 cm long
Leaf Apex, Venation	blunt or rounded at apex; 1-veined			
Leaf Margins & Midrib	entire; glabrous	margins antrorsely scabrous	retrorsely scabrous	
Inflorescence; Peduncles	cymes many-branched ; peduncles and pedicels glabrous	cymes simple ; peduncles and pedicels glabrous	cymes simple ; peduncles and pedicels glabrous	cymes simple ; peduncles and pedicels scabrous
Flowers	white, 2.5–3.3 mm across; corolla 4-lobed	white, 2–2.5 mm across; corolla 4-lobed	1–3, white, to 1 mm across; corolla with 3 blunt lobes	
Fruit Surface; Size	glabrous, the pair \pm 2 mm across	glabrous, the pair 2–3 mm across	glabrous, the pair 2–3 mm across	glabrous, the pair \pm 3 mm across
Range	native (LN)	native (LN)	native (N)	native (LN)

<i>Galium</i> Chart 3 (of 3): Species with smooth fruit and 6–12 cuspidate leaves				
<i>Galium</i> species:	<i>G. mollugo</i>	<i>G. asprellum</i>	<i>G. saxatile</i>	<i>G. verum</i>
	smooth bedstraw	rough bedstraw	heath bedstraw	yellow bedstraw
Stems; Stem Angles; Plant Size	erect to matted, glabrous ; 0.3–1.2 m	weak, climbing; scabrous ; 0.5–1.8 m	trailing, matted, scabrous ; 1–3 dm	erect, stiff, finely hairy ; 3–9 dm
Leaves/Whorl	mostly 8/whorl ; 6 on branches	6/whorl ; 4–5 on side branches	6–8/whorl ; 4 near stem base	8–12/whorl
Leaf shape	linear to oblanceolate or obovate	elliptic to oval-lanceolate	spatulate, oblanceolate to obovate	linear-acicular; shiny above
Leaf size	1–3 cm long × 2–3.5 mm wide	to 1.5 cm long	0.8–2.5 mm long	1–3 cm long × 2 mm wide
Leaf Apex, Venation	cuspidate or mucronate; 1-veined	acute , cuspidate; 1-veined	blunt to acute , cuspidate; 1-veined	acuminate , cuspidate; 1-veined
Leaf Margins & Lower Surface	antrorsely scabrous	finely retrorsely scabrous	antrorsely scabrous	entire, revolute; white-hairy beneath
Inflorescence; Peduncles	panicle loose, nearly leafless; with numerous branched cymes; flowers numerous	panicle leafy, with cymes longer than subtending bracts	panicle elongate, leafy; with numerous branches cymes	panicle dense, elongate; lower panicle branches longer than peduncle internodes
Flowers	white, 2–5 mm across; corolla 4-lobed	white, about 2 mm across; corolla 4-lobed	white, about 3 mm across; corolla 4-lobed	yellow, 2–3 mm across; corolla 4-lobed
Fruit Surface; Size	glabrous, the pair ± 2 mm across	glabrous, the pair ± 2–2.5 mm across	glabrous, the pair ± 3–4 across	glabrous, the pair < 2 mm across
Range	introduced (LN)	native (N)	introduced (N)	introduced (N)

References

FERNALD, M.L. 1970. *Gray's Manual of Botany*. 8th (Centennial) edition, corrected printing of the 1950 edition. D. Van Nostrand Co., New York. 1632 pp.

GLEASON, H.A., and A. CRONQUIST. 1991. *Manual of Vascular Plants of Northeastern United States and Adjacent Canada*. 2nd ed. The New York Botanical Garden, New York, NY. 993 pp.

JUDD, W.S., C.S. CAMPBELL, E.A. KELLOGG, P.F. STEVENS, and W.J. DONOGHUE. *Plant Systematics: A Phylogenetic Approach*. 4th edition. Sinauer Associated, Inc. Sunderland, MA. 677 pp.