

# Plants 4 bees – True Clovers

**Common Name:** True clover species common in Canada: red, white, and alsike clover

**Scientific Name:** *Trifolium* spp. L., *Trifolium pratense* L., *Trifolium repens* L., *Trifolium hybridum* L.

**Native Range:** The true clovers or *Trifolium* genus contains nearly 250 species in the Fabaceae (pea) family. The major genetic sources of this large genus are Eurasia, southern Africa, and the Americas. The three species commonly grown in Canada and the USA are all exotic imports. Although their main commercial value is as forage, they have ecological importance for soil conservation. As legumes, the clovers fix elemental nitrogen in the soil. It has been suggested that red clover has had a greater influence on civilisation than the potato through the benefits of crop rotation.



## White or Dutch clover.

It is believed the origin of the word “clover” may be from the Dutch word for clubs which is “klaver” - representing the three leaflets of clover plant. The term “clover” is also used as the common name of other legumes such as the sweet clovers, *Melilotus* spp., which are not true clovers.

Red clover, *Trifolium pratense* L., is an introduced biennial or short-lived perennial that grows as one of two clover types: early flowering (double-cut) or late flowering (single-cut), this latter is sometimes called mammoth. Red clover is believed to have

originated in Britain, and is sometimes referred to as meadow honeysuckle.

White clover or Dutch white clover, *Trifolium repens* L., originated as a cool season perennial legume of the Mediterranean. It has become one of the most widely distributed legumes on earth. The three general types of white clover usually recognized are large, intermediate, and small.

Alsike clover, *Trifolium hybridum* L., is a short-lived (often only 2 years) perennial legume that is often treated as a biennial. It is believed to have originated in Sweden, and records show it was cultivated there as early as 1750.

**Canadian Distribution:** Red clover can be found throughout the moist boreal forest regions of Canada. It is not found in the central prairies. The longer days of early summer, at least 14 hours, are required for flowering of the early variety, while the late variety requires 16 to 18 hour days.

White clover has been used as a forage in North America since colonial times. It was noted as early as 1746 and has since spread into northern regions of Canada. It grows best in moist temperate areas with fertile soil and does not tolerate the droughts of the prairies or saline, alkaline, or acid soils. Alsike clover was introduced into England and Scotland about 1830 and into the United States by 1840.

Alsike clover is widely distributed throughout Canada. It is the ‘tough one’ of the clovers, often found along roadsides, railroads, in fallow fields, and in wastelands. It is also extensively cultivated as a forage crop. Although not as nutritious as the previous two species, its ability to utilise poor conditions make it a common crop in regions where not all conditions are ideal for agricultural crops. It is mainly distributed in the cool temperate zones and because it is frost tolerant it can be found north to the sub-arctic.

## Red clover, *Trifolium pratense* L.

**Description:** *T. pratense* grows erect from the crown, with hollow, hairy stems and branches. Stem lengths of early and late varieties average 45 cm and 60 to 75 cm, respectively. The early type has about 4 branches per stem; the late flowering has 6. The large leaves consist of a slender stalk bearing 3 leaflets, usually with a horseshoe shaped mark. Flowers are borne in compact clusters with approximately 125 florets, usually rose pink. Seedpods are small containing kidney-shaped seeds that vary in color from yellow to deep violet. Late flowering red clover recovers more slowly from harvesting, usually permitting only one crop a season. The taproot of red clover is extensively branched.



*T. repens* grows along the ground. Leaves and roots develop along the stolon at the nodes. The leaves are composed of three leaflets, which sometimes have a “crescent” or “water mark” on the upper surface. The flower heads (with 40 to 100 florets) are borne on long stalks from the leaf axils. Florets are white but may have a pink hue. The large type is two to four times larger than the common white clover.

The alsike is a true species and not a hybrid as the name implies. *T. hybridum*'s smooth stems and leaves emerge from a basal crown, reaching a height of 30 to 90 cm. Trifoliate leaves have leaflets with toothed margins and no leaflet markings as found on the other clovers. The plant tends to lodge unless companion plants hold the stem upright. Flowers range from pink to white, and are borne along the length of the stem, becoming brown and shriveled after cross-pollination by honey bees. The flower heads are much smaller than red clover, and the stems do not terminate in a flower. Flowering is usually in mid summer; the racemes bear 30 to 50 florets. Flowers arise from each leaf axis; thus the flowers are oldest near the base of the stem. The taproot has many lateral branches.

**Ecology:** Red clover is quick growing and tolerant of shade, a characteristic that enables growth under taller plants such as flowering shrubs (eg. chokecherry (*Prunus virginiana* L.)). *T. pratense* cannot withstand being cut back to ground level, at least 5 cm of growth should be left after each harvest to encourage re-growth. The early varieties tend not to be as winter hardy as the late cultivars. The later the seeding the higher the risks of winter kill. The flowers are mostly self-sterile and require insect pollination for seed set. Seed production occurs in the second and subsequent years.

Red clover prefers well-drained soil with adequate moisture. Loam, silt loam, and even fairly heavy soils are better than light sandy or gravelly soils. It grows on moderately acid soil, but better yields are obtained when calcium levels are adequate and the pH is above 5.5, better yet in the range of 6.6 to 7.6. Red clover is intolerant of drought and salinity.

Wet years can result in excessive vegetative growth and decreased flower production leading to a drop in honey production. Red clover should be planted in early spring, no later than the first week in July, when soil moisture conditions are adequate. Companion crops are not recommended, as red clover does not compete well.

White clover can be so successful that it may become invasive in some habitats displacing desirable vegetation. Under dry winter conditions winterkill is a risk. It thrives in cool moist climates being best adapted to clay and silt soils in humid and irrigated areas. It grows successfully on sandy soils with a high water table or irrigated droughty soils when adequately fertilized. White clover seldom roots deeper than 60 cm, which makes it suited to shallow soils with adequate moisture.

On good agricultural land red and white clover almost always out produce alsike clover. Alsike is often grown in the cool climates of eastern Canada where it tolerates wetter more acid soils; it is also somewhat tolerant to alkaline soils. It can tolerate flooding for long periods and can be killed during prolonged droughts. Growth persists throughout hot weather with sufficient moisture.

Alsike prefers silty clay loam soil with a pH of at least 6.0. It does not do well under competition or under even moderate grazing, thus it is commonly used for hay production and conservation projects.

**Honey/Pollen Potential:** In the past, the true clovers were among the most important honey plants for the quantity and quality of honey produced. Beekeepers can often be paid to harvest honey from clover as pollination is needed for seed clover. However, if more attractive nectar-producing plants are in the vicinity (especially for red clover) or the colonies are too far from the crop, the pollination and the nectar harvest can be poor.

Red clover is still considered important for honey in some areas. It produces good quantities of nectar, but because its corolla tube is longer than the honeybees' tongue, the nectar is often unavailable to the bees. The corolla tube of late-season red clover is usually much shorter than at the first flowering. Although surplus red clover honey production is uncommon, beekeepers frequently report that bees work red clover late in the season. Honey production can range from 50 to 100 kg/ha, mostly from the second and/or third crops of the year. The honey is mild and very light coloured.

White clover is more important as a honey plant than red clover. White clover honey is considered a premium product. In many areas it is the principle source of nectar for surplus honey. The best yields come in seasons following a year of excessive rainfall. In wet years the conditions favor the asexual rooting of thousands of new plants, which are ready to produce a crop of nectar the following summer. Honey production can range from 50 to 200 kg/ha. The smaller varieties are best for nectar availability for the bees. The honey is clear and a little more golden than that from red clover.

Alsike clover is the most reliable honey plant of the three species; it produces a honey claimed to be indistinguishable from white clover honey. The nectar production season is longer for alsike than either red or white clover. Honey production can range from 100 to 200 kg/ha. All of these clover honeys tend to granulate quickly and have nectar with sugar contents of 54%, 51%, and 48% for red, alsike and white clover respectively. All the true clovers are classified as excellent sources of pollen.

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### **Interesting Facts and Neat Stuff about the True Clovers**

The three 'leaves' of the Irish "shamrock are considered to represent the Christian trinity. However the lucky four-leaf clover pre-dates Christianity; when the Druids (Celtic priests) had influence across Ireland and much of western Europe. They elevated the four leaf clover to a Celtic charm to protect against malevolent spirits. The four leaves represent faith, hope, luck, and love. Nowadays modern marketers have found a substitute 'four leaf clover', the *Oxalis deppei*, - not a true clover (and maybe not even lucky) but always with four leaves.

In the late 1890s, beekeepers made attempts to select superior red clover honey-producing bees but failed. However, it was later concluded that breeding clover to suit the bees would be more profitable than breeding bees to fit the clover.

Some agronomists believe that red clover will regain popularity with the predicted return to natural agriculture. The decline of the use occurred when farmers switched to high-priced cash crops, infrequent crop rotation to replenish the soil and synthetic fertilizers.

Alsike clover can cause bloat problems to livestock under some conditions. Dutch white is best suited for lawn-type use. It tolerates low mowing, stays green through periods of drought and especially important — it tolerates pet urine.