Brassicas & Chicory for Pastures

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Brassica plants and chicory are broadleaved, herbaceous plants called forbs. Brassicas are in the mustard family (*Brassicaceae*). They are mostly annuals and include species like radishes, turnips, kale, and swede. They can be overseeded in pastures or added in mixes of new pasture seedings. Forage brassicas have been fed to livestock for many centuries. In the U.S. there has been renewed interest in their use. They grow and tolerate temperatures just below freezing, giving them an advantage. Due to their tuberous roots, these plants also fill specific uses such as biological tillage. These traits have made brassicas a significant contributor in grazing systems.

Forage radish with thick tap root used for biological tillage benefits (NWWI in late Sept.).

Another broadleaved plant is forage chicory, a semi-annual or short perennial in the sunflower family (*Asteraceae*). Both forbs, brassicas and chicory, have high energy value, and some have properties that make them desirable to add in a pasture mix. They are low in dry matter (DM), making them more suitable for grazing than haying. They provide high-quality forage due to low fiber and high DM digestibility. These succulent plants can exceed 90% moisture content in fresh herbage. Brassicas are similar in productivity and quality to small grains and annual legumes. In the Upper Midwest, yield potential is reduced from 3-4 tons to 2.0-2.2 tons/ac. They do not fix nitrogen (N) and require additional N compared to legumes.

Anti-quality compounds in brassicas are sulfur components called glucosinolates. They can reach toxic levels for animals when fed diets high in brassica forage (brassica anemia). While horses are not affected, cattle are more susceptible than sheep or goats.

Radish germinates in 2-3 days and is used to reduce compaction due to its tuber and taproot. The 'daikon' type or tillage radish has a deep, penetrating root, and is a strong biomass producer, recommended for fall grazing. There is also oilseed radish varieties providing nematode suppression. These do not have deep taproots but can still be used for biological tillage due to their lateral taproot system. It should be planted no later than mid-August.

Turnips require only 80-90 days of growth to reach maximum yields. Tubers penetrate and aid in breaking up soil, helping compacted pastures. The common cultivar, purple top, has large bulbs. Other varieties with smaller bulbs and larger tops make them better-suited for grazing. Mature turnips provide high-quality forage for grazing, and the roots are grazed after the top-growth has been grazed.

Forage chicory is a 2- to 3-year perennial. It has secondary compounds (sesquiterpene lactones, terpenoids) found to have anti-parasitic properties used to reduce parasite loads in lambs. It is adapted to acidic soils, moderately to well-drained; it also requires soils high in phosphorus and potassium. If planted in spring, it has a deep tap root and heat tolerance for continued growth during the summer. Nutritive value and mineral content is similar to alfalfa or cool-season grasses.

In summary, forbs like brassicas and chicory can provide high-quality forage, retain high-quality herbage during cold weather, and contribute to soil compaction improvement.