Artigos

Adaptation Mechanisms to Forage Plants Defoliation

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Grazing is a process impacting on the plant, removing leaves, apical meristems eliminates, reduces the pool of plant nutrients and promotes changes in the allocation of energy and nutrients from roots to shoots in order to compensate for losses photosynthetic tissue. However, promotes the benefits plants by increasing the penetration of light inside the canopy by changing the proportion of new leaves more photosynthetically active, and activation of dormant meristems at the base of the stem and rhizomes. The ability of plants to survive and grow under defoliation results from two mechanisms: avoidance and tolerance. The first involves mechanisms to prevent and reduce the severity of defoliation and second mechanisms under conditions to promote growth of defoliation.

The avoidance mechanisms consist of attributes of the plant architecture, deterrence mechanics and biochemical compounds that reduce the accessibility and palatability of the plant tissues. The avoidance grazing refers to features that allow the plant to reduce both the frequency and intensity of defoliation, especially adaptations morphogenetic and architectural changes that reduce the accessibility of leaves to grazing animal, and mechanical defenses (higher ratio stem, leaf, the smallest size sheet etc.). repellents or biochemical compounds (phenols, alkaloids, tannin condensed silica etc.) which reduce the flavor of the plant. The change in plant architecture that results in avoidance mechanisms may also contribute to increased tolerance to grazing. The size of the leaf meristems can be reduced and positioned closer to ground level and therefore more protected from the direct effect of defoliation. This particular attribute of grass species represents an important selective advantage compared to dicotyledons, whose apical meristems are easily removed by animals.

For grasses, the avoidance morphological mechanisms can be developed as a plastic response to defoliation of different intensity and frequency. This phenotypic plasticity allows the plant to respond and adapt quickly to any change in the system of grazing emphasizing thereby their own adapted genotypes. Frequent and severe defoliation causes reduction in size of individual tillers, followed by an increased number of tillers. The increase in tiller density may be due to the fact that frequent defoliation prevents the reduction of the ratio of light red: far red as perceived by plants. A concomitant reduction in density is not easily tiller explained, however, can be mediated by the maintenance of the sheath a short time constant.

Defoliation severe and leads to repeated development plant leaves with sheaths smaller ligules which are positioned just below the cutting blade and which becomes more horizontal, allowing to keep the lawn green leaf material under the horizon grazing and preserve its supply of carbon . This plant response is fully reversible. Once the defoliation ceases or becomes less frequent, the sheath length of successive sheets gradually increases and recovers its initial value, which is accompanied by larger and more upright strip, until a new defoliation cause new change. Thus, the ability of grass species or cultivars to modify the length of the sheath in response to defoliation regime appears to be important in determining the variation of the plastic response and adaptation to various defoliation regimes.
The mechanisms of tolerance are physiological processes are able to promote growth after defoliation.

The grazing tolerance can be estimated from the time required for the plant, after defoliation with a constant intensity, to recover the same growth rate before the defoliation. This corresponds approximately to the time required to restore the initial plant leaf area at the time of defoliation. The grazing tolerance refers to the physiological mechanisms that allow the plant to continue its growth and to maximize followed by defoliation, despite the loss of photosynthetic tissue, through the provision of meristems with appropriate levels of residual nitrogen and carbon substrates through the process of recycling efficient and rapid restoration of the ability of nutrient uptake by the plant.

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