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# Staggers (Tremorgenic Syndrome)

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# Forage-Related Cattle Disorders

## Staggers (Tremorgenic Syndrome)

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“Staggers” is an all-inclusive term for a group of nervous system disorders caused by indole-diterpenoid mycotoxins produced by various types of fungi on forages. These mycotoxins are collectively known as “tremorgens” (Table 1), and they may be found in several types of grasses at varying stages of maturity. The three main grass types associated with tremorgenic syndrome are *Paspalum* spp. (dallisgrass and bahiagrass), *Cynodon dactylon* (bermudagrass) and *Lolium perenne* (perennial ryegrass). Clinical signs are characterized by tremors and incoordination that tend to worsen with excitement or movement.

Cases of perennial ryegrass staggers are most likely to occur when perennial ryegrass infected with the endophyte *Neotyphodium lolii* is grazed intensively in the summer and fall. The highest concentration of the tremorgens exists in the basal leaf sheaths, so cattle are most at risk when the infected grass is grazed close to the ground. Alternatively, paspalum staggers or dallisgrass staggers occurs when animals consume the seed heads of mature dallisgrass (*Paspalum dilatatum*) or bahiagrass (*Paspalum notatum*) infected with the fungus *Claviceps paspali*. The fungus invades the grass flower and replaces the seeds with a mass of fungal tissue or “sclerotia.” Similarly, bermudagrass tremors occurs when bermudagrass becomes tremorgenic in late summer and fall when seed heads are infected with the fungus *Claviceps cynodontis*.

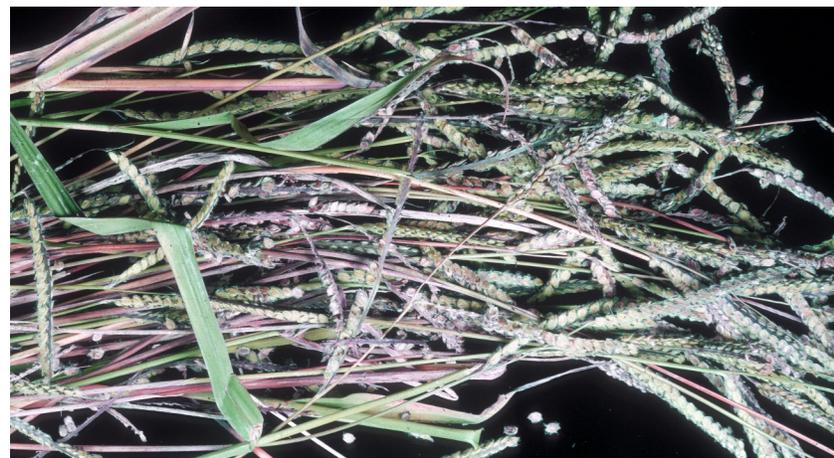
**Table 1. Three main grass types associated with tremorgenic syndrome.**

Disease/Grass Affected	Fungus	Indole-diterpenoid Mycotoxins: “Tremorgens”	Species Affected
Perennial Ryegrass Staggers Grass: <i>Lolium perenne</i>	<i>Neotyphodium lolii</i>	Lolitrems B Paxilline	Cattle, Sheep Horses, Llamas
Paspalum Staggers Grass: <i>P. dilatatum</i> (Dallisgrass) Grass: <i>P. notatum</i> (Bahiagrass)	<i>Claviceps paspali</i>	Paspalitrems A-C paspalinine	Cattle, Horses Buffalo
Bermudagrass Tremors Grass: <i>Cynodon dactylon</i>	<i>Claviceps cynodontis</i>	Paspalitrems A & B Paspaline paspalinine	Cattle, Horses

Regardless of fungal type, clinical signs of staggers are similar.

- When at rest, animals appear to move and graze normally.
- The earliest signs are head tremors and muscle twitching (fasciculations) of the neck and shoulders which later may involve the extremities.
- With excitement or movement, tremors of the head, shoulder and flank worsen and are accompanied by incoordination, ataxia (wobbling gait) or a stiff hopping gait, and/or general weakness of hind limbs.
- As the condition worsens, the animal may exhibit staggering, head shaking, salivation, collapse and seizures or other neurologic signs (opisthotonus, nystagmus). Deaths rarely occur except from accidental trauma or from consequences of being recumbent (downer).
- Affected animals usually return to normal movement and grazing after a period of rest. A full recovery may be expected in approximately 1-2 weeks once removed from the infected grass and left undisturbed.

Dallisgrass (*Paspalum dilatatum* Poir.) infected with ergot.



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In a typical episode, a cow may stand with her hind limbs extended in a base-wide stance and sway. When forced to run, she may have exaggerated movement of the legs resulting in incoordination that causes her to fall. She may paddle violently while attempting to get up. After a period of rest, she will sit up, rise unassisted and then slowly walk away.

Diagnosis is based upon the clinical signs coupled with a history of grazing one of the affected grasses. Another possible cause of forage-related tremors is poisoning by *Aspergillus clavatus*, a mold associated with feeding sprouted cereals (barley) and sugar beet residues, hydroponically grown sprouts or malted by-products. This is a much more severe disease due to degeneration of the brain and spinal cord characterized by tremors, staggering, weakness, paralysis, and recumbency (downer) followed by death.

This condition has been described in many parts of the world but as yet not in North America.

Staggers has no effective treatment other than gently, quietly removing the herd from the infected pasture. Prevention is based on minimizing the amount of mycotoxin consumed. In the case of *Paspalum* staggers, prevention is best accomplished by scouting the field for signs of the fungus in the seed heads and mowing if the pasture is significantly infected or by maintaining high grazing pressure to prevent heavy seeding. Prevention of ryegrass staggers is based on avoidance of heavy grazing that forces livestock to graze the lower parts of the plant. Ryegrass hay cut when the grass is toxic has been shown to retain toxicity for at least two years. Prevention of bermudagrass tremors is simply avoidance of severely infected pastures.

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