Response of Forage Grasses to Rhodesgrass Scale[1] [2]

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Highlight

Yields of 38 species of native and introduced grasses were found to be significantly reduced by scale infestation. Grasses are grouped into three classes: (1) grasses with reduced yields, (2) grasses infested but not affected and (3) resistant grasses. Twenty-eight new hosts of rhodesgrass scale are recorded. The data indicated that rhodesgrass scale is of economic importance in south Texas.

Losses in forage yield which could be attributed solely to rhodesgrass scale, *Antonina graminis* (Mask.) have not been determined by research. Chada and Wood (1950) reported that entire stands of rhodesgrass, *Chloris gayana,* were destroyed by the scale, and that besides rhodesgrass, johnsongrass (*Sorghum halepense,* bermudagrass (*Cynodon dactylon,* and St. Augustinegrass (*Stenotaphrum secundatum* (Walt.) Kuntze), were the preferred hosts. Most other hosts were only lightly infested. However, no data were presented to substantiate this observation. Hosts of rhodesgrass scale in Queensland have been recorded also, but no quan-

[1] *Homoptera: Coccidae*

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Table 1. Grass species affected by rhodesgrass scale determined by greenhouse clipping, Class I, Weslaco.

Scientific name	Common name
1. *Andropogon saccharoides* var. *langipaniculatus* Swartz Gould	Longspike silver bluestem[1]
2. *Andropogon saccharoides* var. *torreyanus* (Swartz) Steud.) Hack	Silver bluestem
3. *Aristida wrightii* Nash	Wright's threeawn[1]
4. *Bothriochloa barbinodis* Lag.	Cane sourgrass[1]
5. *Bothriochloa hybridus* Gould	Hybrid sourgrass[1]
6. *Bouteloua trifida* Thurb.	Red grama[1]
7. *Brachiaria ciliatissima* (Buckl.) Chase	Fringed signalgrass
8. *Cenchrus ciliaris* L.	Buffel sandbur
9. *Cenchrus incertus* M.A. Curtis	Coast sandbur[1]
10. *Cenchrus myosuroides* H.B.K.	Big sandbur[1]
11. *Chloris ciliata* Swartz	Fringed windmillgrass
12. *Chloris cucullata* Bisch.	Hooded windmillgrass
13. *Chloris gayana* Kunth	Rhodesgrass
14. *Chloris latisquamea* Nash	Nash windmillgrass[1]
15. *Chloris subdolichostachya* C. Muell.	Shortspike windmillgrass[1]
16. *Cynodon dactylon* (L.) Pers.	Bermudagrass
17. *Digitaria californica* (Benth.) Henrard	Arizona cottontop[1]
18. *Digitaria patens* (Swallen) Henrard	Texas cottontop[1]
19. *Eragrostis intermedia* Hitchc.	Plains lovegrass[1]
20. *Eragrostis lugens* Nees	Mourning lovegrass[1]
21. *Eragrostis magastachya* Link	Stinkgrass[1]
22. *Eragrostis oxylepis* var. *oxylepis* (Torr.) Torr.	Red lovegrass[1]
23. *Eragrostis sessilispica* Buckl.	Tumble lovegrass[1]
24. *Eragrostis trichodes* var. *trichodes* (Nutt.) Wood	Sand lovegrass
25. *Leptochloa dubia* (H.B.K.) Nees	Green sprangletop[1]
26. *Panicum filipes* Scribn.	Filly panicum[1]
27. *Panicum hallii* Vasey	Halls panicgrass
28. *Rhynchelytrum roseum* (Nees) Stapf. & Hubb.	Natalgrass
29. *Setaria geniculata* (Lam) Beauv.	Knotroot bristlegrass
30. *Setaria macrostachya* H.B.K.	HBK bristlegrass[1]
31. *Setaria scheelei* (Steud.) Hitchc.	Southwestern bristlegrass[1]
32. *Setaria texana* Emery	Texas bristlegrass[1]
33. *Setaria verticillata* (L.) Beauv.	Hooked bristlegrass
34. *Sorghum halepense* (L.) Pers.	Johnsongrass
35. *Sporobolus cryptandrus* (Torr.) Gray	Sand dropseed[1]
36. *Trichloris crinita* (Lag.) Parodi	Twoflowered trichloris[1]
37. *Trichloris pluriflora* Fourn.	Fourflowered trichloris
38. *Vaseyochloa multinervosa* (Vasey) Hitchc.	Texasgrass

[1] New host record for rhodesgrass scale in North America.

titative assessment of damage was given (Brimblecrombe, 1966).

Interviews with ranchers of Brooks, Kenedy, Willacy, Kleberg and Duval Counties indicated the grazing capacity of native ranges had been reduced by approximately 30 percent since the early 1940's, subsequent to the introduction of rhodesgrass scale into Texas. This heavy loss has not been regained, presumably due to scale infestation of native grasses. A series of tests was begun in 1963 to determine if native grass losses could be attributed to scale attack.

Procedure

Seed of selected grasses were planted in 2-gallon pots in the type of soil preferred by the species. Seedlings were infested with rhodesgrass scale crawlers by placing adult rhodesgrass scale among the plants when they were 1 to 2 inches tall. Plants were watered as needed, and a complete fertilizer containing minor elements was added to the water biweekly.

Yields were obtained each time flowering occurred, usually aggregating three or four harvests. Yield was determined as ovendry hay. Reduction in yield was calculated and the percentage of the plants dead at the end of the test determined.

Results

In Tables 1 and 2, the grasses are listed by scientific and common name in three classes on the basis of susceptibility to scale: Class I—grasses with yields and/or stands reduced by scale, Class II—grasses infested by scale but yields not reduced, and Class III—grasses on which scales did not settle. Thirty-eight species were grouped in Class I, nine in Class II, and nine in Class III.

Reduction in yield and percentage plant mortality of Class I are shown in Table 3. Grasses reacted to scale infestation in two different ways: (1) seedlings were highly susceptible but surviving mature plants were tolerant as indicated by decreasing yield reduction in subsequent clippings; or (2) seedlings were tolerant or not highly susceptible, but as greater scale numbers developed greater yield reduction resulted. An interaction with clipping may be indicated.

Scale numbers were not indicative of scale damage. Thin-stemmed grasses such as bermuda and filly panicum were severely damaged, while grasses with stouter stems such as rhodesgrass, buffel sandbur and southwestern bristlegrass, although infested with three or four times as many scale, were less severely affected. Egyptian panicum, a stout plant, apparently was not affected although severely infested with scale. Most species in Class II were lightly infested.

The grouping of unaffected species in Class II does not imply that they would not be affected by scale under different management systems or under range conditions. These grasses were tested under optimum growing conditions. Chada and Wood (1960) cited examples to demonstrate that drought and overgrazing or clipping would intensify scale damage. Similar observations were recorded in Queensland, Australia (Anonymous, 1940).

Twenty-eight new hosts of *A. graminis* in North America are shown in Tables 1 and 2.

Table 2. Grass species not affected by rhodesgrass scale (Class II, infested but yield not reduced) or not infested (Class III, scale free), Weslaco.

CLASS II	
1. *Bouteloua curtipendula* (Michx.) Torr.	Sideoats grama
2. *Digitaria insularis* (L.) Mez ex Ekman	Sour fingergrass[1]
3. *Eragrostis swalleni* Hitchc.	Swallen lovegrass[1]
4. *Panicum geminatum* Forsk.	Egyptian panicum[1]
5. *Panicum maximum* Jacq.	Guineagrass
6. *Pappaphorum bicolor* Fourn.	Pink pappusgrass
7. *Pappaphorum mucronulatum* Nees	Whiplash pappusgrass[1]
8. *Setaria firmula* (Hitchc. & Chase)	Bristle panicgrass[1]
9. *Tridens albescens* (Vasey) Woot. & Standl.	White tridens
CLASS III	
1. *Andropogon scoparius* var. *littoralis* (Nash) Hitchc.	Seacoast bluestem
2. *Bothriochloa ischaemum* var. *songaricus* (L.) Rupr.	East Indies sourgrass
3. *Dicanthium annulatum* (Forsk.) Stapf.	Pretoria angletongrass
4. *Heteropogon contortus* (L.) Beauv.	Tanglehead
5. *Panicum obtusum* Kunth	Vinemesquite
6. *Paspalum setaceum* Michx.	Thin paspalum
7. *Paspalum plicatulum* Michx.	Brownseed paspalum
8. *Setaria leucopila* (Scribn. & Merr.) K. Schum.	Plains bristlegrass
9. *Tridens eragrostoides* (Vasey & Scribn.) Nash	Lovegrass tridens

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Table 3. Reduction in yield and percent plant mortality resulting from rhodesgrass scale infestation on grasses in a greenhouse test.

Grass	Yield loss, percent					Plants killed, percent
	1st clipping	2nd clipping	3rd clipping	4th clipping	Total loss	
Cane sourgrass	0.0	22.8	62.7	40.9	26.1	42.1
Hybrid sourgrass	25.5	37.3	26.9	34.8	32.4	42.5
Longspike silver bluestem	0.0	37.2	40.4	32.7	28.5	23.6
Silver bluestem	0.0	90.0	56.5	—	18.2	85.0
Wright threeawn	0.0	18.0	56.8	—	8.4	0.0
Red Grama	29.0	15.4	16.6	85.8	25.4	74.4
Fringed signalgrass	0.0	38.0	50.7	56.5	44.0	—
Buffel sandbur	25.0	37.6	16.3	11.6	18.8	55.0
Coast sandbur	2.8	43.1	55.9	39.9	37.8	42.5
Big sandbur	0.0	0.0	33.7	33.9	10.2	52.0
Fringed windmillgrass	75.2	87.3	88.5	—	86.9	—
Hooded windmillgrass	87.8	81.8	10.5	—	48.8	—
Rhodesgrass	61.7	4.2	7.7	—	18.0	49.3
Nash windmillgrass	13.5	.2	9.1	11.6	12.7	0.0
Shortspike windmillgrass	27.5	16.7	35.0	84.0	49.4	87.5
Bermudagrass	6.0	54.2	60.9	81.2	59.1	82.5
Arizona cottontop (glabrous sp.)	81.0	96.4	87.4	—	88.3	85.0
Arizona cottontop (pilose sp.)	0.0	26.1	37.2	42.5	28.6	0.0
Texas cottontop	45.6	90.7	73.1	—	75.7	83.3
Plains lovegrass	56.0	12.7	37.8	—	36.4	0.0
Mourning lovegrass	39.6	10.9	9.8	—	17.4	0.0
Stinkgrass	6.0	0	16.2	64.6	20.1	0
Red lovegrass	38.6	17.4	35.8	36.0	28.7	6.2
Tumble lovegrass	11.0	39.2	78.5	—	48.7	65.6
Sand lovegrass	26.9	6.1	42.9	—	24.3	0
Green sprangletop	4.6	34.8	46.8	61.5	29.0	55.0
Filly panicum	0.0	63.7	62.3	72.3	51.6	18.4
Halls panicgrass	47.9	25.2	35.8	—	34.7	26.5
Natalgrass	18.4	20.7	62.3	—	26.4	0
Knotroot bristlegrass	88.5	56.8	61.1	—	63.4	85.0
HBK bristlegrass	0.0	14.6	.4	—	0.0	0.0
Southwestern bristlegrass	14.8	19.0	12.5	17.3	15.6	0.0
Texas bristlegrass	24.9	30.1	0	—	12.4	0.0
Hooked bristlegrass	0.0	12.6	53.8	40.8	18.6	90.3
Johnsongrass	38.0	—	—	—	38.0	0.0
Sand dropseed	0.0	34.4	23.4	31.8	29.1	0.0
Twoflowered trichloris	25.2	35.3	6.5	19.7	20.6	17.5
Fourflowered trichloris	12.9	13.2	45.4	11.6	32.4	0.0
Texasgrass	53.1	38.5	15.2	7.6	25.9	0.0