NUTRIA PELT DAMAGE FROM BIDENS LAEVIS

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Abstract: Nutria (*Myocastor coypus*) were collected monthly from June 1976 to December 1978 and examined for sores resulting from the awns of smooth beggartick (*Bidens laevis*). Nutria became infected in December and were heavily infected from January to March. *Eleocharis* spp. were the taxa most commonly found in association with *Bidens laevis*

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The Louisiana coastal marshes encompass an area of approximately 1,580,000 ha, of which approximately 25% is freshwater marsh (Chabreck 1972). Freshwater marshes are very important to fur animals and wintering waterfowl because of their vegetative diversity (St. Amant 1959, Chabreck 1970, Palmisano 1972).

The nutria is the most important furbearer in Louisiana and greatest densities occur in freshwater marsh (Palmisano 1972). During the 1976-77 trapping season 1.89 million nutria pelts were taken in Louisiana and sold for \$14.78 million ($\bar{x}$ = \$7.82) (O'Neil and Linscombe 1977).

Smooth beggartick occurs in portions of the freshwater marshes of southeastern Louisiana. Nutria occurring in the areas with smooth beggartick become infested with the mature achenes of the plant. Each achene has a pair of awns 3 to 4.5 mm long which are retrorsely barbed (Radford et al. 1964: 1126). The awns stiffen as they mature and through direct contact with nutria, the awns become attached to the fur and penetrate into the skin. Nutria which become infested with the achenes of smooth beggartick develop sores and lesions on the skin which greatly reduce pelt value. Chabreck et al. (1977) described the affected area as being covered with necrotic debris, containing inflammatory cells along with colonies of bacteria and fungal hyphae. The condition is termed chronic dermatitis. The lesions cause the skin to weaken and sometimes tear during the skinning process. The sores usually result in holes in the dried pelts.

Chabreck (1972) found that *B. laevis* occurred only in the fresh vegetative type in the Louisiana coastal marshes and comprised only 0.08% of the total species composition of that type. Chabreck et al. (1977) reported that *B. laevis* is a pioneer plant occurring in dense stands in only a few areas of the state. The dominant climax plant species in fresh marshes in *Panicum hemitomon* (Penfound and Hathaway 1938; O'Neil 1949; Chabreck 1970). Chabreck et al. (1977) reported that large die-offs of *P. hemitomon* has occurred since 1973 because of excessive flooding, therefore setting back succession and creating habitat for pioneer plants. Approximately 160,000 ha of marsh in southeastern Louisiana can be considered as potential habitat for the invasion of *B. laevis*. This area produces about 250,000 nutria annually (Chabreck et al. 1977).

The abundance of *B. laevis* has increased during the last 4 or 5 years. Along with the increase of *B. laevis*, there has been a similar increase in the number of reports of chronic dermatitis in nutria (Linscombe 1976, personal communication, La. Dept. of Wildlife and Fisheries, New Iberia). A continued spreading of *B. laevis* could result in considerable losses to trappers and landowners. In 1976 this study was initiated to determine the effect of *B. laevis* on nutria and to determine vegetative composition and associates of *B. laevis*.

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METHODS AND MATERIALS

The study was conducted on Salvador Wildlife Management Area, consisting of 12,000 ha of predominantly floating freshwater marshes. *B. laevis* is a common plant on the study area. The area also contained an adequate nutria population and numerous complaints were received regarding pelt damage.

The extent of damage to nutria by *B. laevis* achenes was determined by monthly examination of 10 nutria pelts. Nutria were collected from June 1976 to December 1977. The nutria were collected by shooting with a .22 caliber rifle or by trapping. Nutria were trapped during months when dense vegetation restricted nutria sightings for shooting. After the nutria were collected, they were examined externally for the presence of sores and achenes. After skinning, each pelt was examined and sketched to show the location of any lesions. Intensity of infection (based on the number of sores) was determined for each animal infected with the achenes of *B. laevis.*

Results from nutria collected from June 1976 to May 1977 were statistically analyzed (ANOVA completely randomized design) to test for differences in the number of nutria infected during each quarter (December to February, March to May, June to August, September to November) (Steel and Torrie 1960:99-131). Results from nutria collected from June 1976 to December 1977 were analyzed (ANOVA randomized block design) to test for differences in lesion location and intensity of infection.

The line intercept method for sampling vegetation was used to determine species composition, vegetative coverage, relative abundance, and plant associations in areas with *B. laevis.* Canfield (1941) described the line intercept method for sampling range vegetation. A rule, approximately 1.5 m long, graduated into 100 equal units, was placed on the ground and total number of units occupied by each plant species touching the rule was recorded. The areas devoid of vegetation were recorded as open. In August 1976, 8 ha (located on Salvador Wildlife Management Area) were chosen for line intercept sampling (vegetation samples were taken in the same area as nutria samples). The areas contained various amounts of *B. laevis* ranging from areas with little *B. laevis* to areas dominated by *B. laevis.* After randomly selecting a starting point, 20 sampling stations were systematically located at 3 m intervals along each transect. At each sampling station, one line intercept sample was conducted.

RESULTS AND DISCUSSION

Monthly Variation in Pelt Damage

Variation Among Months—Damage to nutria by achenes of *Bidens laevis* was assessed by monthly examination of 10 nutria from June 1976 to December 1977 (Table 1). Results from pelts collected in areas with *Bidens laevis* were statistically analyzed to assess differences in the number of nutria affected each month, intensity of infection, and location of lesions on the pelts.

A highly significant difference ($P<0.01$) was found in the number of nutria affected each quarter (Table 2). In November, nutria utilized *B. laevis* to build resting platforms and they became infested with the achenes of the plant. The achenes possess 2 retrorsely barbed awns (Fig. 1) which penetrate the nutria's skin and cause lesions to develop. The achenes are the initial source of infection with bacterial and fungal infections occurring secondarily. The lesions cause a loss of epidermis due to necrosis and result in holes in the dried nutria pelts (Chabreck et al. 1977).

The most common bacterial organism identified in the cultures made from the lesions was *Staphylococcus aureus* (coagulates positive) (personal communication, 20 September 1978, R. Wessler, Tulane Medical Center, Department of Dermatology, New Orleans, LA). He also stated that *Staphylococcus aureus* is a bacteria commonly found in sores and boils in humans.

Table 1. The number[a] of nutria infected each month by intensity rating and the number of nutria with lesions beginnings to heal; nutria collected from Salvador Wildlife Management Area, St. Charles Parish, Louisiana.

Sample Date	Number with lesions	*Intensity Rating*[b] Severe (>8)	Moderate (4-8)	Light < 4	Number with lesions healing
24 June 1976	0	0	0	0	0
15 July	1	0	0	1	0
17 August	1	0	1	0	0
18 September	0	0	0	0	0
16 October	0	0	0	0	0
12 November	0	0	0	0	0
15 December	9	4	2	3	0
14 January	8	6	1	1	0
Sprayed *Bidens laevis*[c]	8				
No *Bidens laevis*[d]	0				
17 February	10	7	0	3	0
Sprayed *Bidens laevis*[c]	10				
No *Bidens laevis*[d]	0				
18 March	9	6	2	1	7
15 April	10	5	3	2	7
14 May	8	3	2	3	4
16 June	9	3	3	3	4
14 July	4	1	2	1	4
16 August	8	2	2	4	5
16 September	0	2	1	3	5
13 October	1	0	0	1	1
17 November	1	0	0	1	0
20 December	7	3	1	3	0
Mean		2.2	1.1	1.6	

[a]Ten nutria were examined each month.

[b]Based on number of lesions present.

[c]Nutria collected from a separate area where *Bidens laevis* had been sprayed with 2, 4-D for control.

[d]Nutria collected from a separate area where Bidens laevis was absent.

After becoming infested with the mature achenes of *B. laevis* in November, lesions develop in December and 90.0% of the nutria examined in January, February, and March were infected (Table 1). The healing process began in March and continued through fall. New growth of the skin resulted in isolation of puss pockets and eventual healing of the lesion. During October and November 1977 only 10% of the nutria collected had lesions.

Variation Among Areas—During January and February 1977, 10 additional nutria were collected monthly from an area containing no *B. laevis* and 10 from an area containing *B. laevis* that was treated with 2,4-D the previous fall (October 1976). These were compared with animals taken during the same months from dense, untreated stands of *B. laevis.* The area without *B. laevis* was located approximately 8 km from *B. laevis* plants; none of the 20 animals collected had lesions on their skin. Eighteen of the 20 nutria collected from the sprayed *B. laevis* area had lesions on the skin and 18 of 20 animals from

Table 2. Analysis of variance of the number of nutria infected each quarter of the year; nutria collected in areas with *Bidens laevis* from June 1976 to May 1977.

Source of variation	*Degrees of freedom*	*Mean Square*
Quarter	3	226.00[a]
Error	8	4.67

[a](P < 0.01)

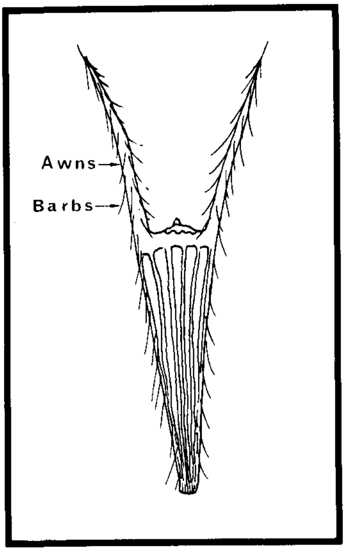

Fig. 1. An enlarged diagram of an achene of *Bidens laevis* (actual length = 12 cm)

the non-treated area were infected (Table 1). The spraying was done after the achenes had completed development and was apparently ineffective in reducing nutria infection.

Degree of Infection—Each nutria infected with lesions was graded and placed in 1 of 3 categories (severe, moderate, or light infection) (Table 1). A difference ($P < 0.05$) was found in the number of nutria placed into each of the intensity categories (Table 3). More nutria ($P < 0.05$) were rated as being severely infected ($\bar{x} = 2.2$) than being moderately infected ($\bar{x} = 1.1$) and lightly infected ($\bar{x} = 1.6$) (Table 1).

Lesion Location—Lesion location on each nutria collected was plotted on a sketch of a nutria pelt (Fig. 2). The pelt was divided into 5 ventral regions (neck, thorax, anterior abdomen, median abdomen, and posterior abdomen). The number of nutria having at least 1 sore in each region was tallied each month (Table 4). There was a difference ($P < 0.01$) in the number of nutria infected in each region (Table 5). The thorax region ($\bar{x} = 4.3$) was the most common area infected and the neck ($\bar{x} = 1.1$) was the least common area infected. Orthogonal comparisons indicated that more nutria ($P < 0.01$) had sores on the thorax region than on the anterior, median, and posterior abdomen regions (Table 5).

Table 3. Analysis of variance of degree of infection in nutria collected in areas with *Bidens laevis* from June 1976 to December 1977.

Source of Variation	*Degrees of Freedom*	*Mean Square*
Month	18	5.484[a]
Intensity	2	6.386[a]
Severe vs $\frac{\text{Light + Moderate}}{2}$	1	10.140[a]
Moderate vs. Light	1	2.632[b]
Error	36	

[a]P < 0.01
[b]Not significant.

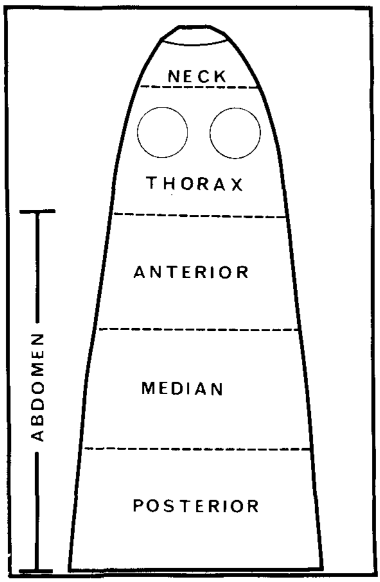

Fig. 2. A diagram of a nutria pelt showing the five ventral regions used for the lesion location analysis.

Nutria often walk with their chests rubbing against the ground, thus causing the thorax region to come in contact with achenes and to be infected frequently.

A condition similr to chronic determatitis was described by Kinsel (1958) as acne and furunculosis in pen-raised nutria. The acne develops due to irritation of the skin. Small hard lumps develop on the skin which quickly grow into larger boils that rupture, draining blood and pus. Pus was often seen oozing from open lesions on nutria on the study area. Kinsel (1958) stated that the acne may become chronic, causing large deep

Table 4. Number of nutria[a] collected having lesions in each ventral region; nutria collected from Salvador Wildlife Management, St. Charles Parish, Louisiana.

Date	*Ventral Regions*				
	Neck (1)[b]	*Thorax (2)*	*Abdomen*		
			Anterior (3)	*Median (4)*	Posterior (5)
24 June 1976	0	0	0	0	0
15 July	0	1	0	0	0
17 August	1	1	1	1	1
18 September	0	0	0	0	0
16 October	0	0	0	0	0
12 November	0	0	0	0	0
15 December	0	9	7	5	5
14 January	2	7	7	6	5
17 February	5	8	9	8	7
18 March	3	9	9	7	7
15 April	3	9	8	8	8
14 May	2	7	6	5	4
16 June	0	9	6	5	6
14 July	0	3	3	3	3
16 August	1	7	5	4	3
16 September	2	5	5	4	3
13 October	0	1	0	0	0
17 November	1	0	0	0	0
20 December	1	6	3	7	4
Mean	1.1	4.3	3.1	3.3	2.9

[a]Ten nutria examined each month.

[b]See Figure 2.

Table 5. Analysis of variance of lesion location on nutria collected from June 1976 to December 1977.

Source of Variation	*Degrees of Freedom*	*Mean Square*
Month	18	38.490[a]
Lesion Location	4	27.563[a]
2 vs $\frac{3+4+5}{3}$	1	14.754[a]
3 vs $\frac{4+5}{2}$	1	3.167[b]
Error	44	

[a]$P < 0.01$

[b]Not significant.

ulcers accompanied by necrosis. He noted that the affected animals became depressed and lost their appetite. Runnels et al. (1968) reported that a similar dermatitis develops on backs of lambs when sharp awns and burrs from plants come in contact with skin causing an irritation to develop.

Chronic dermatitis in nutria caused by the awns of *B. laevis* is very similar to the acne and dermatitis described by Kinsel (1958) and Runnels et al.(1968), respectively. During times of peak infection on the study area, many nutria appeared weakened and could be approached closely before they attempted to escape. In January and February 1977, many dead nutria were observed on the study area. The effect of the chronic dermatitis coupled with low food supplies and cold temperatures probably caused the mortality.

Vegetative Composition and Plant Associations

Vegetation was sampled in 1976 to determine species composition, vegetative coverage, relative abundance, and plant associations in areas with *B. laevis*. *Eleocharis* spp. and *B. laevis* were the dominant species having relative abundance values of 3754.32 and 2951.11, respectively. Other abundant species found in association with *B. laevis* were *Eichhornia crassipes*, *Hydrocotyle ranunculoides*, *H. umbellata*, *Sacciolepis striata*, and *Sagittaria falcata*. A total of 94.8% of the area sampled was vegetated (Table 6).

Table 6. Species composition (SC) (%) and relative abundance (RA) of marsh vegetation on transects in areas with *Bidens laevis* in August 1976.

	1976	
Plant species	*SC*	*RA*
Aeschynomene virginica	0.13	12.33
Alternanthera philoxeroides	0.44	41.72
Bacopa monnieri	1.16	110.00
Bidens laevis	31.12	2951.11
Cephalanthus occidentalis	0.15	14.22
Cyperus spp.	0.81	76.81
Echinochloa walteri	0.73	69.23
Eichhornia crassipes	8.50	806.06
Eleocharis spp.	39.59	3754.32
Fuirena squarrosa	0.07	6.64
Hydrocotyle ranunculoides	5.55	526.31
Hydrocotyle umbellata	4.89	463.72
Lemna minor	0.06	5.69
Lippia lanceolata	1.44	136.56
Ludwigia leptocarpa	0.06	5.69
Pluchea purpurascens	0.04	3.79
Pontederia cordata	0.06	5.69
Sacciolepis striata	2.68	254.26
Sagittaria falcata	2.27	215.26
Saggitaria sp.	0.04	3.79
Spirodela sp.	0.16	15.17
Taxodium distichum	0.03	2.84
Vigna luteola	0.02	1.90
Total vegetative composition	100.00	
Total plant coverage (%)	93.77	

Three plant associations, all containing *B. laevis*, were identified during the line intercept samping in 1976. The *B. laevis-Eleocharis* spp. association was the most frequently occurring plant group on the study area. Sixteen of the 20 areas sampled were classified as *B. laevis-Eleocharis* spp. association. In this association, *Eleocharis* spp. had a relative abundance value of 4560.48, while *B. laevis* had a relative abundance value of 2603.79 (Table 7). Other common species included *I. crassipes*, *H. umbellata*, and *H. ranunculoides*.

Three of the 20 areas sampled made up the *B. laevis-E. crassipes* association. The relative abundance value for *B. laevis* was 5656.83, while the relative abundance value for *E. crassipes* was 1923.23 in this association. The only other common species in this group ws *H. ranunculoides*. The flotant formed by this association is dynamic. Stress through wind activity and water movement often causes the flotant to break apart and move to new locations. This activity may cause *B. laevis* to invade areas not occupied by the species (Table 7).

Table 7. Species composition (SC) (%) and relative abundance (RA) by plant associations of marsh vegetation on transects in areas with *Bidens laevis*.

Plant Species	*Plant Associations*					
	Bidens, Eleocharis		*Bidens, Hydrocotyle, Eichhornia*		*Bidens, Sagittaria, Eleocharis*	
	SC	*RA*	*SC*	*RA*	*SC*	*RA*
Aeschynomene virginica	0.00	14.40	0.00	0.12	0.12	9.68
Alternanthera philoxeroides	0.44	42.24	0.25	23.32	0.99	79.89
Bacopa monnieri	0.84	80.65	0.00	0.00	11.40	919.98
Bidens laevis	27.12	2603.79	60.65	5656.83	4.96	400.27
Cephalanthus occidentalis	0.18	17.28	0.00	0.00	0.00	0.00
Cyperus spp.	0.70	67.21	1.50	139.90	0.37	29.86
Echinochloa walteri	0.73	70.09	0.32	29.85	2.23	179.86
Eichhornia crassipes	6.73	646.15	20.26	1923.23	0.12	9.68
Eleocharis spp.	47.50	4560.48	1.18	110.06	22.18	1789.93
Fuirena squarrosa	0.09	8.64	0.00	0.00	0.00	0.00
Hydrocotyle ranunculoides	4.37	419.56	11.29	1053.02	8.18	660.13
Hydrocotyle umbellata	5.64	541.50	2.00	186.54	0.50	40.35
Lemna minor	0.08	7.68	0.00	0.00	0.00	0.00
Lippia lanceolata	1.53	146.90	0.93	86.74	1.61	129.93
Ludwigia leptocarpa	0.07	6.72	0.07	6.53	0.00	0.00
Pluchea purpurascens	0.04	3.84	0.00	0.00	0.12	9.68
Pontederia cordata	0.05	4.80	0.11	10.26	0.00	0.00
Sacciolepis striata	2.62	251.55	0.68	63.42	10.78	869.95
Sagittaria falcata	0.89	85.45	0.00	0.00	36.43	2939.90
Sagittaria sp.	0.05	4.80	0.00	0.00	0.00	0.00
Spirodela sp.	0.12	11.52	0.39	36.38	0.00	0.00
Taxodium distichum	0.03	2.88	0.00	0.00	0.00	0.00
Vigna luteola	0.03	2.88	0.00	0.00	0.00	0.00
Total species Composition (%)	100.00		99.99		99.99	
Total plant coverage	96.01		93.27		80.70	

One area sampled was classified as the *B. laevis-S. falcata-Eleocharis* spp. association. *S. falcata* and *Eleocharis* spp. were dominant species in this association, having relative abundance values of 2939.90 and 1789.93, respectively. *Sacciolepis striata*, *H. ranunculoides*, and *B. laevis* were other abundant species (Table 7).

CONCLUSIONS

The achenes of *B. laevis* first become attached to the nutria's fur during middle to late November. Sores and lesions develop by mid-December and nutria are highly infected during the trapping season. During the spring and summer the lesions begin to heal and by October and November the following year, only 10% of the animals collected had sores remaining on the skin.

Because sores do not develop until December, an early trapping season could be utilized to harvest nutria from areas infested with *B. laevis*. Chabreck and Dupuie (1970) reported that only 20% of the nutria collected in November had prime fur, while 60% of the nutria collected in December had prime fur. This difference in pelt primeness represented a 42% increase in pelt value from November to December. Because a November trapping season would result in harvesting unprime fur, we recommend that an early trapping season be allowed only in areas heavily infested with *B. laevis* and that the season should begin around mid-November. Trappers would then have approximately a 2 to 3 week period to harvest nutria before they become highly infested.

Eleocharis spp. were the most common taxa found in association with *B. laevis*. *E. crassipes*, *H. umbellata*, *H. ranunculoides*, *S. falcata*, *S. striata*, and *Cyperus* spp. were other species commonly found in association with *B. laevis*.

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