SURVEY OF CATTLE LICE\textsuperscript{1}, GRUB\textsuperscript{2}, AND PSOROPTIC MITE\textsuperscript{3} INFESTATIONS IN SOUTHEAST GEORGIA

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Abstract: Vacuum sampling detected the cattle biting louse, \textit{Bovicola bovis} (L.), on 14.8\% of 128 cattle in a Southeastern Georgia sales barn from 21 January through 18 March 1985. Vacuum sampling failed to detect the presence of \textit{B. bovis} in 264 samples taken from early spring through fall. None of the samples were positive for the mite, \textit{Psoroptes ovis} (Hering). The common cattle grub, \textit{Hypoderma lineatum} (de Villers) was in the backs of 54\% of sales barn cattle and an untreated herd examined 19 November to 4 March, with a peak of 13.5 grubs per infested animal in mid-January.

Key Words: Cattle lice, cattle grub, \textit{Bovicola bovis}, \textit{Hypoderma lineatum}, \textit{Psoroptes ovis}, ectoparasites.

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In the past 20 years many changes in the management of cattle have occurred, thus warranting a survey of current ectoparasite incidence. Cattle from Georgia are a part of an extremely complex series of interstate livestock movements. In 1985, the Georgia Department of Agriculture issued 29,304 health certificates for cattle shipped into Georgia and certificates for 213,572 head shipped to 33 other states (J. A. Cobb, personal communication). The Georgia cattle population rose 1\% to 1,750,000 head in 1985 with an estimated 780,000 calves born and only 10,900 calves slaughtered within the state (Snipes and Hammer 1986). State records and estimates indicate that the vast majority of the Georgia calf crop is destined for finishing operations in other states. Thus, ectoparasites of Georgia stocker cattle and calves are potential problems for the conditioning and final feed lots across the country.

In a survey of 23 herds of cattle in 19 counties, Roberts (1963) detected lice in 16 of the herds, January-March 1962. \textit{Linognathus vituli} (L.) and \textit{Solenopotes capillatus} Enderlein, both Anoplura, were detected in 57\% and 50\%, respectively, of the infested herds, while \textit{Bovicola bovis} (L.), Mallophaga, was found in only two herds. Roberts (1963) reported no correlation between degree of infestation and location of the herds in Georgia. Cattle lice spend their entire life on the host, with populations declining and becoming cryptic during the spring and summer (Lewis and Christenson 1962; Bram 1978).

Bovine psoroptic mange outbreaks caused by \textit{Psoroptes ovis} (Hering), the sheep scab mite, generally are confined to cattle in mid-western states and California (Meleney and Christy 1978; Meleney and Roberts 1979). However, the later paper reported the mange in Georgia in 1976. \textit{Psoroptes ovis} live on the skin and feed on

\textsuperscript{1} MALLOPHAGA: Trichodectidae. Accepted for publication 25 February 1988.
\textsuperscript{2} DIPTERA: Oestridae.
\textsuperscript{3} ACARI: Psoropticidae.
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tissue fluids by piercing the skin with their minute chelicerae. Serum, which exudes from the feeding site wounds, hardens and forms a scab (Sweatman 1958).

The common cattle grub, *Hypoderma lineatum* (de Villers), was found in 11 of 18 herds in Georgia with the average number of grubs per animal ranging from 0.3 in Clarke County to 8.8 in Spalding County (Roberts 1963). Cattle grub populations are generally higher in the Piedmont and upper to middle Coastal Plains than in other parts of Georgia (Roberts et al. 1964). The life cycle of the common cattle grub, *H. lineatum*, takes approximately 1 year.

The objective for our study was to survey cattle for ectoparasites in Southeast Georgia both in private herds and sales barns. Our survey emphasized detecting *B. bovis*, *P. ovis*, and *H. lineatum*. *Psoroptes ouis* was included even though seldom reported from Georgia because vacuum sampling (Callcott 1985; French and Callcott 1987) provided a technique to detect sparse populations that produce no clinical symptoms of psoroptic mange. The vacuum sampling method also warranted evaluation for detecting *B. bovis*.

**MATERIALS AND METHODS**

All animals were located in counties of the southeastern coastal plain of Georgia. Counts and samples were taken while cattle were crowded in a narrow alley leading to a head-gate or while being held in a head-gate. The vacuum method of Callcott (1985) and French and Callcott (1987) was used to survey for *B. bovis*, and *P. ovis*. We used a household vacuum cleaner, an in-line screen support for Whatman no. 4 filter paper and an individual collecting head for each sample. The collecting head was moved against the hair to facilitate skin contact. The vacuum was allowed to pull for 30-45 seconds. Except where noted, the standard sample was taken from the withers and areas extending along the top-line to the tailhead. Samples were processed by soaking in alcohol with eosin, rinsing on to lined filter paper and observing at 10-12 magnification with a stereoscopic microscope (Meleney et al. 1982; Callcott 1985; French and Callcott 1987). Skin scrapings were made by trimming ca. 25 mm² area of hair with scissors; a #22 scalpel blade was then used to scrape the sample into a wide-mouth jar (59 ml). The skin scraping samples were then processed as described above for vacuum samples.

The number of cattle grubs per animal was estimated by back palpation as recommended by Bram (1978). Either the entire back between the withers and the hips was palpated, or one side of the back was palpated and this number multiplied by two to approximate the total number of cattle grubs present. The second method was used in situations where only one side on the animal could be reached.

**Scraping Versus Vacuum Sampling for B. bovis**

On 5 calves known to have *B. bovis*, 10 paired samples were taken. A vacuum sample was first taken in a circular area ca. 35 mm in diameter. A scraping sample (ca. 25 mm²) was subsequently taken within the vacuumed area.

**Sales Barn Survey**

During the winter, 20-30 vacuum samples and 10-20 palpation counts were taken every 2 weeks on unrestrained cattle in a crowded alleyway (21 January to 1
CALLCOTT and FRENCH: Survey for Cattle Lice, Grubs, and Psoroptic Mites

April 1985) in a sales barn located in Hagan, Evans County. The cattle in the sample were considered stocker grade with an estimated weight of $313.8 \pm 13.9$ kg; 79% were female. The summer and early fall survey for lice was done with cattle restrained by a head-gate in a sales barn in Statesboro, Bulloch County with 264 vacuum samples taken (20 June to 21 November 1985). The sample sites were poll (12 samples), ear (22), neck (6), withers (85), dewlap (18), bottom line from between front legs to udder or scrotum (45), tail set (56), tail and switch (10), and udder or scrotum (9).

Private Herd Survey

Six private herds of registered or controlled cross-bred cattle in Bulloch, Effingham, Screven and Tattnall Counties were sampled (See Table 1 for the number of samples and dates). An additional herd (EXP) in a psoroptic mange experiment was sampled from 19 November to 13 March 1985; these grade heifer calves were purchased through the Statesboro sales barn, not treated for cattle grubs after purchase in October, and presumed to be untreated for insect parasites.

Arithmetic means are reported $\pm$ standard error of the mean (SEM).

RESULTS AND DISCUSSION

Scraping Versus Vacuum Sampling for B. bovis

Five of the 10 paired samples contained B. bovis in both vacuum and scraping samples. Two other vacuum samples contained B. bovis but not in the paired scraping sample; two other sample pairs contained lice collected by scraping but not by vacuuming; and one sample pair was negative for lice.

Lice Survey

Bovicola bovis were present in 19 of 148 vacuum samples collected from cattle in a sales barn during the winter survey. All cattle that tested positively for B. bovis had light infestations using the criteria established by Bram (1978). Less than 25% of cattle examined were infested per collection date (Table 1).

Table 1. Incidence of Bovicola bovis in vacuum samples collected from sales barn cattle in Southeast Georgia January-April 1985.

<table>
<thead>
<tr>
<th>Collection Date</th>
<th>Number of Cattle Sampled</th>
<th>Number of Cattle Parasitized</th>
<th>Percent Parasitized</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan 21</td>
<td>23</td>
<td>3</td>
<td>13.0</td>
</tr>
<tr>
<td>Feb 4</td>
<td>30</td>
<td>6</td>
<td>20.0</td>
</tr>
<tr>
<td>Feb 18</td>
<td>30</td>
<td>2</td>
<td>6.7</td>
</tr>
<tr>
<td>Mar 4</td>
<td>20</td>
<td>2</td>
<td>10.0</td>
</tr>
<tr>
<td>Mar 18</td>
<td>25</td>
<td>6</td>
<td>24.0</td>
</tr>
<tr>
<td>Apr 1</td>
<td>20</td>
<td>0</td>
<td>0.0</td>
</tr>
</tbody>
</table>

Of the adult and nymphal lice collected, about half of them were intact, while the remaining were fragmented. Most of the lice eggs collected were empty with a few containing embryos; the viability of the embryos was not determined. The percent of animals parasitized varied over the first 8 weeks and dropped from a high of
24% on 18 March to none on 1 April. The 1985 summer and early fall survey attempted to detect cryptic populations of *B. bovis*. Only four samples, from withers or neck, yielded *B. bovis* with no more than two specimens per sample.

No ectoparasites were collected in 180 vacuum samples from the six private herds. Five of 5 heifers in the EXP herd were positive for *B. bovis* in vacuum samples taken 2 January and this species was also in scraping samples from 7 of 8 EXP heifers on 16 January.

While vacuum sampling has been shown to be as effective as scraping for detection of *P. ovis* (French and Calcott 1987), *B. bovis* is more difficult to detect by vacuum due to adaptations to grasp or glue to hair. Hair parting, then counting (Bram 1978) and scraping require considerably more skill and are very difficult to perform in a rapidly moving sales barn operation. In the two sales barns we worked, prior to sales, lots or groups of cattle were crowded into an alleyway leading to a head-gate. A veterinarian and an assistant recorded or applied a state ear tag and took a blood sample from each potentially reproductive animal; this process of less than one minute per animal made it difficult to examine the cattle concurrently for ectoparasites. In the alleyway, the cattle were unrestrained and thus difficult to sample except by the vacuum method.

One half of the *B. bovis* specimens in vacuum samples were fragmented and most of the eggshells were empty, indicating that vacuum sampling did not determine the activity of a louse population, but indicated that *B. bovis* was present at some time in the season. During the winter, the vacuum sampling indicated that ca. 14% of the cattle passing through that sales barn, from 21 January through 21 March, had been exposed to *B. bovis*. In the six private herds, the evident superior management and ectoparasite control measures were effective as indicated by 180 negative samples. The EXP herd, bought through a sales barn in October and not treated for ectoparasites, showed 87.5% parasitism by *B. bovis* in January.

*Mites, P. ovis*

No *P. ovis* were found in the 333 vacuum samples taken during the late fall and winter from cattle in private herds and sales barns. We are confident that none were present on the top line of these cattle due to the efficacy of the vacuum method for *P. ovis* (Calleott 1985; French and Calcott 1987).

*Cattle Grubs*

The data from grub counts on cattle in sales barns and the EXP herd were similar and are combined in Table 2. Of the 122 examinations, 54% were positive for cattle grubs from 19 November to 4 March. The count was nearly constant through 18 February then declined on 26 February and 4 March; no grubs were found 13 and 18 March. In four private herds, only 1 of the 40 animals examined was infested (2 grubs). Roberts (1963) reported 9 of 14 herds had grubs with a parasitism rate of 38.5% (avg 3.5 grubs/animal) in a survey of cattle in 14 Georgia Counties. Our data from the sales barn and EXP herd indicated that a higher incidence of parasitism with more grubs (peak 13.5 grubs) per infested animal.

CONCLUSIONS

The vacuum sampling method of French and Calcott (1987) for the mite, *P. ovis*, was valuable in detecting the louse *B. bovis* in sales barns. Although not the
ultimate diagnostic tool, vacuum sampling was the most feasible in the sales barn situation and will indicate the incidence rate of *B. bouis* during the winter months. This sampling method failed to reveal cryptic populations from early spring through fall. None of the vacuum samples were positive for *P. ovis*. Cattle grubs, *H. lineatum*, were present in over one half of the cattle processed through a sales barn during the winter. Herds with well executed management programs were essentially free of all three parasites.

Table 2. Incidence of cattle grubs in Southeast Georgia, November 1984-March 1985.

<table>
<thead>
<tr>
<th>sample dates</th>
<th>n</th>
<th>% with grubs</th>
<th>grubs/infested host</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nov 19</td>
<td>11</td>
<td>63.6</td>
<td>5.6</td>
</tr>
<tr>
<td>Jan 4-16</td>
<td>31</td>
<td>67.7</td>
<td>13.5</td>
</tr>
<tr>
<td>Jan 21-29</td>
<td>27</td>
<td>55.5</td>
<td>13.4</td>
</tr>
<tr>
<td>Feb 4-18</td>
<td>30</td>
<td>56.7</td>
<td>10.3</td>
</tr>
<tr>
<td>Feb 26-Mar 4</td>
<td>24</td>
<td>25.0</td>
<td>4.5</td>
</tr>
<tr>
<td>Mar 13-18</td>
<td>15</td>
<td>0</td>
<td>—</td>
</tr>
</tbody>
</table>

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