Ergot is not a new disease of grains and grasses in North Dakota. It has been observed, particularly in rye, for many decades. The severity of the infestation varies with weather conditions, area, and variety and type of grain or grass.

Ergot is caused by a fungus, *Claviceps purpurea*, which infects the flowers of cereal grains and grasses causing the seed or kernel to develop as a purplish-black sclerotium. The ergot bodies are usually larger and less dense than the seeds of the grains or grasses.

Ergot toxicity is traceable to its content of alkaloids. These alkaloids cause various responses when consumed by or administered to an animal. One of the more common symptoms observed when toxic levels of ergot are consumed is the constriction of the blood vessels flowing to body extremities causing a shortage of blood in the legs, tail, ears, etc. of the animal. This may result in tissue death with "sloughing off" of the damaged appendages. This is often referred to as the chronic or gangrenous form of the disease.

Another symptom of toxicity is poor breeding efficiency, as evidenced by poor conception rate or abortion. Abortion results because the ergot stimulates the contraction of the uterine muscles. In fact, ergot was described in the middle ages and was used in childbirth and to control hemorrhages in the days of secret concoctions and potions.

Milk production may also be reduced by ergot in the feed. In some cases there is complete agalactia.

A recent circular (NDSU Extension Circular PP-551, 1971) reviews the toxic effects of ergot on livestock.

Research on the effects of long term, low level (less than 0.15 per cent) feeding of ergot to fattening cattle was initiated in an effort to ascertain whether the results obtained from an evaluation of a new grain, triticale (Rossner), were due to the grain or to traces of ergot that the grain contained. No reports were found in the literature where ergot had been fed at low levels over a long period of time.

Because the first noticeable symptoms appeared to be a reduced feed intake and reduced gains, small fleshy heifers were allotted to four groups and fed finishing rations containing two levels of ergot from two sources to see if these symptoms would appear. The results of feed intake and gain are presented in Table 1.

<table>
<thead>
<tr>
<th>Lot</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment</td>
<td>Control</td>
<td>0.5% Rye Ergot</td>
<td>0.5% Wheat Ergot</td>
<td>1% Wheat Ergot</td>
</tr>
<tr>
<td>Initial Wt. Lb.</td>
<td>591</td>
<td>594</td>
<td>603</td>
<td>586</td>
</tr>
<tr>
<td>Final Wt. Lb.</td>
<td>623</td>
<td>592</td>
<td>572</td>
<td>571</td>
</tr>
<tr>
<td>Av. Daily Gain, Lb.</td>
<td>0.65</td>
<td>-0.04</td>
<td>-0.057</td>
<td>-0.31</td>
</tr>
<tr>
<td>Feed per day, lb.</td>
<td>11.1</td>
<td>8.88</td>
<td>8.00</td>
<td>7.77</td>
</tr>
<tr>
<td>Feed per pound gain, lb.</td>
<td>17.2</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
</tbody>
</table>

The heifers were fleshy and were kept on these rations for only 49 days at which time the experiment was terminated to make room for other research.

The control group did not gain well, but the groups receiving the added ergot ate 20 to 30 per cent less feed and lost weight. In addition, the heifers on the ergot were showing heavier hair coats which were dull and lacked the "bloom" seen...

---

Dr. Dinusson is professor, Haugse is associate professor and Knutson is assistant professor, Department of Animal Science.
A similar lot of steers fed ergot (0.15% of ration). Note their long, matted hair coat, lack of bloom, un thriftiness and listlessness.

North Dakota Experiment Station steers fed a normal ration. Note their bloom, alertness and condition.

November - December, 1971
on the heifers in the control lot. Also, the heifers
fed ergot were drinking much more water as evi-
denced by the difficulty in providing enough bed-
ding in the lots to keep the pens dry. A further
observation was that the heifers fed ergot appeared
to show more stress from the warm weather expe-
rienced during the trial.

In another experiment, 0.5 per cent ergot was
added to barley rations for fattening cattle. Two
lots were dairy-beef crossbred steers and two lots
were beef steers. The results are summarized in
Table 2.

<table>
<thead>
<tr>
<th>Table 2. Ergot in Rations for Fattening Cattle.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lots</td>
</tr>
<tr>
<td>------</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Treatment-Ergot</td>
</tr>
<tr>
<td>Initial wt. lbs.</td>
</tr>
<tr>
<td>Final wt. lbs.</td>
</tr>
<tr>
<td>Av. Da. Ga. Lb.</td>
</tr>
<tr>
<td>Av. Feed/day/lb.</td>
</tr>
<tr>
<td>Lbs. feed/lb. gain</td>
</tr>
<tr>
<td>Per cent Intake of Control</td>
</tr>
<tr>
<td>Per cent Gain of Control</td>
</tr>
</tbody>
</table>

As can be seen from the table, feed intake was
reduced as the steers on ergot consumed only about
88 per cent as much of the ration. The gains were
reduced more for the beef type than for the dairy-
beef crosses. In general the dairy-beef crosses were
more aggressive, ate more and gained faster, but
were not as efficient in feed conversion.

In regard to other expressions of toxicity, the
wet pens were in evidence as a result of greater
water intake and urination. The inability to shed
winter coats was also in evidence, and the ergot-fed
cattle showed increased respiration and some dis-
comfort on warmer days. The beef-type showed
more stress than did the dairy-beef crosses. This
and other observations suggest that not all cattle
respond alike to the effects of ergot in the ration.

In another experiment comparing performance of
yearling steers receiving 0 or 0.15 per cent ergot,
steers receiving ergot consumed eight per cent less
feed and gained three per cent more slowly with
comparable feed efficiencies. In another compar-
ison, steers receiving 0.15 per cent ergot consumed
15 per cent less feed per day and gained 25 per cent
less rapidly. In this comparison the gains were af-
fected more by an outbreak of foot rot which was
very difficult to cure, presumably because of less
blood flow to the feet. There were also cases of
digestive upsets in the ergot-fed lot, not noted in
any other lot. The other usual symptoms of toxicity
were also present, increased urination and wet
pens, inability to shed winter hair with matting of
hair, heat stress, etc.

From these three experiments, it was apparent
that many of the symptoms observed in experi-
ments where triticale was being evaluated were due
to the traces of ergot. Similar symptoms were ob-
served in one experiment where the triticale con-
tained only 0.06 per cent ergot.

The problem of ergot toxicity is not a simple
one. Several questions remain unanswered in re-
gard to low level long term feeding of ergot. Not
all ergot appears to have the same level of toxicity.
Whether this variation due to grain species (i.e.,
ergot from rye, wheat, triticale, etc.) is of any sig-
ificance is not known. The effect of storage, or
grinding and storage, on potential toxicity is un-
answered. A limited number of observations show-
ed that ergot stored for two years was still toxic.
The tolerance to ergot by different breeds or spe-
cies of livestock has not been fully clarified.

Until more definitive data is available, any ra-
tions containing 0.06 per cent or more ergot should
be considered potentially toxic, particularly for
long term feeding. Many of the symptoms of toxic-
ity observed for levels of 0.15 per cent and 0.5 per
cent ergot in rations were also observed in triticale
rations containing 0.06 per cent ergot.

In general, the symptoms most generally ob-
served for long term low level (less than 0.15 per
cent) feeding of ergot were reduced feed intake,
reduced gain, unthriftiness, increased water intake
and urination, and heat stress. The cattle did not
shed their long winter hair normally, as shown in
the pictures. At temperatures of 80° F and above,
the cattle had increased respiration rates (panting)
and frequent slobbering of saliva.

The cattle had less resistance as evidenced by
the difficulty in curing foot rot when it occurred.
There were more digestive disturbances and diffi-
culty in keeping on full feed. Lameness and tender
feet and legs was observed. Some cattle were ner-
vous, while others appeared dull and listless. This
could be called "unpredictable behavior".

The symptoms of ergot toxicity could go un-
noticed unless similar cattle without ergot in the
feed were available for comparison, because in
general, the symptoms are those of "poor-doing,
unthifty" cattle. No treatment for ergotism is
known at this time. Cattle which had been fed ergot
and showed many of the symptoms of ergotism had
not fully recovered even after six weeks of feeding
an ergot-free ration.

Research on the various aspects of ergotism is
continuing in an effort to shed more light on the
many problems associated with this disease.