Suspected nitrite poisoning in pigs caused by *Capsella bursa-pastoris* (L.) Medik. (‘herderstassie’, shepherd’s purse)

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**ABSTRACT**

Nitrite poisoning in pigs was suspected when 4 of 18 pigs died in a piggery near Ellisras in the Northern Province. The pigs showed typical brownish discolouration of the blood at autopsy. It was established that they ingested vegetable tops and weeds from the adjacent garden as part of their daily ration. Of the available plants, only *Capsella bursa-pastoris* contained nitrites. The drinking water and some of the other plants tested positive for nitrates but not for nitrites. This is the first report of suspected nitrite poisoning in pigs caused by *Capsella bursa-pastoris*.

**Key words**: *Capsella bursa-pastoris*, nitrite poisoning, pigs.

**CASE HISTORY**

At a small piggery near Ellisras in the Northern Province, 4 of 18 pigs died suddenly within a period of 24 h. The pigs were kept in open, brick-walled sties with a corrugated iron overhang roof providing shade and shelter.

The caretaker maintained that, although they were not in good condition, the pigs were eating well and appeared healthy the day before this incident.

The pigs received a dry feed made up of chicken litter and yellow maize with a little salt added to it. This was supplemented with green feed consisting of weeds and vegetable tops from the garden, which was fertilised with the dung and slurry washed from the pig-
Histopathology

No specific lesions were observed during histopathological examination of sections of the liver, kidney, brain, lung and skeletal muscular tissues.

Identification of plants

Plants were identified as follows at the National Herbarium of the National Botanical Institute, Pretoria: Amaranthus sp. (pigweed), Capsella bursa-pastoris (shepherd's purse or herderstassie), Brassica rapa (turnip), Spinacia oleracea (spinach) and Brassica oleracea (broccoli).

Nitrate and nitrite levels in plants

Nitrate and nitrite levels in the plants are reflected in Table 1. The only plant that contained significant nitrite levels was Capsella bursa-pastoris. The sample of this plant from Onderstepoort, by contrast, had high nitrate levels but, like the other plants, tested negative for nitrite.

<table>
<thead>
<tr>
<th>Specimen</th>
<th>Nitrates</th>
<th>Quantity (ppm*)</th>
<th>Nitrites</th>
<th>Quantity (ppm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>Positive</td>
<td>12760</td>
<td>Negative</td>
<td>–</td>
</tr>
<tr>
<td>Spinacea oleracea</td>
<td>Negative</td>
<td>–</td>
<td>Negative</td>
<td>–</td>
</tr>
<tr>
<td>Brassica oleracea</td>
<td>Negative</td>
<td>–</td>
<td>Negative</td>
<td>–</td>
</tr>
<tr>
<td>Amaranthus sp.</td>
<td>Positive</td>
<td>–</td>
<td>Negative</td>
<td>–</td>
</tr>
<tr>
<td>Brassica rapa</td>
<td>Positive</td>
<td>–</td>
<td>Negative</td>
<td>–</td>
</tr>
<tr>
<td>Capsella bursa-pastoris</td>
<td>Positive</td>
<td>8020</td>
<td>Positive</td>
<td>4630</td>
</tr>
<tr>
<td>Onderstepoort Capsella</td>
<td>Positive</td>
<td>100</td>
<td>Negative</td>
<td>–</td>
</tr>
</tbody>
</table>

*ppm = parts per million.

DISCUSSION

The results of the analysis indicate that the pigs probably died of nitrite poisoning caused by ingestion of Capsella bursa-pastoris. According to Clarke et al., pigs are more susceptible to nitrite poisoning than cattle and sheep, the minimum lethal dose of sodium nitrite being 70-75 mg per kg body mass. Ruminal bacteria that can convert nitrites to ammonia by means of a nitrite reductase enzyme enable ruminants to safely digest feeds or drinking water with higher levels of nitrates.

This is the first report of suspected nitrite poisoning caused by Capsella bursa-pastoris. The rather unusual circumstances under which the plant grew, namely nitrate-rich water for irrigation, nitrogen-rich manure and slurry used as fertiliser, and probably some bacterial decomposition of the plant material, must have contributed to the concentration of nitrites in this common weed. The negative nitrite test and only 100 parts per million of nitrates in the Onderstepoort specimen of this plant, indicate that unusual circumstances are required for this plant to become toxic.

ACKNOWLEDGEMENTS

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REFERENCES