

# Pigweed is Toxic to Pigs

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Redroot pigweed (*Amaranthus retroflexus* L.) may be lethal to pigs.

Pigweed is a major agricultural weed throughout North Dakota; fence rows, farm yards and empty livestock lots tend to have luxurious pigweed growth, especially during warm months. A distinct health problem known as "perirenal edema" may affect hogs (2,3), and sometimes cattle (6), following ingestion of sufficient quantities of the weed. The term "perirenal edema" describes the appearance of the kidneys and tissues surrounding them in pigs victims of pigweed poisoning.

## CAUSE OF KIDNEY DAMAGE

Perirenal edema is attributed to ingestion of excessive amounts of redroot pigweed. In hogs, the problem is commonly observed during summer months. Most affected pigs have weighed 30 to 120 pounds and the clinical histories have usually involved sudden access by hogs to pasture or green plants following a period of confinement. Clinical signs have appeared four to eight days after access to the weed.

Redroot pigweed may accumulate nitrate, but clinically perirenal edema bears no resemblance at all to nitrate poisoning. Somehow hogs readily ingest pigweed, even when their normal diet is plentiful. The actual toxic principle(s) in the weed, although not yet identified, appears to specifically damage the tubules of the kidney. Depending on how much weed a pig ingests, the kidney damage may become extensive and severe and cause death from heart failure (2).

## CLINICAL SIGNS AND LESIONS

Clinical signs are of sudden onset and appear four to eight days after animals started to eat pigweed. Initially, affected pigs are weak and tremble; later they appear incoordinated, knuckle their pastern joints and eventually become paralyzed in their hind limbs; their attempts to walk fail as they drag their rear legs. Their temperature remains normal. Death usually occurs within two days following onset of clinical signs (3).

Postmortem examination reveals pale-brown kidneys surrounded by abundant jelly-like light-colored material and

fluid (Fig. 1), thus the term "perirenal edema." Microscopic examination of kidney specimens reveals extensive kidney damage characterized by distention, degeneration and necrosis of kidney tubules (2). The clinical signs and gross renal changes result from kidney damage cause by pigweed toxin(s).

So far, no effective treatment for this condition is known; prevention is easier. Confined pigs should not be allowed to eat the weed. Interestingly, hogs raised on pasture with free access to redroot pigweed seldom if ever become victims of pigweed toxicosis. This suggests that pasture-raised hogs either avoid the weed or develop resistance to its toxic principle(s).

## PIGWEED TOXICITY TO PIGS CONFIRMED AT NDSU

Rain and sunshine provided favorable conditions for abundant growth of redroot pigweed in most North Dakota counties during the summer of 1986. Previous experiments

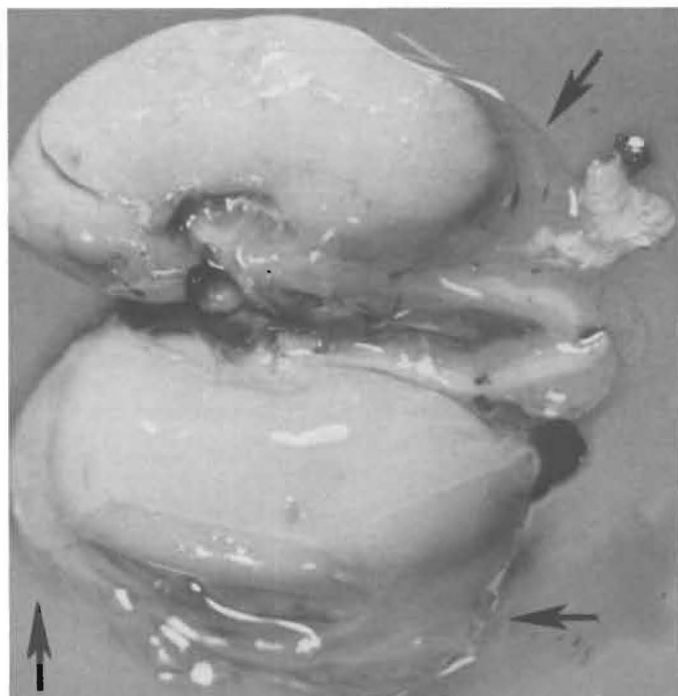


Figure 1. Kidneys from piglets victim of pigweed toxicosis. Kidneys are pale and surrounded by abundant edema (arrows).

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at NDSU had indicated that pigweed was not toxic to laboratory rats (1) or rabbits (4). A simple test was conducted to determine if pigweed growing in North Dakota was toxic to pigs.

Two young pigs, weighing 8 and 12 pounds respectively, were deprived of feed for 24 hours. They were bled to assess their kidney function, penned together and offered, twice daily, freshly picked, whole redroot pigweed plants as their only feed. The plants, collected from fields near the NDSU campus, were lush, about 18 to 24 inches tall and in their early to mid bloom. During the first day the pigs just nibbled at the plants, but from the second through the fourth day they devoured them without hesitation; only some roots were left. Both piglets appeared and acted normal until the morning of the fifth day when they appeared listless, were recumbent and unable to stand up. They had lost 1.5 and 1.3 pounds respectively. They were killed and laboratory examinations performed.

The results of these examinations revealed marked edema surrounding the kidneys of both pigs (Fig. 2); there was severe, acute, disseminated dilation and necrosis of kidney tubules. Analysis of blood sera taken right before euthanasia revealed marked elevation of blood urea nitrogen (BUN) and creatinine levels. These results are consistent with renal failure in pigs associated with ingestion of redroot pigweed. Furthermore, the results of this test demonstrated beyond doubt that ingestion of large amounts of North Dakota varieties of redroot pigweed can be lethal to pigs.

## REFERENCES

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Figure 2. Abdominal cavity from pig victim of pigweed toxicosis. Kidneys are pale, swollen, and surrounded by abundant edema (arrows).

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4. Schamber, G.J. and A.R. Misek. 1985. "*Amaranthus retroflexus* (redroot pigweed): Inability to cause renal toxicosis in rabbits." Am. J. Vet. Res., 46(1):266-267.
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The leading reason affecting land sellers to sell was the need to reduce debt. Second and third reasons were economic conditions or low commodity prices and poor return on investment. Lender pressure was listed as fourth, followed by forced sale, and retirement or health or estate settlements. Among those listing a second reason, most frequently given were estate settlements, followed by economic conditions and the need to reduce debts.

Major factors influencing the 1986 farmland market included low commodity prices, poor conditions of the

economy, availability of credit, and low return on investment. The leading second reasons listed were availability of credit and low commodity prices.

Respondents were asked to venture an estimate of how land values a year from now will compare to current values. The majority, with 65 percent, indicated that November 1987 land values will be down by 5 percent or more. Nearly a third said that fall 1987 land values will be about the same as now, and less than 4 percent had the optimism to say that land values will be higher at year end.