

Hilltop cattle

Information sheet – Trace elements

The Hilltop area has nine farms and four streams. The farms are all similar in size. Five of the farms are able to produce healthy cattle. However, on West Hill, Oak Bank, Lane Ends and Southfield farms the local vet has noticed:

- the cows are underweight
- they have rough, dull coats and the hair tends to fall out
- calves are small and weak, and mothers produce much less milk than usual
- some animals have a strange walk the farmers call ‘staggers’.

The vet thinks these problems may be caused by either a **deficiency** (too little) or an **excess** (too much) of some **trace elements**. All animals need certain trace elements in their diet, but some elements can be **toxic** (poisonous) at high concentrations, so getting the balance right is essential. Many trace elements build up in the liver, so the vet has taken liver samples from both healthy and unhealthy cows in Hilltop. These were sent to a laboratory for analysis. The results are shown in Table 1.

Table 1 Average concentration of trace elements in livers of cattle.

Element	Symbol	Concentration (mg kg ⁻¹)	
		healthy cattle	unhealthy cattle
chromium	Cr	2.0	1.1
copper	Cu	70.0	16.0
iron	Fe	180.0	44.0
manganese	Mn	40.0	12.0
molybdenum	Mo	3.5	24.0
nickel	Ni	4.0	1.3
selenium	Se	0.3	0.1
zinc	Zn	4.0	3.0

The vet also collected stream sediment samples for analysis from the four streams. Elements that are found in the sediments are also likely to be found in the grass the cattle feed on. Table 2 shows the results.

Table 2 Levels of trace elements in stream sediments.

Stream	Trace element concentration (mg l ⁻¹)							
	Cr	Cu	Fe	Mn	Mo	Ni	Se	Zn
1	2	40	280	180	34	3	–	60
2	1	32	170	140	4	1	–	16
3	1	94	420	310	60	4	–	81
4	2	54	340	220	5	2	–	74