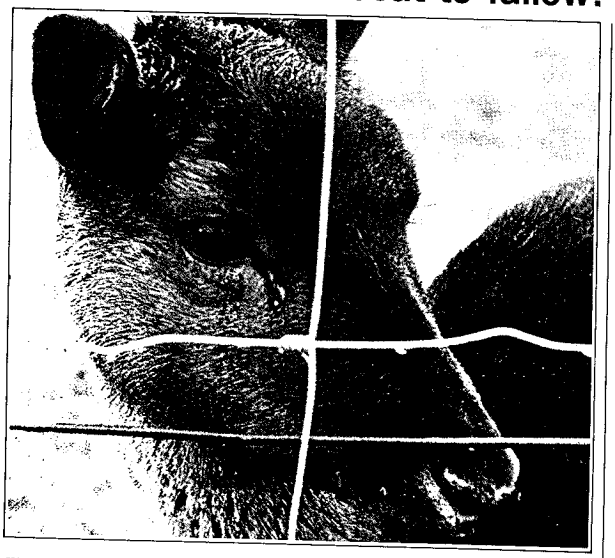
Fallow deer it seems are more susceptible to the facial eczema toxin than Red deer. This is the gist of a paper given by Messrs P.H. Mortimer and B.L. Smith of the Ruakura Animal Research Station at the Ruakura Farmers' Conference this year.

Facial eczema a threat to fallow?



WITH INCREASING numbers of deer-farming enterprises being established in the North Island the refencing of well-established ryegrass/clover pastures, grazed by sheep or cattle has been, in many cases, necessary to accommodate deer. Although high rates of stocking are therefore possible from the outset, in certain locations, such grazing conditions can prove dangerous for either sheep or dairy cattle in hot summer conditions where rainfall and high humidity promote the rapid buildup of toxic spores of the facial eczema fungus, *Pithomyces chartarum*.

Prior to the facial eczema season, the susceptibility of both Red and Fallow deer to sporidesmin, the facial eczema toxin, was examined to determine the severity of liver sustained under similar conditions. The siting of trials and the numbers of deer used was dictated by the availability of suitable deer.

Trials with Red deer

In November 1980, sixteen one-year-old stags (spikers) were randomised into four equal groups. Three groups received, respectively, totals of 0.3, 0.6 and 1.2 mg sporidesmin per kg liveweight, given by stomach tube as a solution in water. The total individual animal dose was equally divided and given over three consecutive days. The fourth group was a non-dosed control group. Serum samples were taken before and at 14, 21 and 28 days after dosing, and used to determine levels of the enzyme Gamma GT (GGT) which is a good indicator of the degree of facial eczema liver injury present in the live animal.

The dosed toxin produced no clinical disease and no elevation of GGT enzyme except in one animal at the highest dose where there was a slight increase in itself barely significant.

The Red deer dosed at the highest level of sporidesmin (1.2 mg/kg) were slaughtered after 5 weeks and livers were found to be little affected.

As it was possible that an initial challenge may increase susceptibility to a second challenge, the eight deer in the low and medium sporidesmin groups were regrouped and rechallenged at 0.6 and 1.8 mg sporidesmin/kg liveweight in the same manner as before. We know that sheep are more susceptible to a given dose of the FE toxin when they have recently received an earlier dose.

Again, no clinical signs appeared in the deer, but one deer in each of the new groups suffered moderate liver injury and GGT enzyme levels increased to 20 times pre-dosing levels. For the results which similar doses of sporidesmin would have produced in sheep see Table 1 (b).

The toxin also produced ulceration and bleeding of the urinary bladder of seven of the eight deer and the severity was the worst in the group dosed at the higher level. There was good evidence that an infection had spread from the ulcerated bladder up into the kidneys.

Fallow deer

In February 1981, a trial was commenced in the Bay of Plenty in which sporidesmin was dosed to Fallow deer to determine their susceptibility to the FE toxin. Twenty 15-month stags (spikers) were randomised into four groups of five. Three groups were dosed in the same manner as the deer in the first Red deer trial but on three alternative days (i.e. Monday, Wednesday and Friday). Again the fourth group was a non-dosed control one.

Seven days after the first dose was given clinical signs were seen. Over the next few days progressively more deer were affected. Clinically affected deer stood or lay down in isolation, were restless, showed frequent shaking of the head and ears, and made rapid tongue-like movements. They sought the shade. Skin irritation was evident from the frequent rubbing of parts of the body, especially the muzzle and lower jaw, the eyelids and the ears. Temporary blindness was detected in some.

Examination of the membranes of the mouth and eyes revealed they were deeply jaundiced. There was frequent passing of deep yellow-coloured urine. In all deer given the high dose there was rapid breathing and respiratory distress. This involvement of the lung resulted in early deaths, sometimes before jaundice and photosensitisation had occurred for these changes take several days to develop.

All dosed deer either died or were killed to terminate suffering and the survival intervals for individual deer and for the three groups are presented in Table 2.

Post-mortem examination of all animals revealed a complex disease picture and highlighted many important features:

- The severe lung injury produced in the high dose level group does not occur in sheep similarly dosed. Its occurrence is also very unlikely in deer in the field disease.
- Liver injury in deer is characteristic of that found in sheep and, as in sheep, bile-duct injury and blockage commonly leads to jaundice and photosensitisation. Increases in serum GGT levels occurred in deer and were of a similar magnitude to those occurring in sheep.
- Severe ulceration and bleeding in the urinary bladder was present in all dosed animals – in Fallow deer also it is likely that secondary infections sometimes spread up the urinary tract to involve the kidneys.
- The skin lesions of photosensitisation frequently included inflammation, ulceration and death of tissues at the tip of the tongue, sometimes involving muscle tissue of the tongue deep beneath the ulcers. Involvement of the tongue is occasionally seen in facial eczema in calves but rarely in sheep.
- Stomach and intestinal ulcerations also occurred in several deer. Perforated ulcers were found, causing usually a local but sometimes a generalised peritonitis.
- Yellow pigment, possible bile pigment, deeply stained the fluid contents of the eyeball. This is possibly related to the temporary blindness we observed.

Natural outbreaks of facial eczema in deer

Almost before the Fallow deer trial terminated, naturally-occurring cases of facial eczema disease in Red deer and more numerous cases, including a severe herd outbreak, in Fallow deer came to our attention.

Apart from acute respiratory distress, the whole range of clinical signs previously seen in the experimentally-produced disease was noted in field outbreaks in Fallow deer. Post-mortem examination emphasised that the severe jaundice and photosensitisation, including the severe injury to the tongue and eyes, were common and serious features of the natural disease. Urinary bladder lesions were always present and gastro-intestinal ulcerations were commonly present.

General conclusions

The dosing trials show that Red deer have a slow susceptibility to the facial eczema toxin and are certainly of lower susceptibility than are sheep.

On the other hand Fallow deer appear to be at least as susceptible as sheep, probably more so. In this comparison caution is required for it was found, in retrospect, that many of the Fallow deer in the trial had some residual liver injury from natural intake of FE toxic pastures grazed probably a year earlier when they were four to six months of age. For this reason we refrained from tabulating a comparison of dose responses between Fallow deer and sheep.

We have encountered many more clinical field cases in Fallow deer than in Red deer and sub-clinical liver damage has been widespread in Fallows.

To make a more definitive judgement on the relative susceptibilities of Red as opposed to Fallow deer, a direct comparison of susceptibility is necessary. Regarding clinical signs of facial eczema, again we have a great deal more information of Fallow than on Red deer. Both in dosage trials and in natural outbreaks, Fallow deer show severe behavioural reaction to photosensitisation.

In addition, they commonly suffer severe lesions of the urinary tract as well as of the liver. Tongue ulceration is very common, is probably highly painful and could well restrict the ability or the desire to graze. Ulceration in the stomach and intestine also occurs and contributes to the overall severity of the disease. Blindness is yet another distressing symptom observed. Altogether, facial eczema can be a very serious disease of Fallow deer and mortality rate in the field can be high.

It seems clear that stringent facial eczema control measures will be required on North Island farms where deer are intensively stocked.

Red deer – Sporidesmin dosing trials

Table 1 (a)
1st challenge

Dose mg/kg	Actual response in Red deer (4/gp.) (% affected)			Typical response in sheep (% affected)		
	GGT	Photosens	Death	GGT	Photosens	Death
0.3	0	0	0	75	35	5
0.6	0	0	0	80	50	20
1.2	25	0	0	90	80	60
Table 1 (b) 2nd challenge						
0.6	25	0	0	80	50	20
1.8	25	0	0	100	*	90

* *Death occurs before photosensitisation*

Table 2

Fallow Deer – Sporidesmin Dosing Trials

Days to death	Dose mg/kg	5 deer/group: Number affected				
		Lung damage	Photo-sens	Tongue ulcers	Urinary bladder ulcers	Blindness
7 x 8 x 9 xx 10 x o 11 o 12 o 13 14 o ●● 15 16 17 ● : 24 ●	1.2 0.6 0.3	5 2 0	3 3 3	2 1 3	5 5 5	0 1 3