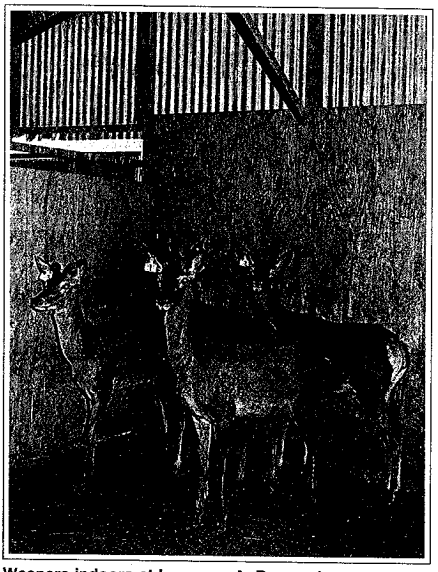
Growing in light

As a growing number of deer farmers are discovering, housing deer under artificial daylight can beat the winter blues and bring carcases up to killing weights between August and November, when prices are at their peak. **Craig Matthews** reports.



Weaners indoors at Invermay AgResearch

WEANERS CAN grow up to twice as fast during winter if they are housed under artificial daylight, using in-wintering techniques developed at Invermay AgResearch.

Deer farmers are only too well aware of the compromises they must make due to the imbalance between venison production and market demand.

Seasonal growth is part of the genetics of deer and occurs regardless of the amount of food you give them.

Even deer supplied with plenty of food over winter still reduce their food intake to set winter levels.

However, research at AgResearch Invermay — by the team of Dr Jimmy Suttie, Dr Jim Webster and Ian Corson — has provided a solution to this imbalance for farmers who are organised and dedicated.

The researchers have found that seasonal growth can be manipulated. The most important factor controlling deer growth is daylength. Lengthening spring days tell the animal that it's time to start growing.

This sensitivity to daylength can be used to production advantage. By exposing deer to the same amount of light during winter that they would receive in mid-summer, the rapid spring growth phase can be kick-started earlier.

Faster growth

This means that starting the treatment in, say, April-May and ending around August — about 20 weeks— will maximise liveweight gain through to mid-September.

Studies at Invermay have also shown that weaners grow faster under artificial light than they would under natural summer daylight, even when the latter is accompanied by good pasture.

The prize finding, though, is the boost that artificial light can bring to growth from May to August, which under natural conditions is the lowest period of weight gain.

By guaranteeing liveweight gain during winter, artificial light ensures a well grown deer when prime venison supply is low and prices are high.

In-wintering under artificial daylight brings most benefit in cooler areas, such as Otago and Southland.

However, it could also be useful in areas like Westland, Canterbury, and perhaps the North Island's volcanic plateau. In coastal areas and north of Nelson, the benefits may only be marginal.

In-wintering

Just bringing deer indoors during winter, without altering daylength, brings benefits. Improvements in growth rate and feed efficiency — conversion of food to lean meat — have been found.

In-wintered stock also become

very quiet and easily managed. In areas with heavier soils, winter pasture damage is lessened and overall stock carrying capacity can be increased.

In-wintering doesn't require any fancy housing. Existing hay sheds or adapted covered deer yards are being successfully used.

A semi-enclosed building is best, as animals get natural sunlight during the day and are easier to feed. The building must be well ventilated so that the air is clean and the floor is kept as dry as possible.

Only like-sized animals should be kept together to avoid bullying, and toys — such as soccer balls — should be provided to prevent boredom.

Health and feed

The deer can be exercised on fine days, to allow for the cleaning and maintenance of pens. Animals which are penned together should be exercised together, and overly aggressive or submissive individuals removed from the group.

All stock should be drenched before in-wintering. As deer have died indoors from yersinia and chlostridial diseases, vaccination should also be considered.

Foot abscesses can also be a real problem, but removing all rough surfaces and sharp edges at floor level helps prevent these.

Deer can be sent to slaughter directly from the pen or released outdoors to take advantage of spring pasture.

However, they should be hardened off before release by running them outdoors progressively longer on fine days.

Clean water must be always available, preferably from more than one trough so that submissive animals will still have access. To minimise competition and maximise access to food, all deer in a pen should be able to comfortably feed at once.

Invermay staff recommend a feeding space for each animal of one and a half times the breadth at the shoulder.

For a 40 to 60 kg Red weaner that's about 45 cm. Any feed normally available to deer is fine to use. The more feed, the greater the return.

In fact, to really capitalise on longer winter daylength the deer must be fed consistently high quantities of high quality food. Daylength changes alone merely provide the potential for increased

growth; increased food supplies actually fuel the growth.

When feeding weaners high levels of concentrated diet or cereals, it's crucial they receive a gradual introduction, otherwise acidosis may result. Invermay phases in concentrated feeding over 25 days.

Lighting and altering daylength

It's not important what type of electric lighting is used. What is crucial is that the deer must see the same quality of light over the entire wintering period, whether that light is natural or artificial.

Irrespective of other available light sources, it's vital to provide a lighting intensity of at least 250 to 300 lux.

This is measured 1 m above the floor, not directly under the light fitting.

Lighting can be controlled by electric timers available from electricians and suppliers, who can also advise on light intensity.

Power cuts lasting a few hours won't cause problems; just remember to immediately reset the timers. Don't attempt to compensate for any lost hours of light.

As daylength-treated deer often moult their winter coats, no deer should be released outdoor permanently until it has grown a full summer coat.

Timing

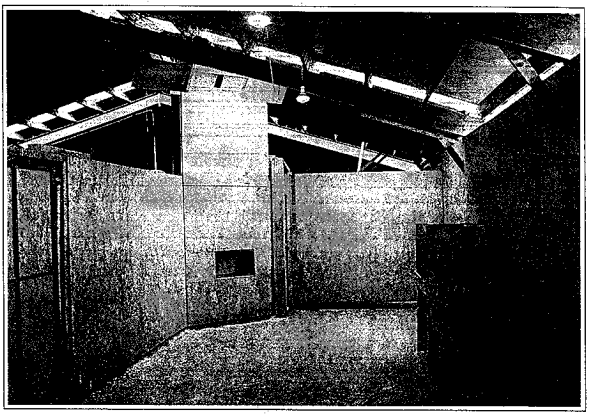
When can you start light treatment? Typically, Red fawns are weaned from late February to late March, and post-weaning appetite remains high until the drop-off during late May to late August.

Thus, in-wintering from late March onwards, or even from April to June, will result in increased growth. Increased growth starts about six weeks after first exposure; food intake increases at the same time.

How much additional daylength is necessary?

It's clear from a range of experiments at Invermay that 16 hours of light plus 8 hours of dark (16L:8D) is the only treatment that successfully brings forward the timing of growth increase and the rate of growth. This applies throughout New Zealand.

How best should increased daylength be presented to deer? Against all logic and common sense, gradually increasing the daylength is not the best strategy. It's best to switch abruptly to 16L:8D. In practice, additional lighting should come on at natural sunset and continue until a block of 16 hours of light has elapsed from the previous dawn.



Provide a light intensity of at least 250 to 300 lux
Measure 1 m above the floor, not directly under the light fitting

If there is not enough daylight to make up the necessary light intensity of 250 to 300 lux, additional lighting during the day will be necessary.

There's no benefit in increasing the lighting beyond 16 hours. At the same time, the full 16 hours must be consistently maintained each and every day for maximum growth. Inconsistency defeats the strategy.

New growth pattern

It takes about six weeks for light treatment to launch the animal into the new growth pattern.

However, once the new pattern takes hold, the effect will persist for a further six weeks after stopping light treatment. So it's possible to stop treatment six weeks before slaughter.

There is no advantage in starting daylength treatment from the middle of summer. The end result will be the same as if starting April-May, minus the extra expense of keeping the deer indoors longer.

The Invermay research involved Red stags only. Other studies, however, suggest that using 16L:8D to enhance growth is successful for both sexes and across a range of species, excluding tropical deer.

The technique is not appropriate for breeding hinds, as it could cause a delay in the onset of breeding.

Liveweight gains

How much liveweight gain is possible? While factors such as weaning time and weight may affect individuals, overall there are significant liveweight gains from light treatment.

For example, weaners that begin light treatment at about 55 kg should weigh about 75 kg after 10 weeks. This compares with an average weight of about 65 kg for untreated weaners after the same period.

After 20 weeks, weaners that began light treatment at about 55 kg would weigh 100 kg. Untreated weaners would weigh a little over 80 kg for the same period.

Any farmer thinking about in-wintering under light should be aware of the investment needed in time and money.

But while the cost of housing and lighting may be high, this should be partly offset by more efficient use of feed. In the final analysis, cost recovery and profit will depend on a high spring price for venison.

Other benefits of in-wintering under light include increased carrying capacity, the ability to give mid-summer feed to hinds and calves because stags have gone to slaughter early, the reduction of stock numbers on heavy soils, and more efficient use of winter feed.

For more specialist advice, contact Dr Suttie at AgResearch Invermay; ph. 03 489 3809. □