Tranquilizing bison

There are several don'ts and a few do's when it comes to tranquilizing and immobilizing bison.

**Donts**
- Don't - Immobilize them at all unless you absolutely must.
- Don't - Immobilize them on hot days.
- Don't - Immobilize them once they are upset or excited.
- Don't - Immobilize them near water.
- Don't - Immobilize them if you cannot get to them and keep the rest of the herd away.

**Dos**
- Do - Be careful, for your own sake and the animal's.
- Do - Employ an experienced person.

The don'ts of bison immobilization

Dont - Immobilize them at all unless you absolutely must.

In most situations on a well managed ranch or farm it should be possible to run the animal(s) that need treatment into yards and do everything without resorting to tranquilizers or immobilizing drugs.

If you have to take the step there is one paramount matter to remember. **There are no drugs licensed for use in bison intended for use in the food chain.** If you or your veterinarian decide that you need to use a particular drug (even penicillin), that decision is made at the discretion of the individual.

Immobilization in zoos is a routine matter and free ranging bison in parks and the wild can readily be captured with drugs.

By and large immobilization should be carried out when the environmental temperatures are below about 75°F (23°C). The reason is that some of the drugs disrupt the animal's ability to control its own body temperature. If this happens, on hot days the animals may easily overheat and die.

Dont - Immobilize them once they are upset or excited.

In most situations the use of tranquilizers, especially the commonly used Rompun®, is really compromised if the animal is alarmed. The dose may be several fold higher than for the quiet animal. I know of one rancher who used 40ml per head of the Large Animal Rompun to sedate some animals prior to testing for TB and brucellosis. Under quiet conditions 4ml would probably have been plenty. Ideally of course, if he had had a set of yards, he need not have used anything.

Fig 1. This immobilized bison bull has fallen against the inside of a one-way door and is jammed in a narrow alleyway. Photo J. Haigh
The only exception to this rule applies to veterinarians and wildlife biologists licensed to use narcotics like M99® and Carfentanil (Wildnil®). These drugs, used at the proper dose rate, will rapidly overcome excitement and effectively immobilize the animal. I have had to use them occasionally for farmed bison that could not be dealt with any other way.

_Dont - Immobilize them near water._

The reason for this is simple. If the animals become disorientated they will wander aimlessly. Chances are, in a world ruled by Murphy’s law, that they will end up in the water, where you will have a very difficult time rescuing them before they drown.

_Dont - Immobilize them if you cannot get to them and keep the rest of the herd away._

Bison will often indulge in mob behaviour if they see an individual in the group behaving peculiarly. They may even attack the drugged animal. Certainly they may keep on waking it up if you have used Rompun. This will almost always lead to a failure because the animal drugged with Rompun will not become properly sedated if it is constantly wakened.

**Basic steps**

There are some basic steps that anybody immobilizing any animal should always take.

If possible the animal should be deprived of food for 24 hours ahead of time, and water for at least 12 hours. This will lessen the risk of rumenal regurgitation that often leads to inhalation pneumonia.

Immobilizations should be carried out in the early part of the day. This will not only reduce the risk of overheating, but will provide for the maximum amount of light for observation and follow up.

The animal should be watched from a safe distance after the drug has been injected. If the injection, often a dart of some sort, has been given in the heavy muscles of the thigh or shoulder you should expect to see some sort of effect within 5-15 minutes. Other injection sites may create delays in drug absorption, and so delay the onset of effects. If Rompun has been used, and the animal is in a safe area where it is not likely to be harrassed, you should stay well away until the animal is lying down and the head has flopped to the ground. It is almost a case of going away and having a cup of coffee. If you approach the animal too soon it may partly wake up. If the head is suddenly lifted you are too early, or your dose is insufficient.

Fig 2. Profile of a bison showing areas (hatched) suitable for dart injection. Heavy muscles in these areas should ensure rapid drug absorption.

You can top up doses. If you can get close enough to give an intravenous dose in the tail vein this will be very effective. The dose needed is likely to be a very small fraction of the intramuscular one.

It is usually a good idea to cover the animal’s eyes. This will both reduce the stimulation and protect the eye.

Try to keep the animal lying on its brisket. This reduces the risk of damage to the lungs.

If possible keep the animal’s head above its stomach. A straw bale or two may help. If it keeps falling onto its side try and ensure that it is the left side. Many drugs, including Rompun, relax the sphincters of the stomach and rumen contents can passively come back up the oesophagus and create problems if the enter the windpipe. If the animal is down on its side for more than an hour try and roll it on to the other side (brisket down).
There are antidotes for the narcotics. Make sure that they are given when the job is finished. Yohimbine is an effective antidote to Rompun in some species. There is as yet no good information on its effectiveness in bison. If it is effective this will prove to be an important boon.

The immobilized animal must be watched for several hours after the treatment. It may become sedated or partially effected by the drugs some hours later. Treatment may involve something as simple as rousing it with a shout or a slap, or as complex as a repeat injection of antidote.

The Dos of bison immobilization

Do - be careful

All of the drugs used for bison immobilization are potent. Some of them are known to have severe effects on humans. Handle the drugs, and the dart guns, with great care. Be sure that somebody else knows what you are doing. If your veterinarian is using narcotics there should be antidotes available at all times.

Do - Lean on experience

Bison farmers, being independent souls, like to do everything themselves. Drug immobilization is one field where this philosophy may get you into trouble. You would probably not consider giving an anesthetic to one of the people on your farm or ranch. If you have no experience with immobilization you should definitely not try and re-invent the wheel. Do call on somebody who knows what they are doing. It will pay every time.

The most difficult thing about immobilizing any animal is knowing when not to.

Specifics

Drug administration

In order to tranquilize or sedate bison you will have to get the drugs into them. Information on the various means by which you can do this is given in pamphlet Administering drugs (GF-D-2-01).

Rompun®

Some drug doses were listed in an earlier pamphlet (Sedation and immobilization, GF-D-1-01). These were for Rompun® and are repeated overleaf (table 1). The wide range of doses quoted is a reflection of the extreme variability of response which depends upon the state of the animal.

Yohimbine

There is still no good published information on the use of Yohimbine as a Rompun antidote in bison. Indications are that it is somewhat effective at doses of about 0.2 mg/kg. Full reversal of the sedation does not seem to occur, but the animal is usually at least roused sufficiently to avoid the problems of prolonged recumbency and bloating.

Telazol®

This drug was first reported to be effective in bison in 1971, but it has only recently been licensed for dogs and cats. It has proved to be very effective in zoo bison, with a duration of action of about 20 minutes, and top-up doses can be given. Doses so far tested appear to be in the 2-4.5mg/kg range. If these results continue to be good Telazol may become the drug of choice for bison immobilization. (Remember that it is not licensed for bison).

Narcotics

From time to time it may prove necessary to catch escaped or free ranging bison with something a little more certain than Rompun. In zoos, and on free ranging or National Park animals, potent
narcotics are sometimes used by veterinarians or specially licensed wildlife biologists. The two drugs used are either etorphine (M99®) or carfentanil (Wildnil®). Both are exceedingly potent substances, and a few drops administered accidentally to a human can be lethal. For bison they are usually best given with a small amount of tranquilizer, usually Rompun, and at the correct dose, given into a heavy muscle where drug absorption occurs rapidly, they are effective in a few minutes (fig 2). An undisturbed animal will often show signs of stumbling within 3 or 4 minutes, and go down quietly in under 6 minutes. If chased by vehicle or helicopter the effects may take a little longer. Because both drugs have wide safety margins in animals it is usually better to give slightly too high a dose rather than an underdose. The latter may cause a prolonged induction period, with excessive excitement, overheating, and even death.

A bison immobilized with narcotics will often retain some reflexes, and not be entirely safe to handle. This especially applies if the animal rolls onto its side, or is being manipulated or loaded. In these cases a bison can often kick violently. If, when you approach the bison from behind, the tail is wagging or the head is moving, it is wise to increase the sedation. The best way to do this is to give a minute dose of Rompun into the tail vein. For a bull 10mg is enough. Five mg will do the trick on a cow.

A number of workers have had trouble with narcotics in bison. Adverse effects reported have included apnea, recycling, regurgitation and unreliable results. One of the principal reasons for problems that arise is the tendency to underdose. This will cause more trouble than overdosing, and overdosing has the advantage of being reversible.

**Antidotes**

The effects of both M99 and Wildnil can readily be reversed with specific antidotes. M99 is marketed with the specific antagonist M5050. This antagonist also works on Wildnil, but greater doses are needed. Two other antagonists currently being tested are Naloxone and Naltrexone. The latter is very effective when used at a ratio of 100:1 relative to the Wildnil dose. It would never be appropriate to attempt an immobilization without having the antidote to hand. Even more important would be the availability of human antidote in case of accidents. The only antagonist licensed for use in humans is Naloxone.

Some doses that may assist veterinarians are suggested in table 2. These are taken from published accounts as well as personal experience.

<table>
<thead>
<tr>
<th>Animal</th>
<th>Wt (kg)</th>
<th>Naloxone (mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bull</td>
<td>700-900</td>
<td>150-200</td>
</tr>
<tr>
<td>Cow</td>
<td>300-450</td>
<td>200-300</td>
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<tr>
<td>Yearling</td>
<td>150-200</td>
<td>500</td>
</tr>
<tr>
<td>Calf</td>
<td>50-100</td>
<td>350-450</td>
</tr>
</tbody>
</table>

**Table 1**
(from GF-D-1-01)

Suggested doses of Rompun (in mg) for bison. Small intravenous "top-up" doses can be used if the animal is not quite sedated enough. Possible Yohimbine doses, at 0.2 mg/kg are given. Take care to avoid intra-carotid injection, which has proved fatal in deer.

<table>
<thead>
<tr>
<th>Animal</th>
<th>Wt (kg)</th>
<th>Sedation</th>
<th>Immobil</th>
<th>Top-up(v)</th>
<th>Yohimbine (mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bull</td>
<td>700-900</td>
<td>70-150</td>
<td>400-1200</td>
<td>15-30</td>
<td>140-180</td>
</tr>
<tr>
<td>Cow</td>
<td>300-450</td>
<td>50-100</td>
<td>250-900</td>
<td>10-20</td>
<td>60-90</td>
</tr>
<tr>
<td>Yearling</td>
<td>150-200</td>
<td>30-50</td>
<td>90-400</td>
<td>5-12</td>
<td>30-40</td>
</tr>
<tr>
<td>Calf</td>
<td>50-100</td>
<td>10-30</td>
<td>30-200</td>
<td>3-7.5</td>
<td>10-20</td>
</tr>
</tbody>
</table>

**Table 2.**

Immobilizing doses (mg) of narcotics with tranquilizers for bison. Rompun is given in the immobilizing syringe (50-100mg for bulls, 20-50mg for cows) or i.v. after the animal lies down (5-10mg total).

**Bibliography:**
