Hormonal Therapy to optimise reproductive efficiency

Shibu Simon

Hormonal therapy is an excellent tool if complimented with other needs of animals in order to ensure maximum returns to the dairy farmer. Proper identification of problem breeders coupled with correct hormonal intervention can be an effective instrument for reducing the losses incurred in cases of excessive days open. Gonadoptrophin releasing hormones (GnRH) and prostaglandin F_2a (PGF $_2$a) can be effectively used for this purpose (White *et al.*, 1996). The extent to which GnRH and PGF $_2$a can improve reproductive performance depends on many variables like proper nutritional, environmental and reproductive management. In the forthcoming discussions, five different regimes of hormonal therapy are reviewed based on results of field trials.

Dr. Shibu Simon MVSc.
Veterinary Surgeon
Veterinary Dispensary
Koorkanchery, Thrissur

The standard method for judging the success or failure of a herd's reproductive efficiency is by evaluating the calving interval. A calving interval of approximately 12 months (60-90 days open) ensures maximum returns to the producer. For a cow producing around 12 litres of milk per day, the farmer earns an average income of approximately Rs.100 per day. Thus the farmer loses Rs.100 per day for each day the cow is open beyond 90 days.

Protocols for hormonal therapy

Five protocols for reducing the number of days open and for improving reproductive efficiency are listed below.

In this protocol one-time administration of GnRH 10 to 14 days postpartum is suggested (Pursley, 1995; Benmrad *et al*,1986). Cows that have difficult calving when given GnRH therapy begin cycling sooner than untreated cows, with upto a 50 per cent reduction in the occurrence of cystic ovaries. However, cows with high rate of metritis are not good candidates for GnRH therapy because of the increase in occurrence of various uterine infections as a result of GnRh therapy (Stevenson, 1994).

Protocol B

In this protocol PGF $_2$a is given once 14 to 28 days postpartum. This improves muscle tone, hastens uterine involution and reduces the occurrence of both uterine infection and pyometra (Ax, 1991).Thus, this regime can be used in herds with a high occurrence of metritis.

Protocol C

Here repeated administration of PGF $_2$a every two weeks beginning at about 28 days postpartum and ending 90 days postpartum is suggested (Ax, 1991). This protocol reduces the rate of both uterine infections and cystic ovaries by keeping cows cycling on a regular basis. PGF $_2$ at every 2 weeks, beginning at about 28 days postpartum can be considered for animals that you want to cycle earlier and more regularly.

Protocol D

Here GnRH is given 30 to 60 days postpartum followed nine days later by PGF_2a. This regime is usually advocated in cows with cystic ovaries (Ax, 1991).

Protocol E

When inaccurate heat detection is the main cause

of poor fertility this protocol can be used. Here GnRH is given at any time during oestrus cycle (after uterine involution). PGF$_2$a is given seven days later and a second dose of GnRH is given 32 hours after the PG F$_2$a injection. The cow should be artificially inseminated 18 hours later (Stevenson, 1994: Pursley, 1994; Pursley, 1995) .

References

Ax, R.L. (1991). Realistic goals for a dairy breeding programme. *Proc Southwest Nutr.Manage.Conf.*, University of Arizona, Tucson.; pp 92 –100.

Benmrad, M; Stevenson, J.S. (1986).Gona dotrophin releasing hormone and prostaglandin F $_2$a for postpartum dairy cows: Oestrus, ovulation and fertility traits. *J.Dairy Sci.*, 69:800.

Pursely R.J. et al (1994). Synchronisation of ovulation in dairy cattle using GnRH and PG F $_2$a . *J.Anim. Sci.* 72 (suppl 1): 230.

Pursely, R.J. et al (1995). Breeding plan cut days open by 23. *Hoard's Dairyman.* Sept 10,: p 539.

Stevenson, J.S. (1994). Hormonal intervention in the control of fertility on dairy cattle. *Proc AABP*, AABP, Rome, Ga. : pp 11 –12.

White,C.R., Keister, B., McCauley, T.C., and Ax, R.L. (1986). Hormonal Therapy in dairy cows: Five ways to improve reproductive efficiency. *Vet. Med.*, 571-572.

Continued from page 9

of heat stress to dissipate heat through the lungs (respiration) and by sweating. Water consumption will be increased by as much as 50%. If water supplies are not adequate or heat stress becomes severe, cows divert water normally used in milk synthesis to the metabolic processes of heat dissipation. So adequate water supply should be strictly ensured. Cooling the water has also proven effective in increasing intake, although the value of the added milk production should offset the cost of cooling the water.

Supplemental fat can be added to rations to increase energy intake. This supplemental fat can come from whole seeds such as cottonseeds or soybeans, tallow, rumen inert sources, or combinations. Most diets will contain about 3% fat (dry basis) without any high fat feeds. The next 2 to 3% fat can come from whole seeds. This results in ration with 5 to 6% fat. Anything above this should be added as rumen inert fat. Rations should not contain more than 7 to 8% of the overall dry matter as fat, because fatty acids reduce the intestinal absorption of calcium and magnesium and results in: increased requirements of these minerals. Excess fat also interferes with fibre digestion in the rumen.

Overfeeding protein during hot weather should be avoided because it takes energy to excrete excess nitrogen. Rations should contain 18% protein or less on a dry basis. Only the highest producing cows need 18% protein ration. Also, rations having greater than 65% of the total protein as rumen degradable protein should be avoided because the excess nitrogen produced would be excreted through kidney.

Hot weather increases the need for **certain minerals**. This is due to increased sweating and urination through which more minerals are excreted. **Potassium** should be increased to at least 1.5% of dry matter, **sodium** to 0.45%, and **magnesium** to 0.35%. Magnesium can be increased already if fats are fed. Potassium chloride and magnesium oxide are added to increase the potassium and magnesium level respectively. Complete minerals designed to contain the higher levels of potassium and sodium should be fed only to lactating cows since udder edema is more prevalent in dry cows receiving extra salt or potassium. If less forage is consumed, and the forage is high in quality, the cow's rumination activity may decrease. Consequently proper use of buffers like **sodium bicarbonate** becomes important to maintain intake, ruminal pH, and milk production.

Other feed additives that can be successfully used in hot weather are **yeast** (improved fiber digestion), **fungal cultures** such as Aspergillus oryzae, and niacin (improved energy utilization).