Potential impact of weather conditions on the emergence of internal parasites and clostridial diseases in Afghanistan and the Near East

After a long period of drought conditions in Afghanistan (1997-2000) and parts of its neighbouring countries, this year’s heavy snowfall will likely lead to a beautiful and lush spring in the region. Although melting of the snow will have a positive impact on agriculture activities, pasturelands and water tables, it also brings favourable conditions for internal parasites and clostridial diseases, in particular enterotoxaemia. It is therefore recommended that livestock holders in the region protect their stock of ruminants with dewormers as well as vaccines and that veterinarians make these conveniently available.

Background information

Livestock management in Afghanistan (source: FAO/AGPC)

By far the greatest part of the land surface of Afghanistan is extensive grazing land. Infertile soil and low rainfall are the reality, but indigenous, traditional, transhumant livestock production systems have been developed over centuries to guarantee livelihoods and livestock grazing in a difficult terrain and climate.

Sheep and goats are usually herded together and both depend on grazing for the largest part of the year. The transhumant flocks move out of the southern lowland areas in the spring to reach the better grazing areas and cooler weather of the highlands. In higher elevations, sedentary flocks depend on local grazing around villages.

There have been marked decreases in livestock numbers in recent years, particularly due to the prolonged drought and civil conflict.

Regional differences in the management of cattle exist. In the eastern provinces, milking cows are usually kept within the compounds, where they are stall-fed and watered. In summer, dry cows, young stock and male cattle are often taken to the hills for grazing where they are managed on a communal basis, but many of the cows may also never go out for grazing. The situation is different in the Northern provinces and the Herat area, where communal grazing of cattle, including cows, is the common practice. In some areas in Central Afghanistan cattle herds are moved to high pastures for the production of cheese and butter during summer.
All ruminants in the Near East, proportion ruminants, 2003 (source: FAO/GLIPHA)

All ruminants / density agric land (LU/sqkm) (source: FAO/GLIPHA)

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Major farming systems in the Near East (source: FAO/Country Profiles)

**Internal Parasites**
Transmission of endoparasites usually occurs by ingestion of infective larvae. Disease risk is determined by factors influencing the susceptibility of the host and the numbers of infective larvae accumulating on pasture. Calves, lambs and kids are most vulnerable, but gastrointestinal nematode outbreaks are common in all ages of sheep and goats. In both cattle and sheep the effect of endoparasites is “management dependent” and in many cases due to poor management practices favoured by farmers. In traditional calf management,
where the number of animals may be more important than quality production, the problem of endoparasites can be masked by the productive system’s inefficiency (principally adequate nutrition).

**Clostridial Diseases**

Clostridial bacteria are ubiquitous. The various species of this genus of bacteria only cause disease under certain favourable circumstances. They are commonly found in soils rich in humus and also in intestinal contents of healthy animals. All *Clostridium* spp. produce different exotoxins which determine their virulence. These toxins can either be ingested (botulism), absorbed from the gut after abnormal proliferation of Clostridia (enterotoxaemia) or absorbed from tissue infection (blackleg, tetanus, or malignant oedema).

**Botulism** (*Clostridium botulinum*): Ingestion of preformed *Cl. botulinum* (types B, C and D) neurotoxin in feed or water causes motor paralysis, leading to recumbency. Sensation and consciousness retain until death.

**Enterotoxaemia** (*Clostridium perfringens*): Acute toxemia of ruminants caused by proliferation of *Cl. perfringens* (types A, B, C or D) in the intestines, affects animals in good condition and on highly nutritious diets. The disease has a rapid course with diarrhoea, depression and convulsions. Sudden death is common.

- **Enterotoxaemia - Dysentery**: Hemorrhagic enteritis and ulceration of the intestinal mucosa results in diarrhoea, dysentery and sudden death.
- **Enterotoxaemia - Tympanism**: Dead animals display belly overload, post-mortem tympanism and accelerated autolysis.
Enterotoxaemia - Pulpy kidney: Softening and accelerated autolysis of the kidney parenchyma due to hepatic hyperglycaemia and the action of the epsilon toxin on kidney tissue; resulting in glycosuria, a characteristic finding in clinical cases.

Blackleg (*Clostridium chauvoei*): Infectious myositis caused by *Cl. chauvoei*, occurring seasonally in warm wet months and affecting animals on a high plane of nutrition. Infection of wounds (shearing, docking, castration) leads to muscle necrosis and severe toxaemia. The fatality rate is high. Intense vascular lesions in the affected area give rise to the characteristic blackish colouring and sweet clover smell, as well as gas bubble formation.

Tetanus (*Clostridium tetani*): Spastic paralysis caused by the action of the *Cl. tetani* exotoxin. Infection of wounds leads to generalised muscle rigidity and spasm, respiratory arrest and death. The fatality rate is high.

Malignant Oedema (*Clostridium septicum, Cl. chauvoei, Cl. perfringens, Cl. sordellii, Cl. novyi*): Acute wound infection caused by organisms of the genus *Clostridium* following deep puncture wounds (i.e., during vaccination, venipuncture, umbilical cord infection, accidental or surgical wounds). Inflammation and swelling occurs at the site of the wound with heat, oedema, pain and subcutaneous emphysema, followed by fever and toxaemia.

Instruments used should be clean, disinfected, or best: sterilized.

**Good practices for the use of anthelmintics**

Benzimidazoles and avermectin-like drenches (macrocyclic lactones) are best administered by placing the drench gun over the tongue to ensure that the whole dose enters the rumen. Restricted access to feed for 24 hours before drenching increases the time for the medication to work as it slows down the flow of gut contents. This prolongs drench uptake and therefore extends the effective duration of the killing effect. Animals should be gathered in the morning and provided with little or no feed – especially no fresh green feed – for the rest of the day.
and overnight. Access to water needs to be ensured at all times. Drench treatment is done the following morning and, for maximum effect, animals should be kept off feed for a further six hours before returning them to pasture. Some local conditions (e.g. poor feed availability, drought) will reduce the effectiveness of this application. Please note that feed should not be restricted if the sheep are pregnant, severely stressed or in poor condition.

Attention should be paid to the fact that goats metabolize drenches very fast, therefore it is recommended to give goats a second or third drench (each 12 hours after the previous dose) for maximum effect. As sheep and goats have the same species of worms, strains can be passed from goats to sheep unless treatment regimen is very strict.

For the successful implementation of rational and sustainable helminth parasite control programmes in grazing animals, a sound knowledge of the epidemiology of the parasite (sometimes not available in developing countries) is important to comprehend host-parasite interactions in the specific climate, management and production context. Furthermore, overuse (or misuse) of anthelmintic drugs needs to be prevented.

**Prevention of clostridial infections**

Clostridial diseases can be prevented by annual vaccination with killed vaccines, which induce circulating antibodies against toxins produced by *Clostridium*. Multivalent vaccines containing bacterin-toxoids (*Cl. perfringens* type B, C and D, *Cl. chauvoei, Cl. septicum, Cl. novyi, Cl. sordellii*) are highly affective if used appropriately and prior to the expected occurrence of clostridial diseases. Besides active immunization of young animals, prepartum vaccination of dams provides colostral immunity to the offspring. Vaccination programmes should be adapted to the local epidemiological context and farming systems. Commercial vaccines may have up to 8 valencies depending on the type and prevalence of clostridial diseases in the region. Animals vaccinated for the first time need to be vaccinated twice at an interval of 2-6 weeks to evoke sufficient immunity. Annual boosters are necessary to maintain solid protection against clostridial outbreaks. Vaccination of animals is highly recommended before high risk periods where outbreaks are expected and prior to favourable conditions such as abrupt changes in feeding systems, extreme temperature variations, pre-rain seasons, grazing on young and lush pastures, transhumance, etc. Clostridial vaccines are commonly used in sheep and cattle, but goats and other animal species can also be vaccinated if epidemiological evidence exists.

**EMPRES actions and follow-up**

It is highly recommended to raise awareness of farmers and field veterinarians in the Central Asian region regarding forecasted favourable conditions for internal parasites and clostridial disease outbreaks. Livestock owners should be advised to contact their local veterinarian for prevention measures. Enough polyvalent vaccines should be made available to cover seasonal and emergency vaccinations. For countries with insufficient vaccination production, vaccines could be procured from surrounding countries (e.g. Pakistan, Iran). In some countries, international agencies and non-governmental organizations are organizing medicine procurement from the government and distribution to local veterinarians. This could also be an option for procurement and distribution of vaccines against clostridial diseases.
Sources of information

EMPRES group (http://www.fao.org/ag/aga/agh/empres)


FAOSTAT: (http://faostatexternal.fao.org/faostat/default.jsp?language=EN&version=ext&hasbulk=0)


The photos of Clostridial disease pathology were kindly contributed by L. M. Ferrer, J. A. García de Jalón and M. de las Heras; authors of the “Atlas of Ovine Pathology”: SERVET, Zaragoza (Spain) 2002.