Sheep on the Tibetan Plateau Flock Structure and Breeding Strategies

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Introduction The Tibetan steppe with its strong continental climate is one of the most severe environments in the world. Tibetan pastoral grazing system is a special system with mixed different animal species, including yak, sheep, goat and horse etc. Each species has its own specific characteristics and adaptations to the environment. Despite the harsh environments, rangelands on the Tibetan steppe provide forage for an estimated 12 million yak and 30 million sheep and goats that support the livelihoods of about 5 million pastoralists (Dennis et al., 2006). Yak and sheep are the two main species in the grazing system. The mortality of sheep is higher than yak during harsh winters and springs, but with higher restocking rate than yak. Although yaks characterize Tibetan pastoralism, sheep are usually more important economically. Sheep are more common than yaks in the western regions of Qinghai-Tibetan plateau because sheep can browse shorter grass than yak and sheep can be sold out much sooner than yak. An average nomad family may raise 300 to 400 sheep in this area. Sheep provide wool and meat and milk. Sheep meat is the preferred meat among nomads as well as in agricultural and urban areas. The wool from Tibetan sheep is also one of the best carpet wools in the world. Because overpopulation and overuse of natural resources are causing fundamental social and economic changes among the herding households, the livestock flock structure is also changing accordingly towards a market economy, e.g. the proportion of Tibetan sheep with good wool and meat quality increase.

Flock structure Tibetan sheep is regarded as a special breed adapting alpine harsh environments, extreme cold and low oxygen content of the air in high altitude and high solar radiation. The body figure of Tibetan sheep is large with thick and long hair, and high proportion of fine and semi-fine wool for resisting cold and radiation. A transhumance form of management for Tibetan sheep dominates in the Qinghai-Tibetan plateau because of natural pasture dependent grazing system. The flock structure varies according to local environmental conditions and culture. With the introduction of the household responsibility system, sheep were allocated to herding households and household heads now made decisions about selection and flock structure. However, normally there are three groups, lamb, ewe and male sheep. Male sheep is split into two portions, castrated sheep and ram. Castrated sheep is mainly used for meat. Ram is an important group in sheep flocks. Good breeds of ram can ensure good properties of lamb. Sheep generally lamb one time in April every year but due to abortion and other factors, the lambing rate is only about 60%. Ewes represent around 45% of the flock as an average (Miller, 1999; Lei et al., 2004).

According to figure and physiological characteristics and region distribution, Tibetan sheep is divided into two main types, Gaoyuan type and Hegu type. Gaoyuan type distributes in the area up the altitude of 4500 m. And Hegu type was mainly in the area with the altitude under 4500 m. Some other breeds, Xinjiang fine sheep, Meilinu fine sheep, Gaojiasuo fine sheep and Cigai semi-fine sheep etc. were also introduced to some places in Qinghai-Tibetan plateau. Because people in the city pay much more attention to food quality now, green sheep meat in alpine grassland become favorable. Tibetan sheep wool is also attracted much attention in the world because of high quality. Tibetan sheep take more and more proportion in the flock structure because of so many merits.

Breeding strategies Mating season of sheep is from September to November every year. Lambs may not be big enough for sale in the first year. In some areas, the lamb will be sold out for lamb meat within 1 year old. Generally, the lamb will be sold out for fatting in 1.5 years old. Sheep breed improvement started in the 1960s and 1970s with the introduction of fine wool breeds. Recently biotechnologies were also used for improving breed quality of Tibetan sheep (Wang et al., 2007). With the improvement of breeding technology, the proportion of fine wool sheep and ewes are higher and higher. On the other hand, the proportion of mating male sheep decreases with the improvement of quality.