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Shearing time of sheep with special reference to conditions in northern Europe: a review

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SUMMARY

Sheep are most commonly shorn once a year. However, shearing takes place twice annually in some localities of the world. Those who shear sheep more frequently than once yearly may in some cases increase annual wool production and enhance fleece quality. Other important reasons for such practices seem to be hot climate in warm countries and housing at northern latitudes. While the traditional shearing time is spring and early summer in northern Europe there has been a certain development towards winter and even autumn shearing of housed sheep. In some countries such changes have resulted in sheep being shorn twice yearly, normally in autumn and again in late winter. Winter shearing, usually taking place during pregnancy, leads to increased energy requirements and voluntary food intake but may improve the utilization of dietary protein and enhance the mobilization of maternal fat reserves. Moreover, gestation length and lamb birth weight is increased and winter shearing may even stimulate ewe milk production and result in faster lamb growth rate. Reproductive performance of young ewes can be improved by pre-mating shearing. It is concluded that winter shearing of housed well-fed sheep in northern Europe may have both husbandry and production benefits.

Key words: shearing frequency, shearing time, sheep, wool.

KURZFASSUNG

Der Zeitpunkt der Schafschur, unter Berücksichtigung der Bedingungen in Nordeuropa: Ein Überblick

Die Schafe werden gewöhnlich einmal im Jahr geschoren. An einigen Orten der Welt findet die Schur zweimal im Jahre statt. Durch das öfter als einmal im Jahr vorgenommenes Abscheren der Schafe kann in einigen Fällen die jährliche Wollproduktion erhöht und eine Qualitätssteigerung erzielt werden. Weitere wichtige Faktoren für eine wiederholte Schur scheinen das heisse Klima warmer Länder sowie die Stallhaltung in nördlichen Breitengraden darzustellen. Während in Nordeuropa das Frühjahr und Frühsommer als traditionelle Schurzeit gelten, ist bei Stallhaltung der Schafe eine gewisse Entwicklung in Richtung Winterschur oder gar Herbstschur zu verzeichnen. In einigen Ländern hat sich diese Wandlung etabliert. Die Schafe werden jährlich zweimal geschoren, gewöhnlich im Herbst und wiederholt im späten Winter. Die Winterschur fäll normalerweise in die Trächtigkeitsperiode der Tiere und führt zu vergrössertem Energieverbrauch sowie erhöhtem Futterbedarf. Die Schur kann die Nutzung der Protein Ration verbessern und die Mobilisierung der Fettreserven des Mutterschafes steigern. Es wird hierbei ferner die Trächtigkeitsdauer verlängert, was zu einer Erhöhung des Geburtsgewichtes der Lämmer führt. Die Winterschur kann sogar die Milchbildung beim Mutterschaf stimulieren, wodurch sich ein schnelleres Wachstum des Lammes ergibt. Die Vermehrungsrate kann bei jungen Mutterschafen durch eine Schur vor der Begattung verbessert werden. Es steht fest, dass in Nordeuropa die Winterschur von Schafen bei Stallhaltung und guter Fütterung sowohl landwirtschaftliche wie erzeugerische Vorteile bringen können.

RESUME

L'époque de la tonte des moutons en relation avec les conditions de l'Europe septentrionale: résumé

On tond les moutons normalement une fois par an. Toutefois la tonte se fait à deux reprises la même année en certains endroits du monde. Ceux qui pratiquent la tonte plus d'une fois par an, peuvent en certains cas, augmenter la production annuelle de laine et améliorer la qualité de la toison. Les autres raisons importantes de cette pratique semblent être le climat dans les pays chauds et l'enfermement en bergerie sous les latitudes septentrionales. Alors que l'époque traditionnelle de la tonte se situe au printemps et au début de l'été en Europe du nord, on peut observer un certain développement de la tonte d'hiver et même d'automne pour les moutons gardés en bergerie. Ces changements ont abouti dans certains pays à la tonte pratiquée deu fois par an, en automne d'abord, puis à la fin de l'hiver. La tonte d'hiver, qui a lieu pendant la gestation, entraine bien des besoins énergétiques accrus et une suralimentation, mais peut en revanche améliorer l'utilisation des protéines diététiques et favoriser la mobilisation des réserves maternelles de graisses. En outre, la durée de la gestation et le poids des agneaux à la naissance augmentent. La tonte d'hiver peut même stimuler la production de lait chez la brebis et accélérer le taux de croissance des agneaux. Les capacités reproductrices des jeunes brebis peuvent être améliorées par la tonte pratiquée avant l'accouplement. En conclusion, la tonte d'hiver des moutons de l'Eureope du Nord, gardés en bergerie et bien nourris, peut présenter des avantages à la fois pour l'élevage et pour la production.

YFIRLIT

Rúningstími sauðfjár með sérstöku tilliti til aðstæðna í Norður-Evrópu: yfirlitsgrein

Sauðfé er venjulega rúið einu sinni á ári. Þó er fé klippt tvisvar árlega sumstaðar í heiminum. Þeir sem rýja fé oftar en einu sinni á ári geta í sumum tilvikum aukið árlega ullarframleiðslu og bætt gæðin. Aðrar veigamiklar ástæður þess að tvírýja virðast hlýtt loftslag í heitum löndum og húsvist á norðurslóðum. Þótt hefðbundinn rúningstími sé að vorlagi og snemma á sumrin í norðanverðri Evrópu hefur vetrar- og jafnvel haustklipping fjár á húsi verið tekin upp að nokkru marki. Í sumum löndum hefur þessi þróun orðið til þess að fé er tvírúið, venjulega á haustin og aftur síðla vetrar. Vetrarrúningur, sem venjulega fer fram á meðgöngutíma ánna, krefst aukinnar fóðurorku og leiðir til meira áts en getur aftur á móti bætt nýtingu próteins í fóðrinu og aukið niðurbrot forðafitu í skrokk ærinnar. Jafnframt lengist meðgöngutíminn og lömb fæðast þyngri. Vísbendingar eru um að vetrarrúningur örvi mjólkurmyndun áa og auki þannig vöxt lamba. Klipping fyrir fengitíma getur aukið frjósemi gemlinga og ungra áa. Þær ályktanir eru dregnar af tiltækri þekkingu og reynslu að vetrarrúningur vel fóðraðs sauðfjár sem nýtur húsvistar í Norður-Evrópu geti í senn bætt búskaparhætti og aukið hagkvæmni við framleiðsluna.

INTRODUCTION

In this review information has been summarized on various aspects relating to shearing time of sheep, particularly under north European conditions. Special attention is paid to winter shearing of housed sheep which in some cases results in sheep being clipped twice yearly. Biological and technical aspects of the frequency and the timing of shearing are discussed with regard to sheep husbandry and productivity.

FREQUENCY AND TIME OF SHEARING

Normally sheep are shorn once a year. However, shearing may take place twice annually in some localities of the world and cases of even three or four yearly shearings have been documented. Important reasons for frequent shearing seem to be hot climate in warm countries and housing at northern latitudes (Lunde, 1911; Sæland, 1938; Ryder, 1983; Yeates, 1965). The removal of the fleece is usually timed so as to coincide with favourable climatic conditions. Thus in northern Europe the traditional shearing time is spring and early summer while housed sheep may be shorn in winter (Eiríksson, 1964; Adalsteinsson, 1972; Nedkvitne, 1972; Rutter

et al., 1971). In the Nordic countries winter shearing has developed into sheep being shorn twice yearly, normally in autumn and again in late winter (Nedkvitne, 1979; Ryder, 1983; Thorgeirsson *et al.*, 1990; Thorsteinsson and Thorgeirsson, 1991).

FLEECE WEIGHT AND QUALITY

Frequency and time of shearing affects wool characteristics, particularly staple length and the extent of discolouration. While wool growth is stimulated by shearing more frequently than once a year (Bigham, 1974; Smith *et al.*, 1980; Karpova, 1981; Sumner *et al.*, 1982), such practices may result in too short staples being produced (Kneale and Bastiman, 1977; Gardner and Brown, 1985). However, double shearing may reduce un-scourable yellow fleece discolouration thus offsetting at least partly disadvantages of reduced staple length (Sumner and Armstrong, 1987; Sumner and Scott, 1990). Under Nordic conditions contamination of the wool by vegetable matter from hay, and urine dis-colouration, may be largely eliminated by shearing just before or at the onset of housing in autumn (Kristinsson and Arnthórsson, 1990; Thorgeirsson *et al.*, 1990).

ENVIRONMENT AND HOUSING

The extent to which body heat is lost following shearing depends on prevailing weather conditions, i.e. air temperature, wind velocity and the amount of precipitation (Sumner *et al.*, 1982). Consequently, sheltering requirements are increased as a response to cold stress, particularly during the first 3–4 weeks after shearing (Done-Currie, 1980; Lynch and Alexander, 1980; Sumner *et al.*, 1982). Thus autumn and winter shearing in northern Europe normally necessitates adequate housing in order to ensure the welfare of the sheep. Such sheep houses may be insulated so as to reduce the cooling effect of low outdoor temperature. The generation of body heat after shearing raises air temperature in the sheep house, for example, under Icelandic conditions by 4–7°C accompanied by a reduction in air humidity by 10–15%, according to Einarsson (1984). Reduced floor area and trough space are amongst well recognized advantages of shearing housed sheep (Rutter *et al.*, 1971; Black and Chestnutt, 1990a).

PHYSIOLOGICAL CHANGES

The physiological responses to shearing include decreased respiration rate, increased heart rate and a fall in body temperature (Nedkvitne, 1970; Austin and Young, 1977; Kirk *et al.*, 1984; Russel *et al.*, 1985; Vipond *et al.*, 1987; Crossley *et al.*, 1988; Phillips *et al.*, 1988; Black and Chestnutt, 1990a). The extent to which the sheep is required to adapt to shearing depends on environmental conditions such as air temperature, wind and rain. The skin becomes thicker soon after shearing providing some protection against cold exposure (Wodzicka-Tomaszewska, 1958; Sumner *et al.*, 1982; Vipond *et al.*, 1987). To compensate for the heat lost due to shearing, energy requirements are increased, especially in a cold environment (Bottomley and Hudson, 1976; Arnold and Birrell, 1977; Davey and Holmes, 1977). Consequently, voluntary food intake is usually increased, particularly during the first 3–4 weeks after shearing. This increase is often in the range of 10–20% going up to 60% (Wodzicka-Tomaszewska, 1963; Ternouth and Beatty, 1970; Nedkvitne and Hals, 1972; Kneale and Bastiman, 1977; Maund, 1980; Morgan and Broadbent, 1980; Phillips *et al.*, 1988; Black and Chestnutt, 1990ab; Thorgeirsson *et al.*, 1990; Everts, 1991). Increase in food intake after winter shearing was greater with silage than hay and greater in small than large ewes in Scotland according to Vipond *et al.* (1987). Several changes have been reported in blood parameters after shearing reflecting metabolic adaptation to cold exposure (Thompson *et al.*, 1982; Astrup and

Nedkvitne, 1988; Symonds and Lomax, 1990; Symonds *et al.*, 1988ab). Wool slip (alopecia) in winter shorn housed ewes has been attributed to high levels of corticosteroids after shearing (Morgan *et al.*, 1986).

EFFECT ON BODY WEIGHT AND CONDITION

If increased nutritional requirements at shearing are not met it is inevitable that losses in body weight and condition, as well as in wool growth, will occur (Bottomley and Hudson, 1976). Young sheep with their thinner skin and lower body mass per unit surface area are more susceptible to shearing stress than adult sheep (Sumner *et al.*, 1982) and special attention must also be paid to pregnant and lactating ewes, particularly under conditions of winter shearing in northern Europe (Einarsson, 1984; Russel *et al.*, 1985). In fact, sufficient fodder and adequate shelter are basic requirements well known to sheep farmers who have successfully adopted such practices. In their studies on metabolic adaptation in winter-shorn ewes Symonds *et al.* (1988a, 1989) have demonstrated that cold exposure stimulates the mobilization of maternal body fat reserves to meet enhanced energy requirements.

EFFECT ON REPRODUCTION

Shearing towards the end of anoestrus in summer may advance the time of first oestrus in adult ewes (Lees, 1967) but autumn shearing of ewe lambs has little if any effect on the onset and duration of cyclic activity (Dýrmundsson and Lees, 1972; Sumner and Dobbie, 1982). Neither has shearing any effect on reproductive parameters such as the progesterone profile (Williams, 1984; Hari *et al.*, 1988), and the duration of oestrus (Loftsson and Dýrmundsson, 1990). Although shorn ewes may be less sexually attractive to rams than woolly ones (Tilbrook and Cameron, 1989) there is no evidence of mating success being impaired, even when both ewes and rams are shorn just before the mating season. On the contrary, the serving dexterity of the rams may be improved (Thorvaldsson, 1990). While the effect of shearing on ovulation rate is variable, barrenness is reduced and the lambing rate is increased, especially in young ewes (Smith *et al.*, 1980; McMillan and Knight, 1982; Sumner *et al.*, 1982; Thorgeirsson *et al.*, 1990). The beneficial effect of pre-mating shearing on reproductive efficiency appears to be most clearly pronounced in autumn-shorn housed ewe lambs in the Nordic countries (Adalsteinsson, 1972; Nedkvitne, 1979; Nedkvitne and Hals, 1972; Thorgeirsson *et al.*, 1990; Thorsteinsson and Thorgeirsson, 1991). This may be attributed to increased embryo survival due to the alleviation of a mild heat stress (Thwaites, 1967; Ryle, 1961). In general, shearing during pregnancy has insignificant effects on lambing rate (Adalsteinsson, 1972; Rutter *et al.*, 1972; Kneale and Bastiman, 1977; Maund, 1980; Sumner and Willoughby, 1985).

EFFECT ON BIRTH WEIGHT AND GESTATION

It is well established that shearing during and even before pregnancy, i.e. in autumn and winter in northern Europe, is generally assoicated with increased lamb birth weight. This increase is quite variable, often ranging from 5–15% and may even reach some 20% (Rutter *et al.*, 1971; Adalsteinsson, 1972; Nedkvitne, 1972; Rutter *et al.*, 1972; Austin and Young, 1977; Kneale and Bastiman, 1977; Maund, 1980; Morgan and Broadbent, 1980; Kirk *et al.*, 1984; Murray and Crosby, 1986; Salman and Owen, 1986; Vipond *et al.*, 1987; Phillips *et al.*, 1988; Symonds *et al.*, 1988a; Black and Chestnutt, 1990ab; Thorgeirsson *et al.*, 1990; Thorsteinsson and Thorgeirsson, 1991; Everts, 1991). Concurrently, shearing increases gestation length, normally by 1–2 days but this can, however, only account partly for increased lamb birth weight (Nedkvitne, 1970, 1972; Adalsteinsson, 1972; Murray and Crosby, 1986; Vipond *et al.*,

1987; Black and Chestnutt, 1990a). It is possible that winter shearing of housed ewes may increase foetal growth and gestation length by reducing mild heat stress, particularly in young ewes with full and dense fleeces (Adalsteinsson, 1972; Austin and Young, 1977). While Russel *et al.* (1985) concluded that increased lamb birth weight of wintershorn ewes was probably due to increased voluntary food intake, more recent work in the United Kingdom clearly indicates effects of shearing *per se* independent of food intake (Vipond *et al.*, 1987; Kirk *et al.*, 1984; Black and Chestnutt, 1990ab). Enhanced maternal glucose production and supply to the foetus (Thompson *et al.*, 1982; Symonds *et al.*, 1988b; Black and Chestnutt, 1990a), and improved utilization of dietary protein associated with winter shearing (Ngongoni *et al.*, 1987; Robinson, 1990), may stimulate foetal growth. Consequently, increased birth weight may reduce perinatal lamb mortality, particularly in large litters (Rutter *et al.*, 1971, 1972; Adalsteinsson *et al.*, 1976). In this context other benefits of pre-lambing shearing should be considered, such as improved access of newborn lambs to teats and shorn ewes being more likely to seek shelter during bad weather (Done-Currie, 1980; Vipond *et al.*, 1987; Black and Chestnutt, 1990a).

EFFECT ON LAMB GROWTH

The effects of shearing ewes during pregnancy and lactation on lamb growth are variable, either none at all or positive (Nedkvitne, 1970; Adalsteinsson *et al.*, 1976; Austin and Young, 1977; Morgan and Broadbent, 1980; Sumner *et al.*, 1982; Russel *et al.*, 1985; Murray and Crosby, 1986; Kirk *et al.*, 1984; Phillips *et al.*, 1988; Black and Chestnutt, 1990a; Symonds *et al.*, 1990; Thorgeirsson *et al.*, 1990; Thorsteinsson and Thorgeirsson, 1991). Faster growth may be partly attributed to heavier birth weight of lambs born to shorn ewes (Dýrmundsson, 1972; Pálsson and Thorsteinsson, 1973). Symonds *et al.* (1990) found that lambs from shorn ewes grew on average 20% faster than those from unshorn ewes over the first 30 days of lactation. In their experiment there were no differences in lamb birth weight and ewe feed intake between respective groups, and they concluded that metabolic adaptation to winter shearing resulted in endocrine changes in ewes during lactation likely to increase the partition of nutrients towards milk production. Although voluntary food intake is normally increased in weaned lambs, and they may grow faster as a result of shearing before slaughter, however, their feed conversion efficiency is not improved (Salman and Owen, 1981; Sumner, 1984; Lane and Kemp, 1990).

CONCLUSIONS

The information summarized above clearly indicates a certain scope for flexibility in shearing practices. As several factors have to be taken into account, under a wide range of environmental conditions, general guidelines are of limited value. Moreover, economic considerations, such as those relating to feeding, housing and shearing costs, wool prices and cash flow, need to be under constant review. Thus appropriate management decisions have to be made by individual farmers. Winter shearing of housed well-fed sheep in northern Europe is an example of a shearing regime which may have both husbandry and production benefits. Yet, these have to be weighed against any disadvantages in order to achieve worthwhile results and ensure the welfare of the sheep.

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