ICAR guidelines for alpaca shearing management, fibre harvesting and grading

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Summary

ICAR opened in the 2007 a Working Group (WG) on Animal for fibre. A Task Force (TF) was established at first on Alpaca fibre production. The WG components represent 6 different countries (Italy, China, Australia, Peru, Argentina and UK) and come from different private and public Organizations (3 University, 3 Research Centre and 3 Private Company). The WG on Alpaca Fibre defined the terms of reference for Alpaca and at the moment two of them have been fixed: the Alpaca identification methods and the guideline of Alpaca fibre harvesting and grading. Present paper describes the second term of reference.

In order to offer a common approach at the Alpaca breeders and at the Alpaca textile processors ICAR suggests a common approach of Alpaca breed management with particular attention at the fibre product management in order to exploit at the best the animal selection development. According to the auto certification methodology yet applied in other advanced fibre animal breeding systems, Alpaca fleece collection critical points have been identified. Through the present procedure, the possible defects that may be found in the end product can be easily individuated and localized the error of management in the previous step of the Alpaca fibre processing chain. Present ICAR Guide Line want to be a concrete support for the first Alpaca selection plans which have been organized in particular in the main producing area as Peru and Bolivia.

***Key words**: Alpaca, Textile fibre, Shearing, Grading.*

Introduction

ICAR opened in the 2007 a working group on Animal for fibre. A Task Force (TF) was established at first on Alpaca fibre production. The WG components represent 6 different countries (Italy, China, Australia, Peru, Argentina and UK) and come from different private and public Organizations (3 University, 3 Research Centre and 3 Private Company). The WG on Alpaca Fibre defined the terms of reference for Alpaca and at the moment two of them have been fixed: the Alpaca identification methods and the guideline of Alpaca fibre harvesting and grading. Present paper describes the second term of reference.

In 2006 the NGO DESCO (*Centro de Estudios y Promoción del Desarrollo*), Peruvian breeders Group, was the first Alpaca breeder Association jointed at ICAR in the fibre production section. DESCO carried out the first Peruvian Open nucleus selection plan (PROMEGE - *PROgrama de MEjoramiento GEnético*) carried on in the Highland of Caylloma Province – Arequipa and TOCCRA Station represents the selection nucleus for the 18.000 Caylloma Province Alpaca population (Gonzales *et al*., 1998). Index of selection has been defined and recently first improving animal have been produced. In order to offer a common approach at the Alpaca breeders and at the Alpaca textile processors ICAR suggests a common approach for the Animals and fleeces management with particular attention at the fibre product. Present Guide line are defined in harmonized way at the Alpaca fibre recording methods applied in the PROMEGE selection plan defined in cooperation with DESCO, University of Camerino, ENEA and Catholic University of Cordoba, in order to exploit at the best the animal selection development.

Methodology

Alpaca Fleece Collection Critical Control Points (AFCCCP) have been identified according to the auto-certification methodology currently applied in other advanced fibre animal breeding systems (AWEX 2007).

The application of AFCCCP utilising simple procedures in animal husbandry, fleece shearing management, fibre harvesting and classification, provides conditions to optimise quality of product for the next step in the processing chain. It will also allow the identification of sources of defects, which are detected in end products and localise the individual system failures and errors in management occurring in previous steps of the chain.

Critical control points

The principal critical control points are organized in 6 distinct steps:

- Standardising alpaca clip preparation.
- Structural needs.
- Preparation for shearing.
- Shearing process.
- Grading and classifying.
- Packaging and transport.

The characteristics, how they are measured, and which define the quality of Alpaca fibre products for the textile industry, are:

- Fineness (fibre average diameter - mm).
- Homogeneity (fibre average diameter Coefficient of Variation - C.V. %).
- Staple length (fibre average length – mm).
- Medullation (- percentage %).
- Impurities (greasy yields and percentage content of vegetable matter - %).
- Colour.

For fleece harvesting arrangements to be considered for animal handling, working environment and equipment are as follows:

- Rest Area for Alpaca before shearing.
- Shearing area.
- Procedures for shearing.
- Grading areas.
- Equipment for grading.
- Packaging and baling area.

The final goals of the correct management of the different steps of the fibre/fleece shearing, harvesting and grading processes are:

- Optimising the quality and uniformity of raw material and providing confidence for its use by manufacturers.
- maximizing the financial return and profit

Guidelines for shearing

These guidelines describe the recommended management of actions during the shearing period and the organization of the different working environments.

Step 1: Alpaca clip preparation

Before the alpaca enter the clip areas the follow actions should be taken into account:

- Keep the alpaca in a rest paddock close to the clip area.
- Keep the alpaca dry.
- Divide the alpaca into different groups of shearing according to, type of Alpaca (Suri and Huacaya), age and sex of animals and the colour of fibre, with emphasis on keeping separate fleeces from the white Alpaca and from the younger animals with the finest fibres.

This is the best way to obtain the most homogeneous lots for colour and quality.

The timing of the shearing period is one decision requiring very great consideration in the alpaca fibre production life. The seasonal shearing period will require to be chosen according to the following aspects:

1. Environmental conditions – when cold and windy after clipping, the Alpaca will require to be housed indoors, kept dry and offered concentrate food for 10 days at least.
2. Reproduction activities – staining is increased in fleece harvested after delivery of the cria and during the breeding season when pregnancy also reduces fleece and fibre yield.
3. Pasture vegetative phase – alpaca need to be clipped before the development of seeds in the pasture. Seeds are the main reason for contamination and depreciation of the fleece and along with other vegetable matter are virtually impossible to remove during the different steps of textile processing (IWTO-19, 2004).

Step 2: structural needs

The Pens

In order to reduce contamination in the fleece by extraneous materials, all the farm pens where the alpaca live have to be free of:

- bales, ropes, twines and strings for hay packaging;
- rubbish wastes;
- unused equipment such as old beams or machines;
- wires, barbed wires, old sandpapers, screws, nails, bolts and chains;
- cigarette ends.

The presence of these materials causes major troubles for the textile industry. They greatly reduce the economic value of the end products and even sometimes cause expensive damage to textile processing machinery.

The clip shed area

A shed should be utilized only for the alpaca clip. It should be divided physically into three distinct areas:

1. Alpaca Handling Area. *Where the Alpaca rest before being brought into the clip area*

   This sector has to be totally separate from the other two areas. It is necessary for it to be protected from of draughts and rain, to have the floor covered with elevated wooden floorboards and to have suitable ventilation.

2. Clip Area. *Where the alpaca undergo the shearing*

   The clip area needs to be completely separated from the other two areas and to be covered by wooden floorboard. Careful cleaning needs to be done after shearing finishes for each different Alpaca group separated for fibre fineness and colour and before starting the next group with different fibre characteristics. Finally, all the devices used to immobilize the alpaca have to contain non-contaminating materials (i.e. cotton), in order to avoid contamination especially with synthetics fibres.

3. Fleece Grading Area. *Where the single whole fleeces are separated and graded in different fineness categories.*

   An appropriate artificial or natural light has to be provided in the fleece grading areas; the grading table has to be constructed of single wood planks separated by spaces to enable the falling-out of impurities. Clean previously used sacks or new sacks have to be available for each fibre category.

Inside the shed area the following important rules of hygiene have to be observed

- Before the shearing: remove all rubbish and carefully wash the shed area when it is empty.
- Provide shearing staff with the equipment to clean the shoes (scrapers, containers with cleansing and / or disinfectant liquid).
- Forbid smoking inside the clip area.
- Forbid eating of food.
- Forbid the grooming of Alpaca feet and especially the cutting of nails.

Step 3: preparation for shearing

Before beginning the actual Alpaca clip, all the hygienic rules above have to be respected. All the alpaca must go without food for at least 4 hours and they must be presented at the shearing according to pre – determined categories (age, sex, colour etc. ...)

Finally the bags, where the shearing and grading fleeces will be collected, will have to be checked inside in order to remove rubbish and contaminant materials.

Step 4: shearing process

The alpaca clip method will have to be performed according to the practice and methods of the local available shearers. Whatever the methods, the shearers will have:

- To be careful to separate firstly the less valuable fleeces fractions (feet and belly parts).
- To keep the fleece as intact as possible, in order to make easier the next fleece grading.

- To avoid absolutely the double-cut during shearing. This causes a great variation in average length of the fleece fibre and results in a heavy depreciation in value of the products.

After shearing, shepherds have to be careful to avoid exposing the alpaca directly to sunlight and currents of cold air in order to prevent sunburn and hypothermia.

Step 5: Grading and classification

The principal grading aim is to offer fibre products in such way that the textile manufacturers do have not to make further selection and cleaning before starting factory processing. The results from good grading and handling practices are the elimination of added unnecessary costs and a better quality end product.

The main actions to carry out in the present step are:

- The fleeces must not be rested on the floor.
- Once sheared, the fleeces have to be put immediately on the grading tables.
- Grading tables have to be cleaned after the grading of each fleece.

The fleeces obtained are classified for:

- Type of fleece.
- Fineness.
- Colour.
- Length.
- Presence of medullated fibre or kemp.
- Stained; special category foreseen for dirty fibres.

Each fibre category has to be identified by suitable codes, which have to be affixed on packaging.

Alpaca fibre classification proposal

Fineness category[1]

Under 20 microns	< 20 µm	(SSF - Super Super Fine)
Between 20,1 and 22 µm	>20,1 µm and < 22 µm	(SF – Super Fine)
Between 22,1 and 24 µm	>22,1 µm and < 24 µm	(F - Fine)
Between 24,1 and 26 µm	>24,1 µm and < 26 µm	(M - Medium)
Between 26,1 and 28 µm	>26,1 µm and < 28 µm	(CM – Coarse Medium)
Between 28,1 and 30 µm	>28,1 µm and < 30 µm	(XCM – Extra Coarse Medium)
Over 30 µm	>30 µm	(C - Coarse)
Stained		(STD - Stained)

[1]At the moment the Fineness Categories guide line are referred to Huacaya fleece type .

Colour

Type	Code	Range	Sub Code
White	W		
Black	BLK		
		Dark	B - Dk
Brown	B	Self	B - Slf
		Light	B – Lgt
Light Fawn	LF		
		Dark	GR - Dk
Grey (Black)	GR	Self	GR - Slf
		Light	GR – Lgt
		Dark	RN – Dk
Roan (Brown)	RN	Self	RN – Slf
		Light	RN – Lgt
		Dark	PK – Dk
Pink (Light Fawn)	PK	Self	PK – Slf
		Light	PK - Lgt

Length

> 85 mm < 160 mm	A.A.A.
> 40 mm < 85 mm	A.A.
< 40 mm	A.
> 160 mm	O.G.

Medullation

Very heavily medullated fibre should be separated from the fineness category and included in the category (S).

Step 6: Raw material packaging and labelling

There is a number of different packaging methods. Such methods require clean bags which are not stained and which must also not introduce contamination (i.e. plastic from plastic bags)

Generally bags of strong material are preferred, where the fleeces can be well pressed and are easy to store.

Each bag must also have an individual label, which contains two kind of information: one refers to the farms and consists of:

1. Animal code number.
2. Farm name.
3. Farm address.
4. Telephone number.

and one refers to the fibre as follows:

1. Fineness category (code).
2. Color (code).
3. Length (code).
4. Shearing year.
5. The average diameter of fibres when laboratory analyses have been carried out.

Table 1. Label example.

Farm data	Fibre Data
Animal code N. ……………………………....	Type of fleece………..……………………..….
Farm Name…………………………………...	Fineness Category…..………..…………..……
Farm address…………………………………	Colour…………..……………………….…..…
………………………………………………	Length.…………………….……………..……
……………………………………….....…….	Shearing Year ……………………………..…….
Telephone N. …..……/……………………...	Average diameter…………………….....…….

Conclusion

The alpaca industry is fundamentally still animal based, the value of animals has become directly related to their fibre diameter. The major demand is currently for fine (and preferably white) fibre. By improving alpaca fibre quality and its preparation, producers will be better able to define common objective of selection. Present guideline will have to attend to the Alpaca breeders in the improvement of the final quality products and in the more accurate animal fibre recording method in the perspective of the organization of genetic selection plan. Present guideline represents the first principal step of ICAR service for alpaca breeders at international level.

ICAR would like to approach the problems of Alpaca fibre heterogeneity due to the great variability in type of fleece and type of fibre in order to supply the best raw material as possible at the end users. Next steps of the ICAR South American Camelid Alpaca fibre Working group will the objective definition of Huacaya and Suri fibre/type; the definition of the objective and criteria in Alpaca fibre selection program world wide; the contribution to adequate analytical performance quality for Alpaca fibre recording purpose world wide; the development of reference document and standard on methods of Alpaca fibre analysis and quality assurance in laboratories applicable to animal fibre recording.

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