In-Herd Diversity of Lifetime Performances: A Key for the Sustainability of Livestock Farming System Based on Grassland

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The 21st International Grassland Congress / 8th International Rangeland Congress took place in Hohhot, China from June 29 through July 5, 2008.

Proceedings edited by Organizing Committee of 2008 IGC/IRC Conference

Published by Guangdong People's Publishing House

In-herd diversity of lifetime performances : a key for the sustainability of livestock farming system based on grassland

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Key words : sustainability ,lifetime performance ,diversity ,herd management

Introduction Sustainability of livestock farming systems (LFS) based on grassland depends on their abilities to buffer environmental variations while maintaining targeted production project .These abilities come from the regulating properties of LFS .On one side ,regulations can arise from adaptive grazing management in order to take advantage of resource diversity under climatic hazard (Andrieu *et al* . ,2007) .On the other side ,regulations can also arise from female adaptive abilities driven by farmer practices (Blanc *et al* . ,2007) .At the herd level ,variable female responses generate a diversity of lifetime performances . The objective of this study was to assess the contribution of lifetime performance diversity to the sustainability of LFS based on grassland .We relied on the example of dairy goat herd .

Materials and methods We considered a herd of 150 lactating goats mating in October and kidding in March .Two cases of practices corresponding to different strategies of infertility management were studied over two consecutive years characterised by a fertility rate (FR) decline in the second year .Such decline has been reported to occur after a bad season of grazing leading to a poor condition of females at mating (Mellado et al .1996) .In case 1 ,the farmer systematically culled goats which failed at mating whereas in case 2 ,open goats were maintained in extended lactation during the second year .Comparatively with case 1 , case 2 increased in-herd diversity of lifetime performance by giving opportunities to open goats to contribute to overall production .We relied on a model of lactating goat (Puillet et al ,in press) in order to generate different lifetime performances and to assess overall herd performance .

Results Total milk production in year 1 was similar for both cases (Case 1 : 120 601 kg ; Case 2 : 119 016 kg) .The decline in fertility led to a decrease of production in both cases .However ,in case 1 this decline was around 17% of herd production in year 1 and around 8% in case 2 . In case 2 ,the perturbation due to low fertility was buffered at herd level due to an increase in the number of females maintained in extended lactation .These females contributed to 14% and 24% of overall production in years 1 and 2 respectively .

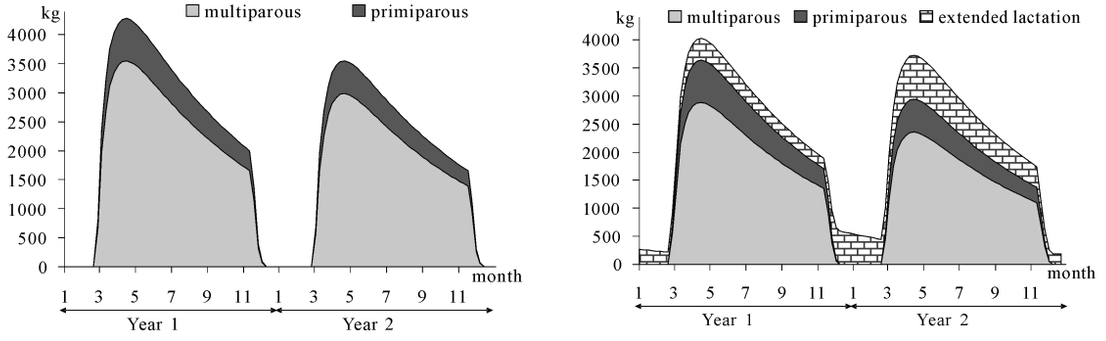

Figure 1 *Contributions of the different types of lifetime performances to overall herd milk production during two years and for two levels of fertility rate (FR=0 85 year 1 ;FR=0 70 year 2) .Left : case 1 (systematic culling of open goats) .Right : case 2 (extended lactation for two years) .*

Conclusions Both management cases illustrate that herd can have regulating properties arising from the diversity of female lifetime performances .This aspect can be of great interest for grassland systems where feed supply is highly variable and female regulating properties are strongly solicited .

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