CIHEAM
Options Méditerranéennes

Prospecting and evaluation in degraded areas, of annual forage legumes, fodder shrubs and perennial grasses typical from Extremadura

González F., Moreno V., Paredes J., Prieto P.M., Paniagua M.

in

Etienne M. (ed.).
Dynamics and sustainability of Mediterranean pastoral systems

Zaragoza : CIHEAM
Cahiers Options Méditerranéennes; n. 39

1999
pages 283-285

Article available on line / Article disponible en ligne à l'adresse :

http://om.ciheam.org/article.php?IDPDF=99600089

To cite this article / Pour citer cet article

González F., Moreno V., Paredes J., Prieto P.M., Paniagua M. **Prospecting and evaluation in degraded areas, of annual forage legumes, fodder shrubs and perennial grasses typical from Extremadura.** In : Etienne M. (ed.). *Dynamics and sustainability of Mediterranean pastoral systems* . Zaragoza : CIHEAM, 1999. p. 283-285 (Cahiers Options Méditerranéennes; n. 39)

CIHEAM

http://www.ciheam.org/
http://om.ciheam.org/

CIHEAM

Prospecting and evaluation in degraded areas, of annual forage legumes, fodder shrubs and perennial grasses typical from Extremadura

F. Gonzalez, V. Moreno, J. Paredes, P.M. Prieto and M. Paniagua
Investigation and Technological Development Service,
Junta de Extremadura, Apartado 22, 06080 Badajoz, Spain

SUMMARY - Once the most important areas have been determined on the Map of erosive states of the Guadiana and Tajo hydrographic basin, a prospecting of three areas was carried out which correspond to different climatic and soil conditions. The best points for harvesting the seeds were determined in impoverished areas or with low soil potential. The hypothesis is that the plants which grow in these places with degraded soil, are resistant to the environmental stress which takes place in the areas which have to be replanted. Three groups of local species were harvested: (i) annual forage legumes; (ii) fodder shrubs; and (iii) perennial grasses. A first evaluation of the whole material harvested has been done, with the aim of selecting by areas the most productive and persistent ecotypes.

Key words: Prospecting, annual forage legumes, fodder shrubs and perennial grasses.

RESUME *- "Prospection et évaluation dans des zones dégradées, de légumineuses fourragères annuelles, arbustes fourragers et graminées pérennes typiques d'Estrémadure". Après avoir déterminé les régions les plus importantes sur la Carte des états érosifs des bassins hydrographiques du Guadiana et du Tage, une prospection de trois régions a été réalisée correspondant à des conditions climatiques et édaphiques différentes. Les meilleurs points pour récolter les graines ont été déterminés dans les régions appauvries ou ayant un faible potentiel de sol. L'hypothèse est que les plantes qui poussent dans ces endroits avec un sol dégradé sont résistantes au stress environnemental qui a lieu dans les régions qui doivent être replantées. Trois groupes d'espèces locales ont été récoltes : (i) légumineuses fourragères annuelles ; (ii) arbustes fourragers ; et (iii) graminées pérennes. Une première évaluation de l'ensemble du matériel récolté a été faite, dans le but de sélectionner par région les écotypes les plus productifs et persistants.*

Mots-clés *: Prospecter, légumineuses fourragères annuelles, arbustes fourragers, graminées pérennes.*

Introduction

In the pasture of acid soils of Extremadura, there are areas of low productive potential and very degraded areas, as a result of the abusive grazing practices, undiscriminated cutting and inappropriate agricultural tasks.

The protection and restoration of these degraded areas, to keep the flora and fauna and the productive diversity, requires as a starting point the implantation of a protective vegetal cover using non-destructive methods of low inputs. The "pasciculture" in controlled extensive systems, as conservative of the background, must be the priority objective.

Therefore, the point is to combine grazing with the preservation of the natural vegetation, avoiding the background erosion. To attain this objective, the basis to regeneration in these degraded areas of low productive potential are: the harvest and use, at the same time, of forage species adapted to our semiarid weather (resistant to grazing and water deficits) with shrub species adapted to arid conditions (McKell, 1975), efficient in the use of the water (De Koch, 1981), and which are kept green during the summer drought period and with perennial grasses which are good at colonizing and avoid the erosion. The hypothesis is that the remaining plants in these degraded areas support the environmental stress and a selection and multiplication of these species will help to regenerate and improve these areas.

Material and methods

The harvest of annual forage legumes was carried out in three areas with different climatic and soil conditions: Comarca de La Serena, central and southwestern mountain of Badajoz, San Pedro Mountain and southwest of Cáceres. These areas are considered as important ones as regards risk of erosion in the Maps of erosive states of the Guadiana and Tajo hydrographic basin (ICONA, 1987, 1991).

The best points for the seed harvest were determined, in these degraded areas or with low soil potential.

The vegetal material harvested, annual forage legumes, has been sown in lines of three metres each, analysing in a first evaluation the flowering cycle of the harvested species, in each one of the studied areas.

As regards the harvest of fodder shrubs, it has also been done within the previous depicted areas, just with the purpose of knowing if they had certain fodder value and so that they could be eaten by the cattle in the periods of pasture shortage.

Preliminary studies of germination have been carried out, because the multiplication by seed of these shrublike species presented certain difficulties, due to inner or outer (lethargies) characteristics of these species which do not allow their germination.

To brake these lethargies different treatments have been applied (Catalán, 1993).

(i) Manual scarification; (ii) immersion of the seed in boiling water for 10 seconds; (iii) the same as the previous one, but for 1 minute; (iv) immersion of the seed for 24 hours in water which is about boiling and leaving it to get cold with the seed inside the water and then cold stratification for 30 days; and (v) immersion of the seed as in the previous case, pre-refrigerating then in the fridge to +5°C for 1 week.

As regard with perennial grasses, they have been harvested with the same criteria as the fodder shrubs since, in addition to the annual forage legumes, they are other feeding resource, as well as avoiding erosion.

Results

The harvest of the annual forage legumes in these areas was done in July 1994 (Gonzalez *et al.*, 1994), following the main criteria, the fact of having a certain grazing value, on the contrary the recovery of these areas would not be profitable economically speaking.

The main species harvested and the number of ecotypes of each of them were the following:

Trifolium angustifolium (ecotypes 1), *T. subterraneum* (23), *T. glomeratum* (23), *T. cherleri* (16), *T. striatum* (11), *T. stellatum* (3), *Medicago polymorpha* (8), *M. maculata* (4), *M. minima* (1), *M. orbicularis* (1), *M. doliata* (2), *Ornithopus compressus* (12), *Biserrula pelecinus* (8), *Astragalus cimbaecarpus* (2), and *Scorpiurus vermiculata* (3).

In a first evaluation the flowering cycle has been determined, with the purpose of classifying those ecotypes in each area, whose cycle is the most frequent (Table 1).

As regard with local fodder shrubs the following species have been harvested (Gonzalez *et al.*, 1995):

Olea europa var. sylvestris, Pistacia lentiscus, Retama sphaerocarpa, Cytisus scoparius, C. baeticus, C. striatum, C. multiflorus, Adenocarpus complicatus, Crataegus monogyna and *Spartium junceum.*

Table 1. Most frequent flowering cycle (days) per species in each harvested area

Area/Species	La Serena	Jerez de los Caballeros	Sierra de San Pedro
Trifolium subterraneum	122	143	122
Trifolium glomeratum	143	146	146
Trifolium cherleri	143	143	139
Ornithopus compressus	139	139	139
Trifolium striatum	150	150	150
Medicago polymorpha	122	127	122

The germination percentage of each species was determined, applying 5 different treatments to the seed, with the aim of a later multiplication.

The germination percentage to the best treatment for each species is shown in Table 2.

Table 2. Germination percentage of the shrub species

Species	Treatment	% of germination
Cytisus baeticus	4	60
Cytisus multiflorus	4	62
Adenocarpus complicatus	4	82
Cytisus scoparius	5	48
Cytisus striatum	5	68
Retama shpaerocarpa	2 and 5	60-58

The wild olive has been multiplied by cuttings or deep-rooted plants coming from mother plants' new shoots, with a very high success percentage (greater than 80%).

With regard to the *Pistacia lentiscus* seeds, only by immersion in water to room temperature for 24 hours, the germination percentage has been very high (superior to 85%).

The harvest of perennial grasses took place in non-degraded areas, these species being the following ones: *Stipa gigantea*, *Melica magnoli*, *Hyparhenia hirta*, *Piptatherum milliaceum* and *Eragrostis curvula*.

The first observations done, these show us *Piptatherum milliaceum* as the most colonizing and the easiest to multiply.

Conclusions

A first evaluation of the annual forage legumes as regards its flowering cycle, leads us to the conclusion that they gather in two groups, the one formed by the *Trifolium subterraneum* and *Medicago polymorpha* which blooms to 122 days, except the *Trifolium subterraneum* in the area of Jerez de los Caballeros which blooms to 143 days and the other one formed by the *Trifolium glomeratum*, *T. cherleri*, *T. striatum* and *Ornithopus compressus* which blooms between 139 and 150 days.

As regards the fodder shrubs the best treatments to break the lethargy are: the seed immersion for 24 hours in water which is about boiling and leaving this to get cold with the seed inside and later stratification in cold for 30 days, and the seed immersion as before but pre-refrigerated in the fridge to +5°C for a week.

In the first considerations the *Cytisus baeticus* and *Adenocarpus complicatus* are the ones with the best behaviour, since they have a faster growing and better adaptation than the rest of the shrubs.

The perennial grasses which present the best behaviour is the *Piptatherum milliaceum*, of great seed production and easy multiplication.

The adaptation of these species to the grazing and its capacity of colonizing will be subject of another publication.

References

Catalán, G. (1993). *Semillas de árboles y arbustos forrajeros: Colección Técnica.* ICONA (MAPA), Madrid.

De Koch, G.C. (1981). *Drought resistant fodder crops*, mimeo Grootfontein College of Agriculture, Middelburg, CP, South Africa.

González, F., Olea, L., Moreno, V., Paredes, J., Prieto, P.M., Paniagua, M. and Santos, A. (1996). *Recuperación a pastos de áreas degradadas en la dehesa de Extremadura.* Memoria SIA 96 (In Press).

ICONA, (1987). *Mapas de estados erosivos. Cuenca del Tajo*. Servicio de Publicaciones, MAPA.

ICONA, (1991). *Maps of the erosive states. Guadiana basin*. Service of publications, MAPA.

McKell, C.M. (1975). Shrubs - a neglected resource of arid lands. *Science*, 187: 803-809.