

Establishment of vegetation in field margins left set-aside after different years in a dryland area in Aragón

A. Cirujeda¹, S. Murillo², E. Langa¹ and C. Zaragoza¹

¹Unidad de Sanidad Vegetal, Centro de Investigación y Tecnología Agroalimentaria, Gobierno de Aragón, Avda. Montañana 930, 50059 Zaragoza, Spain

²DGA Ayudas a la Producción, Servicio Provincial DGA, Pza. S. Pedro Nolasco 7; 50001 Zaragoza

The drylands of the Monegros region (Aragón, North-Eastern Spain) is characterised by low-input extensive farming with scarce steppe vegetation. 8-meter strips surrounding the fields of a farm have been established in different years and natural vegetation was left set-aside to reduce erosion and to increase biodiversity. The objectives of this work were to describe the vegetation establishment in these strips comparing changes in time (2006-2008) and comparing stripes of different ages (set-aside in 2003 to 2007) with the vegetation inside the cultivated fields and to find out how many years are necessary to achieve a permanent vegetation cover.

The vegetation increase was especially high the first spring after set-aside. Number of species increased rapidly from around 4 species in the field up to 22 in the oldest strips. After two years of set-aside more than 14 species were found in several strips. However, some differences between margins were caused not only by the age of the strip but also due to the position of the strip in the landscape (more moisture, a worse soil quality, etc.). Most species found were annual dicotyledoneous plants. The proportion of perennial species increased from year to year and in the oldest strips even more perennial than annual species were found in 2008. Perennial grasses was the group of plants which was less frequent.

Shannon's diversity index changed within years, probably caused by the climatic conditions of each year. The highest value was generally found for the oldest strips (up to 2.5 in 2007) and the lowest for the fields (0.7 in 2008). Some species like *Cardaria draba* and *Fumaria* sp. were important only in fields, while perennial plants like different *Plantago* species and *Dactylis glomerata* were typical of the oldest strips left set-aside in 2003.

As a matter of conclusion, biodiversity increased gradually in the strips set-aside and the proportion of perennial species increased. It is still early to estimate how many years are necessary to achieve maximum diversity but we have observed in some margins that species composition can change in an important way already after 2 years of set-aside.

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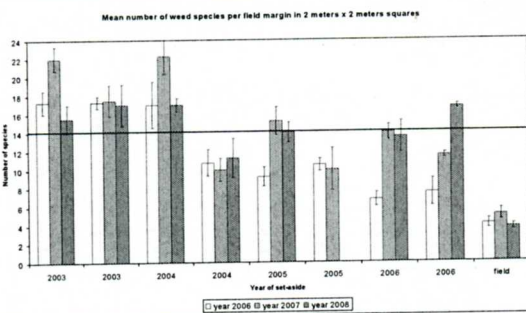


MATERIALS AND METHODS

Vegetation of two stripes of each age were described in 4 fixed 2 meter x 2 meter squares during spring 2006, 2007 and 2008. Stripes were set-aside in 2004, 2005, 2006, 2007 and 2008. Percentage soil cover was assessed in winter and spring; weed species were described with percentage soil cover of each. The same assessments were done in nearby fields.

RESULTS

Percentage of soil cover by vegetation was especially high the first spring after set-aside. Number of species increased rapidly from around 4 species in the field up to 22 in the oldest strips. After two years of set-aside more than 14 species were found in several strips.

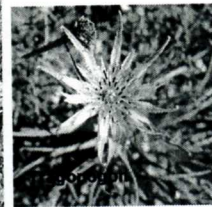
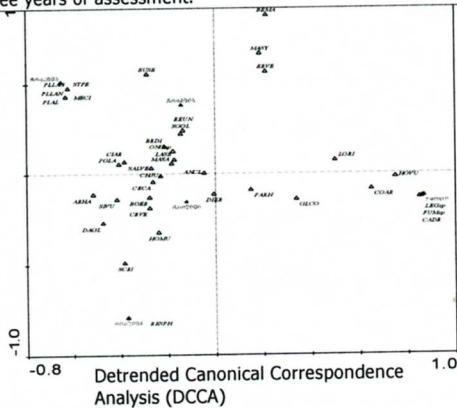


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Some species like *Cardaria draba* and *Fumaria* sp. were important only in fields, while perennial plants like different *Plantago* species and *Dactylis glomerata* were typical of the oldest strips left set-aside in 2003.

Number of weed species found in the different stripes and in the three years of assessment.



CONCLUSIONS

Biodiversity increased gradually in the strips set-aside and the proportion of perennial species increased. We have observed in some margins that species composition can change in an important way already after 2 years of set-aside. Further observations are needed to confirm long-term vegetation establishment.