Plant Archives

INVENTORY OF THE FLORA OF *ROSACEAE* ORCHARDS IN THE SKIKDA REGION (ALGERIA)

Hannachi Abdelhakim

Department of Agronomy, Faculty of Sciences, University Skikda, Algeria.

Email : hakhannachi@yahoo.fr

ABSTRACT

The study focused on the inventory and characterization of the Weeds flora of *Rosaceae* fruit trees in the Skikda region (Algeria). Forty-seven pharmacological surveys were carried out and made it possible to identify 102 weed species. The dicotyledons are dominant with 72 species. Monocotyledons include 30 species. The species listed are divided into 37 botanical families. The ratio of the number of monocotyledonous species to the number of dicotyledonous species (M/D) is 18.75. The biological type for all the species listed shows that annuals dominate and form 54.90% (56 species). Perennial weeds are well represented (31 species), as well as the presence of biennials (15 species). Species whose frequency is between 40 and 60% are three species. While five species have a frequency between 20 and 40%, the frequency <20% contains most of the species 95 or 93.13% of the total specific number.

Keywords : Flora, Weed, Inventory, *Rosaceae*, Skikda.

Introduction

By weed, we mean any plant species that is undesirable in a crop. The reason being of agriculture means that, in a cultivated field, any plant that is not sown or planted voluntarily is considered undesirable and the farmer constantly fights against these weeds (Jauzein, 2001). Indeed, heavy losses in yields and crop quality result from weed competition (Buhler, 2005). They are responsible for 5% of crop losses in temperate zones and generally more than 25% in tropical zones (Le Bourgeois & Marnotte, 2002).

The objective of this work is the floristic and ecological study of orchard weed groups (*Rosaceae*) in the Skikda region. The floristic survey technique used is that of a tour of the fields (orchard), which makes it possible to know the different species of the plot and take into account the variability of ecological and agronomic conditions. The surveys were carried out during the period March - May.

Material and Methods

Study of the flora and ecology of weed groups

Sampling methods

The study of the characterization of the weed flora of the orchards of the Skikda region, focused on 47 phytoecological records. They are distributed over the entire study area so as to take into account the variability of ecological and agronomic factors (Lebreton et *al.*, 2005). The observation surface is often linked to the notion of minimum area. In a cultivated environment, several authors (Barralis, 1976 and Maillet, 1981) consider, in the case of fruit, that apart from edaphic discontinuities, a plot or an orchard that is not too large represents a relatively homogeneous unit. when it comes to environmental factors, notably of an agronomic nature, which can influence the development of species.

Phytoecological surveys

Observations were made according to the phytoecological study protocol for the analysis of weeds in *Rosaceae*. The floristic survey technique used is that of the orchard tour, which makes it possible to know the different species of the plot (Chicouène, 2000; Maillet, 1981 in Lebreton *et al.*, 2005). The surveys are carried out on homogeneous surfaces from the floristic point of view and representative of approximately 100 m^2 (Fenni, 2003), a tour of the orchard is then carried out to inventory the localized species. Maillet (1981) shows that depending on the areas of investigation linked to the methods of floristic surveys, the tour of the orchard is the most exhaustive. It consists of traversing the plot in different directions until all the species are listed.

At the level of the floristic list, each species is assigned a coefficient of abundance – dominance (from + to 5) and sociability (from 1 to 5) as defined by Braun Blanquet (Guinochet, 1973 in Fenni, 2003). The abundance-dominance index has the advantage of integrating the notions of density and cover and appears to be a good criterion for comparing species that do not have the same behavior (Le Bourgeois, 1993). The biological type of each species and its dominant phrenological stage is noted. The species harvested are determined using the new flora of Algeria and the southern desert regions of Quézel and Santa (1963) and the HYPP software CD-ROM (Anonymous, 1994).

Data analysis

The objective of this part is to characterize the flora of *Rosaceae* orchards, to know its composition and to understand how this flora develops and is distributed under the effect of natural and phytotechnical environmental factors. Such knowledge, which aims to contribute to the development of a sustainable and integrated management of the weed flora of crops, presupposes not only the qualitative and quantitative analysis of weeds, but also the study of the ecology species and in particular that of the relationships between weeds and the environment in order to understand the most discriminating descriptors of the environment on the distribution of species (Loudyi *et al.*, 1995).

Floristic analysis

The quantitative floristic analysis makes it possible to describe the agronomic importance of the different species according to their relative frequency within the 47 surveys of the study and their average abundance calculated for the surveys containing the species (Le Bourgeois and Guillerm, 1995 in Lebreton *et al.*, 2005).

It concerns the qualitative description of the different components (richness of the weed flora of the region and the biological and biogeographical diversity). Quantitatively, it analyzes the degree of infestation of species. For this last aspect, two measures of the importance of weeds have been defined. This is the relative frequency of each species and the average value of the cover, calculated by transforming the abundance-dominance into a percentage of mean cover according to the following scale: + (0.5%), 1 (5%), 2 (17.5%), 3 (37.5%), 4 (62.5%) and 5 (87.5%) (Fenni, 2003). Without considering mutually exclusive, abundance and frequency are the most effective parameters for measuring crop infestation by weeds (Barralis, 1976). To designate the main weeds, the weed scientist assigns priority to the frequency of a given species in his study area, while taking into account its abundance (Fenni, 2003). From this approach, a list of the main weeds is drawn up. The species are classified according to their levels of infestation according to the scale proposed by Michez and Guillerm (1984) in Fenni (2003).
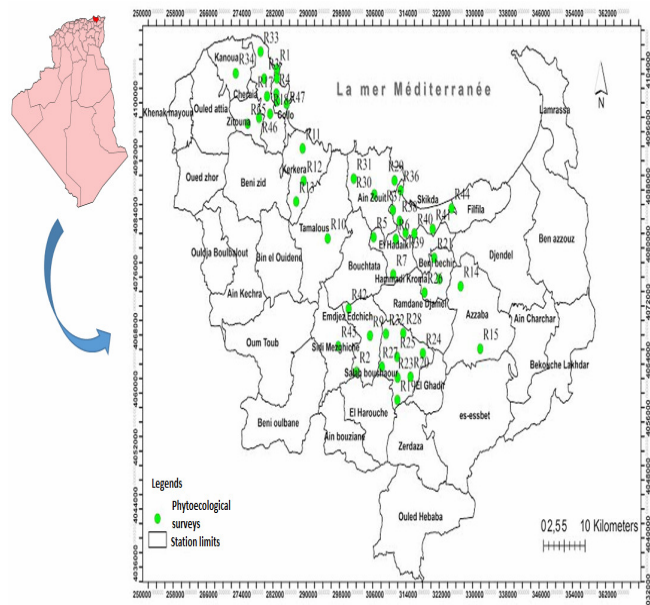

Fig. 1 : Location of phytoecological survey stations in the Skikda region.

Results and Discussion

Florists analyzes of crop weeds in the Skikda region

Description of crop weed flora

The weed flora of all the surveys carried out includes 102 species. This number is quite close to that of other regions of the country: for cereals, Abdelkrim (1995) counts 168 species in the Algiers sector.

The dicotyledons are largely dominant with 72 species or 70.6% of the species. The *Asteraceae* are the majority there with 21 species or nearly 20.6% of the weed flora. The monocotyledons comprise 30 species, or 29.4% of the weed flora, mainly represented by the *Poaceae* which alone represent 15 species, or 14.7% of the weed flora.

The best represented families are respectively *Asteraceae* (21 species), *Brassicaceae* (06 species), *Apiaceae* (04 species), *Poaceae* (15 species) and *Fabaceae* (07 species). These families alone include 53 species, or 52.0% of the species listed. This dominance is explained by the high productivity of the seeds, and the phenology perfectly adapted to the crops (Tanji et *al.*, 1984) (Figure 2).

The ratio of the number of monocotyledonous species to the number of dicotyledonous species (M/D) is 18.75. These results are close to those obtained by Fenni (2003) for the high plains of Constantine, which is very close to the study region.

The floristic richness at the scale of the plot varies from 10 to 30 species, with an average of 15 species per survey. This floristic richness depends on the age of the last weeding carried out at the time of the observation (Lebreton et *al.*, 2005).
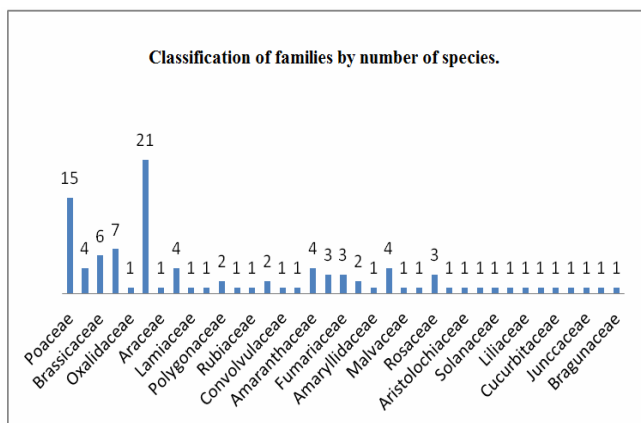

Fig. 2 : Classification of families by number of species.

Among the botanical families identified, that of *Asteraceae* is the most present, it holds 21 species or 20.6% of the weed flora of the Skikda region. Santa and Quezel (1963) consider that it is the most important botanical family in Algeria, since it contains 408 species divided into 109 genera.

The presence of *Brassicaceae* (6 species) and *Apiaceae* (4 species) is significant. These botanical families are clearly distributed throughout the Skikda region and almost in the *Rosaceae* orchards.

The presence of *Poaceae* (15 species) in the middle of an arboriculture such as (apple tree, pear tree, peach tree, cherry tree, apricot tree, plum tree), determine more complex competition phenomena at the level of water, nutrient and

space factors, and also makes any chemical or cultural control of these weeds more difficult (Barralis et *al.*, 1992).

The presence of *Fabaceae* (07 species) involves on the one hand a strong competition for water vis-à-vis the culture because of their deep root system, and on the other hand it allows a great disposition of nitrogen. in the field (Fenni, 2003). This family is represented in the Algerian flora by 55 genera.

Biological aspect

The biological type for all the species listed shows that annuals dominate, forming 54.90% (56 species) of the total number. This high rate of annuals indicates cultural habitats often disturbed by agronomic interventions (Fenni, 2003). It is not surprising in environments that undergo such strong human intervention.

Perennial weeds are well represented, forming 30.39% (31 species) In most cases, vegetative propagation becomes their only mode of survival.

It should be noted the presence of biennials, form 14.70% (15 species), which behave in common with annuals and die after having dispersed their seeds, unique survival organs. They are much more closely linked to plots in the extensive agriculture sector (Fenni, 2003) (Figure 3).
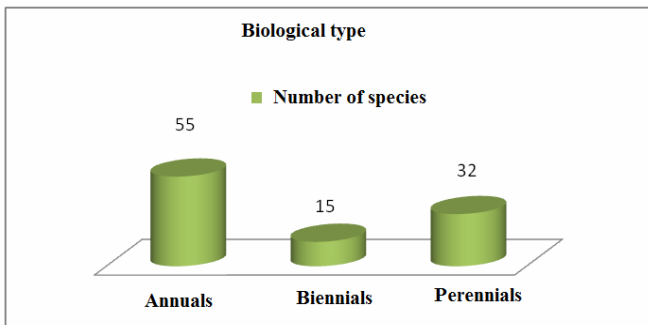

Fig. 3 : Biological type of crop weed species in the Skikda region.

The study of the biographical origin of the descriptive and explanatory analysis of the weed flora of *Rosaceae* orchards in the Skikda region, was to describe the spatial distribution of weeds on the surface of the globe, that- this shows a remarkable diversity on the scale of all the species listed. In the light of this approach, we note the dominance of European species with 38 species, or are they the French species dominates with 23 species. The Mediterranean are represented by 14 species and the American 06 species (Figure 4).
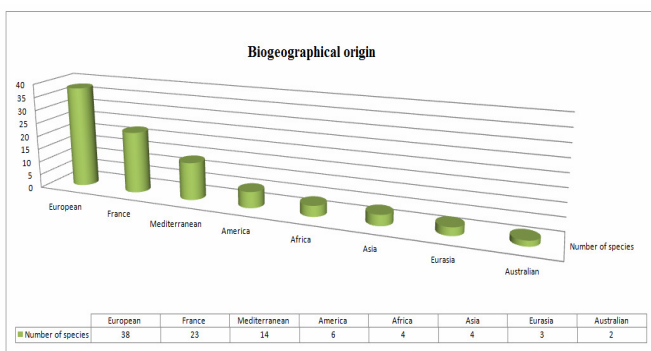

Fig. 4 : Biogeographic origin of crop weed species in the Skikda region.

Species frequency and agronomic importance

The analysis of the relative frequency of species (Table 1) highlights 04 classes of species, which show their potential for harm, and therefore their agronomic importance (Lebreton et *al.*, 2005).

The species whose frequency is between 60 and 80% (class IV) are (00) in number (Lebreton et *al.*, 2005).

Class III (between 40 and 60%) contains two species, one (01) annual and one (01) Biennial. These are less harmful species on the scale of all the trees.

Class II (between 20 and 40%), includes 05 species. This group contains four (04) perennial species and one (01) biennial species.

Class I (- 20%) contains most of the 95 species, i.e. 93.13% of the total specific number

Table 1 : Total recovery of the most abundant and frequent species.

Designation of species groups	Species	Total recovery (%)	Frequency (%)
A very abundant species	//	//	//
Abundant species	*Avena fatua* L.	1285	54
	Oxalis pes-caprae L.	1253	27
	Elytrigia repens L.	1013	42
Moderately abundant species	*Trifolium repens* L.	815	34
	Sinapis arvensis L.	775	16
	Malva sylvestris L.	763	32
	Medicago sativa L.	728	30
	Pteridium aquilinum L.	482.5	20
	Convolvulus arvensis L.	465	19
	Daucus carota L.	438	18
	Rumex acetosa L.	398	17
	Epilobium tetragonum L.	385	16
	Chamaemelum nobile L.	385	16
	Geranium auritum L.	315	13
	Rubus caesius L.	313	13
	Fumaria muralis Sond.	310	13
	Silybum marianum L.	298	12
	Senecio vulgaris L.	285	12
	Lapsana communis L.	268	11
	Veroniqua persica Poir	260	11
	Amaranthus spinosus L.	230	10
	Juucus bufonius L.	228	9
	Chenopodium album L.	225	9
	Panicum millaceum L.	220	9
	Ecballium elaterium L.	215	9
	Sonchus arvensis L.	203	8
	Calendula arvensis L.	202.5	8
	Allium triquetrum L.	200	8

The notation for each species of the recovery index and the taking into account of the frequency, allowed us to identify 28 important species. They are divided into three Groups (Figure 5).

The first group contains very abundant and frequent species; this group does not include any species.

The second group consists of two (02) species: *Avena fatua* L., *Oxalis pescaprae* L. and *Elytrigia repens* L. The third group contains 25 moderately abundant species. Among these species whose harmfulness index is not negligible, take into account: *Trifolium repens* L., *Sinapis arvensis* L., *Malva sylvestris* L., *Medicago sativa* L., *Pteridium aquilinum* L., *Convolvulus arvensis* L. and *Daucus carota* L.
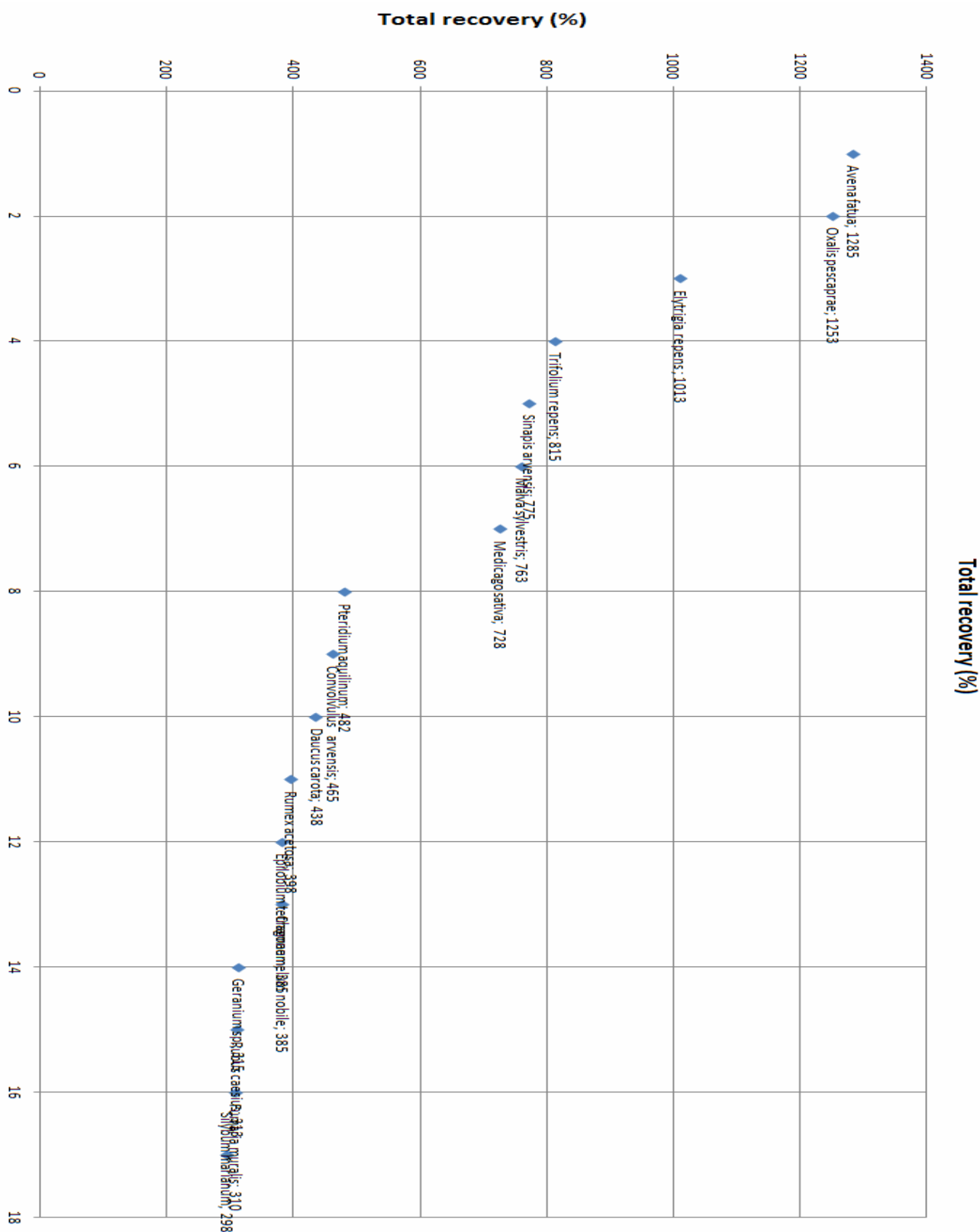
Fig. 5 : Total recovery diagram (%).

Conclusion

The weed flora of all the surveys carried out includes 102 species of weeds. The dicotyledons are dominant with 72 species, of which the *Asteraceae* are the majority with 21 species. The monocotyledons include 30 species, mainly represented by the *Poaceae* which alone has 15 species. The species listed are divided into 53 botanical families. The best represented families are respectively *Asteraceae* (21 species), *Brassicaceae* (06 species), *Apiaceae* (04 species), *Poaceae* (15 species) and *Fabaceae* (07 species).

The ratio of the number of monocotyledonous species to the number of dicotyledonous species (M/D) is 18.75%, which confirms the predominance of dicotyledonous. The biological type for all the species listed shows that annuals dominate, and form 54.90% (56 species). Perennial weeds are well represented (31 species) and form 30.39%, as well as the presence of biennials (15 species) and form 14.70%. The study of the biogeographical origin of the weed flora of the cultures of the region of Skikda and almost on the orchards of Rosaceae.

Species whose frequency is between 60 and 80% (class IV) are (00) species. Class III (between 40 and 60%) contains two (02) species, one (01) annual and one (01) biennial. These are less harmful species on the scale of all the trees. Class II (between 20 and 40%), includes 05 species. This group contains four (04) perennial species and one (01) biennial species. Class I (- 20%) contains most of the 99 species, i.e. 93.13% of the total specific number.

For abundance, the first group contains very abundant and frequent species, this group does not include any species. The second group consists of two (03) species: *Avena fatua* L. and *Oxalis pescaprae* L. and *Elytrigia repens* L. The third group contains 99 moderately abundant species. Among these species whose harmfulness index is not negligible, there are: *Malva sylvestris* L., *Medicago sativa* L., *Pteridium aquilinum* L. and *Trifolium repens* L.

References

Abdelkrim, H. (1995). Contribution to the knowledge of weeds in crops in the Algiers sector: syntactic and morphological approaches. *Thesis Doc., Univ Paris-Sud, center of Orsay*, (France): 151p.

Barrels, G. (1976). Methods for studying weed groups in annual crops: Application to the Côte D'Or. Vth *Coll. Inter. Biol., Ecol. And System. Weeds, Dijon* : pp 59-68.

Barrels, G.; Chadoeuf, R. and Dessaint, F. (1992). Long-term influence of cultivation techniques on the dynamics of emergence in the field of weeds. *IXth international colloquium, Biology, ecology, and systematics* of weeds, Dijon : 12 p.

Buhler, S. and Leroux, G.D. (1997). Use of fall rye (Secale cereale) against weeds in pumpkin. *Department of Plant Science, Laval University*, Quebec, G1K 7 : 4 p.

Fenni, M. (2003). Study of winter cereal weeds in the high plains of Constantine. Ecology, dynamics, phenology and biology of bromes. *State doctorate thesis, University of Sétif*, (Algéria) : 165 p.

Jauzein, P. (2001a). Biodiversity of cultivated fields: floristic enrichment. INRA Environment File, n°21 : 22 p.

Jauzein, P. (2001b). The floristic impoverishment of cultivated fields Agriculture and plant biodiversity. INRA environmental file, n°21: pp 43-64.

Hannachi, A. (2010). Study of crop weeds in the Batna region: Systematics, Biology and Ecology. *Master's thesis Ferhat Abbas Sétif University UFAS* (Algeria): 124 p.

Le Bourgeois, T. (1993). Weeds in the cotton rotation in Northern Cameroon (Africa). Amplitude of habitat - Degree of infestation, *Thesis Doc, Montpellier II, Montpellier*, (France) : 249p.

Lebreton, G. and Le bourgeois, T. (2005). Analysis of the weed flora of lentil in Cilaos – Réunion. Cirad-Ca/3P; UMR PVBMT, 20 p.

Legendre, L. and Legendre, P. (1984). Digital ecology. 1: multiple processing of ecological data. 2nd ed. Masson, Paris, (France) : 260p.

Loudyi, M.C.; Gordon, M. and El-Khairy, D. (1995). Influence of ecological factors on the distribution of weeds in crops in Sais (central Morocco). *Weed Res.*, 35(4): 225-240.

Maillet, J. (1981). Evolution of weed flora in Montpellier under the pressure of farming techniques. *Thesis Doc, USTL, Montpellier*, (France) : 200p.

Michez, J.M. and Guillerm, J.L. (1984). Ecological reporting and degree of infestation of weeds in summer crops in Lauragais. *VIIth Coll. Inter. Biol., Ecol. and Syst. weeds, Paris*, I: 155-162. Negadi A., 2009. *Geography of the Aurès*. HTML, 2009 : 4 p.

Quezel, P. and Santa, S. (1963). New flora of Algeria and southern desert regions. CNRS, Paris, 2 volumes, (France) : 1185 p.

Tanji, A.; Boulet, C. and Hammoumi, M. (1984). Phytoecological inventory of sugar beet weeds in Gharb (Morocco). *Weed Res*, 24: pp391-399.

Traore, K. and Mangara, A. (2009). Phyto-ecological study of weeds in the oil palm agro-ecosystems of Mé and Dabou. *European Journal of Scientific Research*, 31(4): 519 - 533.