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SOME XENOPHYTES OF ORAN CITY (ALGERIA)

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ABSTRACT: The objective of this study is to determine the taxonomic composition of the allochthonous flora of Oran city and to illustrate some bioecological traits that could facilitate the establishment of this flora in an urban environment. In this way, we obtained 14 new taxa for the city, 9 of which have already been cited in north eastern Algeria. These species do not appear in the flora of QUÉZEL & SANTA (1962, 1963). They belong to 12 genera and 8 families, of which 6 taxa are naturalised in Algeria. The majority of these species originate from the American continent and are essentially sexually reproducing therophytes. The biotopes richest in xenophytes in Oran are pavements, gutters and feet of trees. **Keywords**: Allochthonous; Therophytes; Biotopes; Mesh; Urban environment; Oran; Algeria.

RESUMEN: Los xenófitos de la ciudad de Orán (Argelia). El objetivo de este estudio es determinar la composición taxonómica de la flora alóctona de la ciudad de Orán e ilustrar los rasgos bioecológicos que podrían facilitar el establecimiento de esta flora en un medio urbano. Hemos obtenido una lista de 14 taxones nuevos para la ciudad, 9 de los cuales ya han sido citados en el nordeste de Argelia. Estas especies no aparecen en la flora de QUÉZEL & SANTA (1962, 1963). Pertenecen a 12 géneros y 8 familias, de los cuales 6 táxones están naturalizados en Argelia. La mayoría de estas especies son originarias del continente americano y son esencialmente terófitos que se reproducen sexualmente. Los biotopos más ricos en xenófitos en Orán son los pavimentos, las cunetas y al pie de árboles. **Palabras clave:** xenófitos; terófitos; biotopos; medio ambiente urbano; Orán; Argelia.

INTRODUCTION

When a species is intentionally or unintentionally introduced into a territory outside its natural area, it is said to be alien (PYŠEK & al, 2009). This definition includes all parts: seeds, eggs or propagules of such species that could survive and reproduce (GENOVESI & SHINE, 2004). The introduction of exotic species outside their natural area does not systematically lead to biological invasion. Only small proportions of them survive, reproduce, naturalise and can be potentially invasive (WILLIAMSON, 1996).

Invasive alien species (IAS) are the second biggest threat to biodiversity, with serious and often irreversible impacts on native habitats and species (CLÉROUX, 2013).

They affect the environment, the economy and health at global, regional and national levels. The introduction of IAS into virtually every region of the world has accelerated with globalisation, through increased trade, transport, tourism (SAHEL & SAHARA OBSERVATORY, 2020).

According to the Sahara and Sahel Observatory (2020), work on invasive alien plant species in Algeria is still at an early stage, judging by the number of publications. The latter are limited and focus on reports of the presence of species during botanical surveys or observations of infestations (ZEDDAM, 2008; VÉLA & al, 2013). Morphological descriptions, geographical distribution and some studies of interactions between IAS and cultivated species are sometimes reported (OUSLIM, 2013); (SOLTANI AMRI, 2014); (M'SADAK & SAAD, 2015); (MIARA & al, 2018); (ADJIM & KAZI TANI, 2018). Like most north african countries, Algeria does not yet have a complete inventory of introduced, naturalized or invasive species. In addition, research efforts on this flora continue to improve, and particular interest has recently been shown in exotic species in nurseries or gardens, such as the work of (SAKHRAOUI & al, 2019), whose authors report 50 exotic plants considered to be invasive. A recent list of 211 exotic vascular plants in Algeria was proposed by MEDDOUR & al (2020). A large proportion of this list (51.2%) is made up of naturalised species, while around 16% are considered as invasive or potentially invasive.

In this context, we propose to study the plants that we can observe in the streets of Oran city and thus contribute to improving knowledge of the allochthonous flora of Algeria. Our study includes a presentation of the taxonomic composition, followed by a demonstration of some ecological and biological traits that enable these plants to establish themselves successfully in an urban environment, such as biological type, reproduction, dissemination, photosynthesis and biotope.

MATERIAL AND METHODS

Oran is a Mediterranean coastal city and one of the largest metropolises in the Maghreb. It is located in NW Algeria, 432 km from the Algiers. Its latitude is 35° 38'N and its longitude is 00° 37'W. The city has 120 km of coastline and covers an area of 2,100 km². Oran is a major economic and university centre, with port, airport, rail and road infrastructures, and a population estimated at over two millions in 2020 (REMMAS & ZOUAD, 2022).

The relief of the city of Oran has six natural components: the coastal edge, the hills of the sahel, the low coastal plain of Bousfer-Les Andalouses, the plateau of Oran-Gdyel, the north eastern part of the M'leta plain, the great salt lake of Oran and the salt works of Arzew (fig.1).

From a geological point of view, the Oranese coast is located in the western part of the Neogene basin of the lower Cheliff, which can be divided into three units: a narrow northern coastal furrow, dislocated by Quaternary collapses, the Murdjadjo massif, which dominates the highly tectonised city of Oran to the west, and a southern furrow, occupied mainly by the large Oran salt lake (PERRODON, 1957).

Oran region is part of semiarid Mediterranean bioclimate characterised by minimum temperatures of up to 5.42°C and maximums about 32°C, with a WAPS-type seasonal regime (HANITET & al, 2021). This bioclimate is influenced both by the proximity of the sea to the north and by the extension of the salt lake inland (BENDAYKHA, 2018).

The region's vegetation is highly diverse, with groups of therophytic and halophytic grasslands belonging to several vegetation series: *Juniperus phoenicea* L., *Quercus suber* L., *Tetraclinis articulata* (Vahl) Mast, *Quercus ilex* L., *Pistacia lentiscus* L. and *Pinus halepensis* Mill. (MANSOURI & al, 2018).

As part of our study of the spontaneous flora of the city of Oran, we opted for the SUKKOP & WEILER (1988) grid method, which consists of tracing a grid on the map of the city, and each grid presents a study site. To do this, we used the mesh of a 1/7500 scale map of Oran city, made up of 192 meshes, each with a side length of 0.6 km (fig.1).

According to CLERGEAU, (2011) we subdivided the city of Oran along an urbanisation gradient into four zones: city centre, peri-centre, suburban zone and peri-urban zone. Then we made a random selection of 22 meshes distributed in the 4 urban zones to carry out exhaustive sampling of species in different biotopes: pavements (Pv.), gutters (Gt.), bottom of walls (Bw.), tree feets (Tf.). These surveys were carried out during the years 2018-2022 from February to July.

For the identification of the collected material we used several floras such as: BATTANDIER & TRABUT (1884, 1888); MAIRE (1952,1987); QUÉZEL & SANTA (1962, 1963); FENNANE & al (1999, 2007, 2014), flora of eastern Andalusia BLANCA & al (2009), commented synonymic catalog of the flora of Tunisia LE FLOC'H & al (2008). We have updated the scientific names using the AFRICAIN PLANT DATABASE (2023).

RESULTS AND INTERPRETATIONS

The results obtained reveal the presence of 14 allochthonous taxa in our collections, observed for the first time in Oran (tab. 1). In the following we present an ecological description for each species.

Amaranthus blitoides S. Watson (= *A. blitoides var. scleropoides* Thell.)

The prostrate amaranth is an occasional weed of crops originating from southern north America (GESTI PERICH, 2021). Observed in the city of Oran from July to October in the north-east of the city in mesh D15 on a major dual carriageway Millenium1, forming populations growing in gutters and on pavements and around a palm [*Syagrus romanzoffiana* (Cham.) Glassman]. In the SW of the city this species was found on the pavement of a street in K5 mesh. (fig. 2a).

Amaranthus viridis L. (= *A. gracilis* Desf. ex Poir.)

It is an annual weed native from Central America (PETROVA, 2018) that is widespread in the city of Oran. Throughout the harvest period and in most of the grids visited, this species was present with large numbers of individuals occupying the various biotopes: bottoms of walls, pavements, gutters and around trees. (fig. 2b).

Cenchrus longisetus M.C. Johnst (= *Pennisetum villosum* R. Br. ex Fresen)

We observed this east African poaceae (EL MOKNI & VERLOOVE, 2019) in two districts located in the north-east of the city: District of Emir Abdelkader in mesh G15 in february and district of Seddikia in mesh E11 in May. The individuals observed were grouped together in clumps on pavements, at the base of walls and around trees (*Washingtonia robusta* H. Wendl., *Phoenix canariensis* H. Wildpret) and even on artificial lawns of poaceous grass (fig. 2c).

Ceratochloa unioloides (Kunth.) Beauv. (= *Bromus unioloides* Kunth)

It is a brome native to south America (JAUZEIN, 1995). A few feet of this plant were seen in March growing in the gutter of an alleyway in the Saada district (ex. Protin) located to the south-west of the town in mesh K3 (fig.2 d).

Eleusine indica (L.) Gaertn.

It is a tropical plant with a strong covering power (BORNAND & HOFFER MASSARD 2004). This therophyte appears in the month of July in the Oranese agglomeration in several places:

In the south-west: the presence of a few individuals in the gutters and on the pavements of the alleyways in the K5 grid. In J4 mesh, this xenophyte was found at the bottom of walls and in gutters on boulevard Mostafa Ben Boulaid (ex. Bvd. Albert premier). Sparse stands of *E. indica* were also observed on pavements and in gutters along an alleyway in the Saada district in grid K3.

In the north-east of the city, a few feet of this species was seen in the gutters of the boulevard. Millenium 1 in mesh D15 (fig.2 e).

Euphorbia maculata L. [= *Chamaesyce maculata* (L.) Small]

Spotted spurge is an annual native from western north America (WOLFF & KRIPPEL, 2022). We saw this species in September to the north-east of the town growing with *Amarathus viridis* around a *Ziziphus lotus* planted on the pavement of an alleyway in D15 mesh (fig.2f).

Euphorbia serpens Kunth (= *Chamaesyce serpens* (Kunth) Small)

It is a small euphorbia native from Tropical and Subtropical America (HÜGIN,1998). We observed it in September in the north of the city, forming small colonies on the pavement of an alleyway in the Tafna district (ex. Saint-Eugène) in mesh H9. We also observed it in October in the north-east of the town at Bir el Djir in mesh D15 growing around a planted *Strelitzia reginae* (fig. 2g).

Freesia corymbosa (Burm. f.) N.E. Br. (= *Gladiolus corymbosus* Burm. f.)

It is a perennial corm plant, native from south Africa (MANNING & GOLDBLATT, 2010), mainly grown for ornamentation purposes. A single plant growing at the bottom of a wall was seen in March in an alleyway to the

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south-west of the city in mesh K3 in the Saada district (ex. Protin) (Fig. 2h).

Galinsoga parviflora Cav.

This annual asteraceae originates from south America (KAZI TANI, 2012). We observed it in May in a single locality to the north-east of the town in mesh E11, where several plants were scattered on the pavements and in the gutters along an alleyway in the Seddikia district next to the Sheraton hotel (fig. 2i).

Helianthus annuus L.

The common sunflower is an annual plant originating from the north American continent (SEILER & RIESEBERG, 1997). In July one foot of this species was observed growing on a small section of land intended for ornamental planting located at Chakib Arselan Avenue to the south-west of Oran in mesh K3. Two other feet were found in a gutter to the north-east of the town on boulevard Millenium 1 in mesh D15 (fig. 2j).

Nothoscordum x borbonicum Kunth (= *N. gracile* (Dryand.) Stearn)

This is a bulbous geophyte native from south America (RAVENNA, 1991). We saw it in several places from April to May in the form of clumps in the following grids: K3-L4-D15- K5-G12 -F10 colonising various habitats, pavements, gutters, bottom of walls and around the feet of trees [*Brachychiton populneus* (Schott & Endl.) R. Br., *Phoenix canariensis*, *Washingtonia robusta*] (Fig. 2k).

Oxalis articulata Savigny (= *O. floribunda* Lehm.)

It is a clumping perennial native to temperate regions of south America (PETROVA & VLADIMIROV, 2019). We observed it in May and October around two trees, [*Cupressus sempervirens* L. and *Araucaria heterophylla* (Salisb.) Franco], in the streets of Bir El Djir, a district to the north-east of the town in the D15 grid (fig. 2l).

Panicum miliaceum L.

Proso millet is a cultivated annual native from a steppe region in temperate latitudes in northern China (SCHILPEROORD, 2020).This species was only observed in the city of Oran in the gutters at three locations between May and June: to the south-west, in mesh L7 at Hai Es Salem (ex. Saint-Hubert), to the north-east, in mesh G12 at district Ibn Rochd (ex USTO) and in mesh D15 at boulevard Millenium 1 (fig. 2m).

Tropaeolum majus L.

The nasturtium is a therophyte native to Peru and Mexico (LORENZI & MATOS, 2002). That we observed it in March in the north-east of the town in mesh D13 on a pavement in a housing estate in the Akid Lotfi district (fig. 2n).

DISCUSSION

Consultation of the available bibliography on the allochthonous flora of Algeria and in particular the work carried out by ZEDDAM (2008); VÉLA & al (2013); MEDDOUR & EL MOKNI (2016); SAKHRAOUI & al (2019); MEDDOUR & al (2020) enabled us to obtain a maximum of data on the number of taxa, the taxonomic composition, the geographical origin, the biotopes, the degree of naturalization and the regional distribution of this flora in Algeria. The study of the distribution of this flora in Morocco and Tunisia is based on data from AFRICAIN PLANT DATABASE (2023) and data of SAHEL & SAHARA OBSERVATORY (2020).

TAXONOMY

According to the study of MEDDOUR & al (2020), the xenoflora of Algeria comprises 51 families into which 211 taxa are divided. There are 17 families with more than three alien species each, in particular *Fabaceae* (28 taxa), *Asteraceae* (26), *Amaranthaceae* (17), *Brassicaceae* (16), *Poaceae* (13) and *Solanaceae* (12). These six families account for more than half (53%) of alien species.

In our study, the 14 taxa encountered belong to 8 families: 4 species of *Poaceae*, 2 *Asteraceae* and 2 each of *Amaranthaceae* and *Euphorbiaceae*. Only one species was found for each of the *Alliaceae*, *Iridaceae*, *Oxalidaceae* and *Tropaeolaceae* (fig.3). All the species collected do not appear in the flora of Algeria by QUÉZEL & SANTA (1962, 1963), with the exception of *Amaranthus blitoides*, *Oxalis articulate* and *Freesia corymbosa*. The former seems have been confused with *A. blitum* L. and its observation in the town of Oran is the first indication for this xenophyte in Algeria. *Oxalis articulata*, on the other hand, was cited in the same flora under the name *O. floribunda* as subspontaneous but without any indication of locality. As far as the iridaceous *Freesia corymbosa* is concerned, according to all the documentation, there is no data to indicate the presence of this genus in Algeria.

GEOGRAPHICAL ORIGINS

According to VILÀ & al (1999), most of the alien species in north Africa were of Mediterranean and north American origin. This confirms the results of our research into the geographical origin of the xenophytes collected, which shows that the majority of them originate from the American continent (Fig.4), except for *Cenchrus longisetus Eleusine indica* and *Freesia corymbosa*, which are of African origin, and *Panicum miliaceum* L, which comes from Central Asia. This can be explained by a similar climate between the region of origin and the host region (MAILLET, 1997).

DISTRIBUTION IN ALGERIA

The distribution of xenophytes in Algeria clearly follows a north-south biogeographical gradient, with a regular decrease in the diversity of exotic plants from the coast (175 taxa) to the Saharan region (12 taxa) (MEDDOUR & al, 2020). This impoverishment gradient is linked to human occupation and density, the degree of anthropisation and ecological conditions that are less favourable to their expansion southwards (MEDDOUR & EL MOKNI, 2016).

Similar observations of Oran xenophytes have been made in several Algerian cities, in particular Algiers (5 species) and some eastern coastal cities such as Bejaia (3 species), Annaba (3 species) and El Kala (2 species). The Oran xenophytes common to three or more towns are four in number: *Eleusine indica*, *Cenchrus longisetus*, *Galinsoga parviflora* and *Oxalis articulata*. The latter was seen in particular outside the urban environment during a study of lawns in the Tlemcen region of western Algeria (SEKKAL, 2019).

STATUS IN MAGHREB

Analysis of the status of xenophytes observed in the Maghreb (Algeria-Morocco-Tunisia) describes 3 types of species:

The naturalized species in the three countries are *Cenchrus longisetus, Ceratochloa unioloides, Euphorbia maculata, Euphorbia serpens, Nothoscordum × borbonicum* and *Tropaeolum majus. Amaranthus viridis* is a naturalized xenophyte in Tunisia, whereas in Morocco the species is present without this specification. *Amaranthus blitoides* has also become naturalised in Morocco and Tunisia but does not appear in Algeria.

The work of PYŠEK & al (2009) on invasive alien vascular plants in the Maghreb countries reports that the vegetation of Morocco, Algeria and Tunisia contains the most naturalized species, with 410, 328 and 225 species respectively.

The literature review carried out by MEDDOUR & al (2020) shows that a large proportion of alien species are naturalized (51%) (108 taxa), with around 16% (34 taxa) considered to be invasive or potentially invasive. In our list, only six xenophytes have the status of naturalized species in Algeria.

Weed species: *Eleusine indica* is a common weed in all three countries while *Galinsoga parviflora* is an Algerian-Tunisian weed that does not exist in Morocco. Whereas *Cenchrus longisetus* and *Oxalis articulata* have only acquired weed status in Tunisia.

Cultivated species: *Helianthus annuus* is cultivated in all three countries, but *Cenchrus longisetus* and *Panicum miliaceum* are only cultivated in Algeria and Morocco. *Freesia corymbosa* is cultivated in Algeria, but no data is available on this plant in the introduced flora of Morocco and Tunisia.

The analysis enabled us to note that Morocco and Tunisia share with Algeria almost all the xenophytes observed in Oran, with the exception of one species in Tunisia (*Freesia corymbosa*) and three species for Morocco (*Galinsoga parviflora*, *Oxalis articulata* and *Freesia corymbosa*).

ECOLOGY AND BIOLOGICALS TRAITES

With the exception of the geophyte *Nothoscordum × borbonicum,* the majority of the species observed are therophytes (8 species) while 5 species behave like hemicryptophytes (tab.2). This is in line with the results of the study by MEDDOUR & al (2020), which shows that the allochthonous flora of Algeria is dominated by annual plants (90 taxa, 43%). In fact, it is now widely accepted that therophyly, which means species with therophyte behaviour, is the form of life best adapted to habitats subject to disturbance (BALLELLI & PEDROTTI, 2009).

These xenophytes occupy the different biotopes chosen for the study (fig.5), from which we distinguish species that can occupy all environments, such as *Amaranthus viridis* and *Nothoscordum × borbonicum*. There are also species that have been observed only in gutters, such as *Panicum miliaceum*. The other species are found in two to three different biotopes. In general, pavements, gutters and tree feets are the most invaded biotopes.

Most of the plants introduced into the city of Oran reproduce sexually, with the exception of *Oxalis articulata*, which reproduces vegetatively, and 4 species that combine both sexual and vegetative reproduction, namely *Cenchrus longisetus*, *Nothoscordum × borbonicum, Tropaeolum majus and Freesia corymbosa* (tab. 2). While sexual propagation ensures the establishment of the species in areas far from the parent population, vegetative propagation ensures the maintenance and expansion of established populations, thus contributing to the production of dense, tightly-packed formations (DONG & al, 2006).

Species that combine two modes of reproduction, sexual and asexual, can spread rapidly in environments to become invasive (ALBERT & al, 2015).

The xenophytes recorded have several dispersal strategies (tab. 2), anemochory, anthropochory, autochory barochory, hydrochory and zoochory (epizoochory, myrmecochory). However, zoochory, barochory are the most frequent modes in our observations. Only *Euphorbia serpens* can disperse by myrmecochory and anthropochory.

On the other hand, two photosynthetic types dominate in these plants, C3 and C4 (tab. 2). The C4 pathway enables plants to withstand the stressful conditions of water scarcity and high temperatures (SCHILPEROORD, 2020).

Several biological traits need to be taken into account to help understand the presence of this type of plant in urban environments known for their disturbance, such as: prolonged germination, short life cycle, rapid growth, nitrophilia and high seed production rates.

These are traits that could facilitate the acquisition of the invasive character of introduced plants (REJMÁNEK & RICHARDSON, 1996). They are known in certain species of the *Amaranthus* genus such as *A. viridis* (BENSCH & al, 2003) which is a widespread species in the Oran agglomeration.

Plant invasions, as predicted by REJMÁNEK (1999), can occur if, on the one hand, the introduced plants belong to a genus that is not represented in the native flora and, on the other hand, they acquire weed status in their countries of origin, which increases the chances of colonisation of crops in the invaded continent. This is the case with *Galinsoga parviflora*, which is considered a weed in its native area South America and whose genus does not exist in our flora.

Private gardens and nurseries are also involved in introductions and invasions of introduced plants, from which they can escape and colonise natural environments (REICHARD & WHITE, 2001 ; SMITH & al, 2006). In Algeria, the case of *Oxalis pes-caprae* is a good example of these harmful escapes (SAKHRAOUI & al, 2019). *Oxalis articulata* has been introduced as an ornamental plant in many parts of the world, mainly in temperate or Mediterranean climates. It has become naturalised in Europe, Australia, North America (USA), Africa and Asia (PETROVA & VLADIMIROV, 2019).

Eleusine indica (JAUZEIN, 1995), *Euphorbia serpens* (PETROVA, 2018) and *Helianthus annuus* (SEILER & RIESEBERG, 1997), species introduced to Oran, have a certain capacity to adapt to habitats disturbed by human factors and appreciate development in an urban context.

CONCLUSION

The study of alien species in the urban area of Oran has enabled us to discover the presence of 14 new taxa, most of which originate from America. These plants have multiple biological and ecological traits that could facilitate their installation, adaptation and invasion of the urban environment, such as: therophyly, rapid growth, the combination of two types of sexual and vegetative reproduction, high seed production rates, the C4 photosynthetic type and nitrophilia.

Our work could be complemented by studies on the pathways by which these species were introduced and on changes in their status as a result of natural and anthropogenic factors. Permanent inventories of these plants are needed to update the existing lists of allochthonous flora in Algeria. These scientific efforts contribute essentially to the development of strategies for controlling plant invasions and combating their harmful impacts, which threaten natural habitats and indigenous flora.

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(Aceptado el 5-IX-2024)

Table 1: Some xenophytes of Oran city.

Taxonomy	Status in Alg.	Geographical origins	Status in Maghreb	Observation in Alg.	Mesh	Biotope	Life Forms	Rep. Type	Dissm. Type	Photos. type
Amaranthus blitoides S.Watson *AMARANTHACEAE*	No data	N. America	Mor.(Nat.), Tun. (Nat.)	No data	D15- K5	Gt. ; Pv. ; Tf.	Th.	Sexual	Epizoch.	C4
Amaranthus viridis L. *AMARANTHACEAE*	Presence. No precise status	C. America	Mor.,Tun. (Nat.)	Algiers	In every mesh	Pv. ; Gt.; Bw.; Tf.	Th.	Sexual	hydroch.	C4
Cenchrus longisetus M.C.Johnst. *POACEAE*	Nat.	E. Africa	Mor.(Cult./Nat.) Tun. (Wed./ Nat.)	Algiers, Annaba , Djidjel	G15- E11	Bw.; Pv.; Tf.	Hem.	Sexual Vegetative	Epizoch.	C4
Ceratochloa unioloides (Kunth.) Beauv. *POACEAE*	Nat.	S. America	Mor.(Nat.) Tun.(Nat.)	Algiers	K3	Gt.	Hem.	Sexual	Epizoch.	C3
Eleusine indica (L.) Gaertn. *POACEAE*	Wed.	Pantropical	Mor.(Wed.) Tun.(Wed.)	Algiers (Telemly, Hussein Dey) ; Annaba (port) ; El Tarf (Lac Oubeïra)	D15-K3-J4-K5-	Pv.; Gt.; Bw.	Th.	Sexual	Baroch.	C4
Euphorbia maculata L. *EUPHORBIACEAE*	Nat.	N. America	Mor. (Nat.) Tun. (Nat.)	Béjaia, El Tarf	D15	Tf.	Th.	Sexual	Myrmecoch.	C4
Euphorbia serpens Kunth *EUPHORBIACEAE*	Nat.	Tropical and subtro-pical America	Mor. (Nat.) Tun. (Nat.)	El Kala	H9-D15	Pv.	Th.	Sexual	Myrmecoch. Anthropoch.	C4
Freesia corymbosa (Burm. f.) N.E. Br. *IRIDACEAE*	Cult.	S. Africa	No data	No data	K3	Bw.	Hem.	Sexual Vegetative	Myrmecoch.	C3
Galinsoga parviflora Cav. *ASTERACEAE*	Wed.	S. America	Tun. (Wed.)	Annaba; Béjaia: Tlemcen (Saf-Saf)	E11	Pv.; Gt	Th.	Sexual	Anemoch.	C3
Helianthus annuus L. *ASTERACEAE*	Cult.	N. America	Mor.(Nat./Cul. Tun.(Cult.)		D15-K3	Gt.; Tf.	Th.	Sexual	Baroch.	C3
Nothoscordum × *borbonicum* Kunth *ALLIACEAE*	Nat.	N. America	Mor. (Nat.) Tun.(Nat.)	Algiers - M'Sila	K3 -L4-D15-K5-G12-F10	Pv.; Gt.; Bw.; Tf.	Geo	Sexual vegetative	Baroch.	C3
Oxalis articulata Savigny *OXALIDACEAE*	Cult.	S. America	Tun.(wed.)	Béjaia - El Kala - Sétif - Tlemcen	D15	Tf.	Hem.	Vegetative	Autoch.	C3
Panicum miliaceum L. *POACEAE*	Cult.	C. Asia	Mor.(Cult./Nat.) Tun.	No data	D15, L7, G12	Gt.	Th.	Sexual	Anemoch.	C4
Tropaeolum majus L. *TROPAEOLACEAE*	Nat.	S. America	Mor. (Nat.) Tun. (Nat.)	Sétif-Skikda	D13	Pv.	Hem.	Sexual vegetative	Hydroch.	C3

Legends: Biotopes: Bw = Bottom of walls, Gt. = Gutters, Pv.= Pavements, Tf. = Tree feets. Status: Cult. = Cultivated, Nat.= Naturalized, Wed.= Weed. Dissemination types: Anemoch.= Anemochory, Anthropoch. = Anthropochory, Autoch.= Autochory, Baroch. = barochory, Epizooch.= Epizoochory, Hydroch.= Hydrochory, Myrmecoch = Myrmecochory. Life forms: Geo = Geophyte, Hem. = Hemicryptophyte, Th = Therophyte. Photos type = Photosynthetic type. Mor.= Morocco, Tun.= Tunisia. Geographical origins: N.=North, S.=South, E. = East, C.= Central

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Fig. 1. Map of the Oran city 1:7500 (I.N.C.T., 2013).

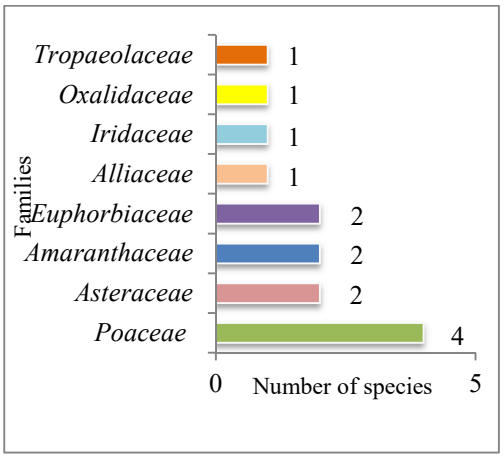


Fig.3. Taxonomy of Oran xenophytes.

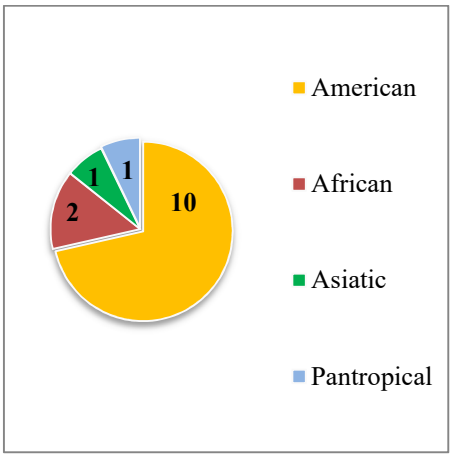


Fig.4. Geographical origin of Oran xenophytes.

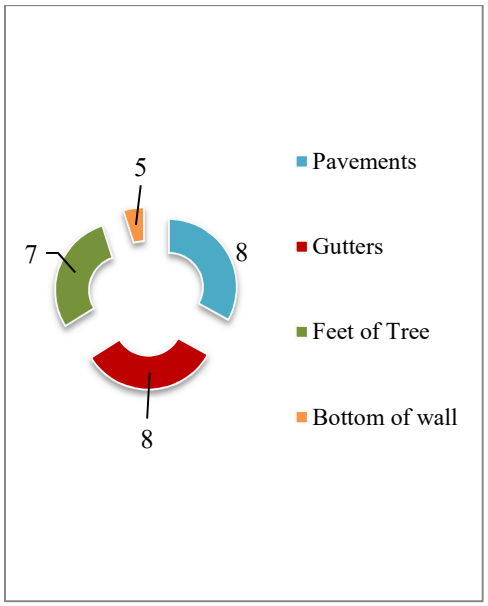


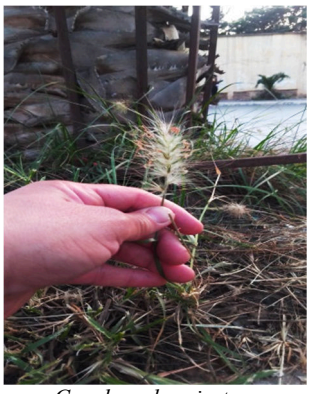
Fig. 5. Number of Oran xenophytes in different biotopes.

Biological traits	Number
Life Forms	
Th	8
Hém.	5
Géo.	1
Type of reproduction	
Sexual	9
Vegetative	1
Sexual and vegetative	4
Type of dissemination	
Anémochory	2
Anthropochory	1
Autochory	1
Barochory	3
Epizoochory	3
Hydrochory	2
Myrmécochory	3
Photosynthetic type	
C3	7
C4	7

Table 2. Biological traits of the xenophytes.


Amaranthus blitoides


Amaranthus viridis


Cenchrus longisetus


Ceratochloa unioloides


Eleusine indica


Euphorbia maculata

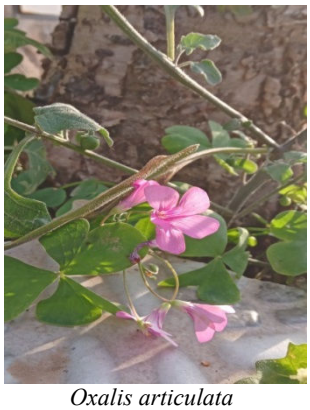

Euphorbia serpens


Freesia corymbosa


Galinsoga parviflora


Helianthus annuus


Nothoscordum × borbonicum


Oxalis articulata


Panicum miliaceum

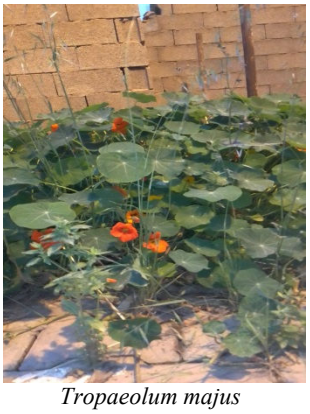

Tropaeolum majus

Fig.2: Photos of some xenophytes of Oran.

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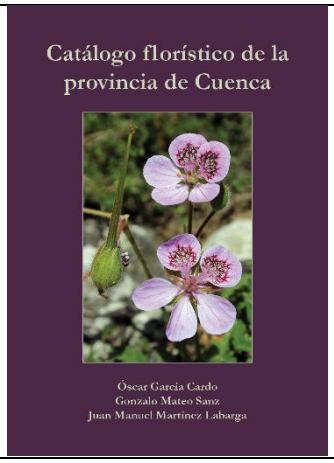

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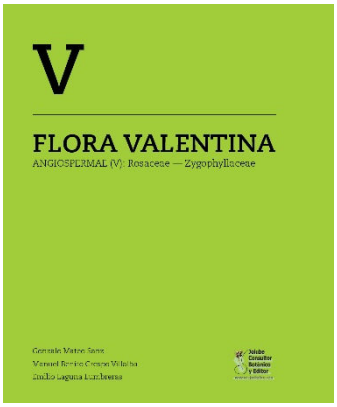

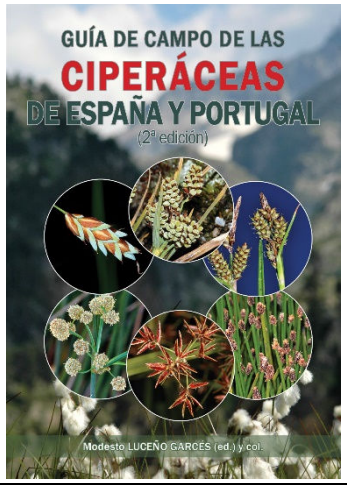

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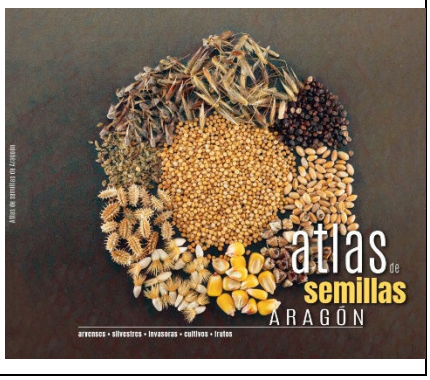

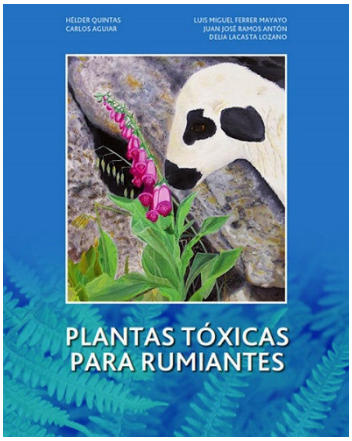

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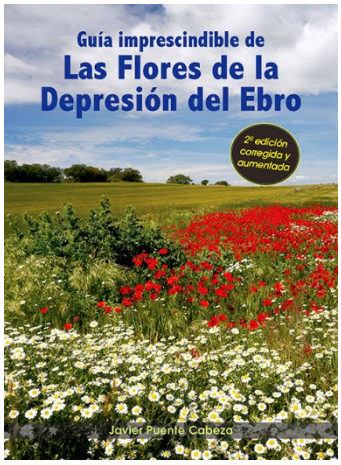

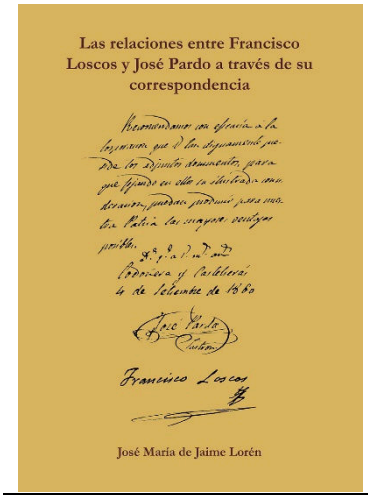

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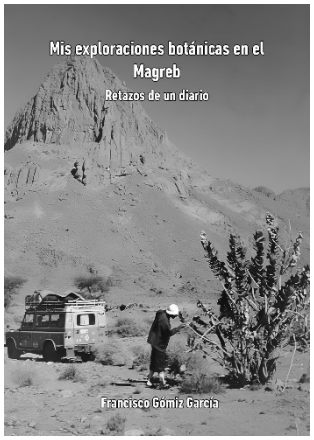

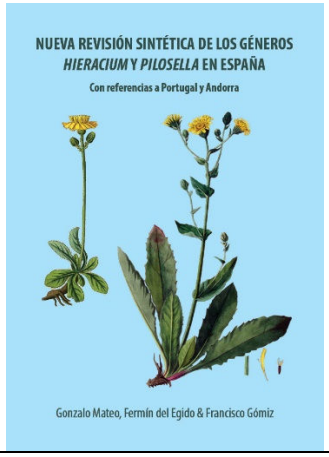

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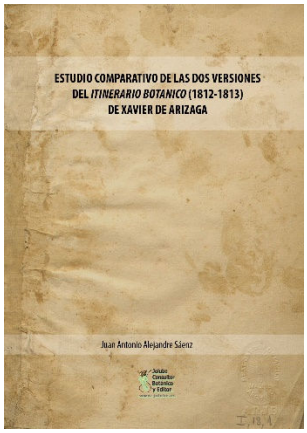

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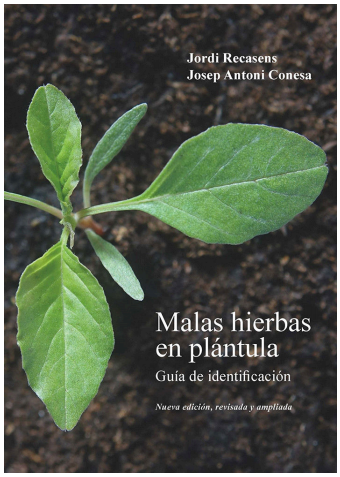

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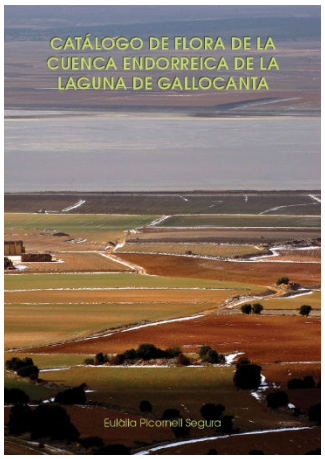

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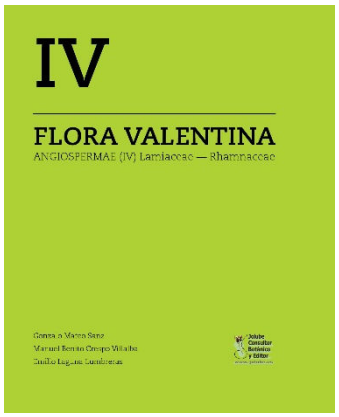

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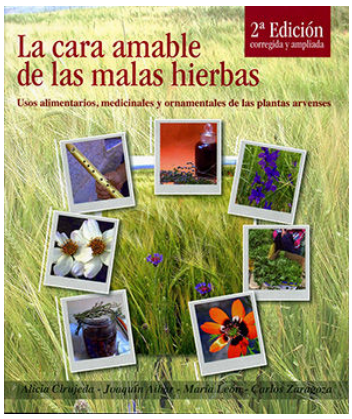

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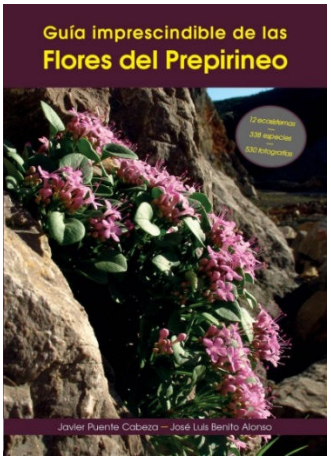

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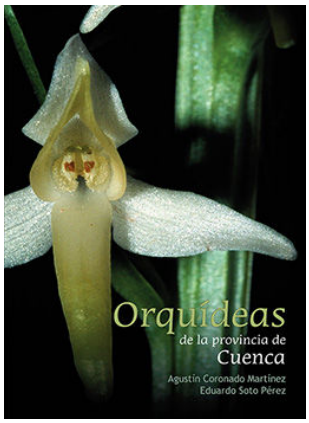

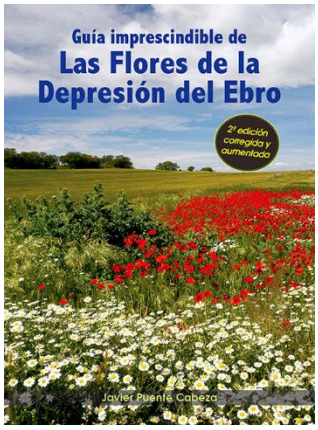

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