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Introduced species in Flora of Libya

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Highlights

- **Data reported in this paper showed that there are 361 introduced plant species (17.72% of the species recorded in flora of Libya).**
- **The reported species include; ornamental plants, windbreak trees, weeds, field crops, vegetables and forage crops.**
- **These species established and become part of the Libyan flora. Some of which are poisonous to humans or animals and some are a strong competitor or allopathic to local plants.**

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ABSTRACT

Introduced Species in Flora of Libya were reported in this study, the results showed of 361 species of introduced plants (17.72%) from the species recorded in the flora of Libya. These species belong to 253 genera and 89 families. Six of these families belong to gymnosperms and the rest belong to angiosperms. The recorded species were introduced for different purposes, such as food, fodder, ornamental, and windbreaks. These species established and become part of the Libyan flora. Some of which are poisonous to humans or animals and some are a strong competitor or allopathic to local plants. In this paper, a list of introduced species, the origin of these species, and the purpose of their introduction will be included.

1. Introduction

Introduced plant species are species transported by biotic and abiotic factors to an area outside its native range (Vilà, *et al.*, 1999). The introduction can be deliberate or accidental; deliberate introduction by humans takes place for economic reasons such as the introduction of crops and stock feed or environmental reasons such as the introduction of plants for erosion control and forestation, or aesthetic value such as ornamental plants (*Eucalyptus*, *Casuarina*). On the other hand, the accidental introduction may take place by both biotic factors (humans and animals) or abiotic factors (wind, water, and transportation means). Even though some of the introduced species have economic value, particularly those introduced deliberately by humans, others may have a drastic impact on the ecosystem if they further spread beyond the place of introduction and cause damage to nearby species, get out of control and become invasive (Mahklouf, 2019).

The flora of Libya contains 2103 species belonging to 856 genera and 155 families. Angiosperms represented by 2088 species, 844 genera, and 155 families. Gymnosperms represented by 15 species, 12 genera, and 10 families (Jafri, and Ali 1981; Klopper *et*

al., 2007). A considerable number of reported species are introduced either deliberately or accidentally (Vilà, *et al.*, 1999).

The work aimed to determine the number of introduced species in the flora of Libya, life forms, and the purpose of their introduction.

2. Materials and Methods

The study was based on the analysis works of literature deals with the flora of Libya (Ali & Jafri, 1976-1977; Jafri & EL-Gadi, 1977-1989), and related works of literature (Keith, 1965; Boulos, 1977; Boulos, 1979; Boulos & Jeffrey, 1979) by going through all the volumes (1-145) and listing all the families, which contain introduced species classification of species according to their life forms and purpose of the introduction.

3. Results and Discussion

Analysis of flora of Libya reveals the presence of 361 species of introduced plants (Table 1) (17.72 %) from the species recorded in the flora of Libya.

Table 1

Several species of introducing plants recorded in flora of Libya.

No	Species	Family	Life form	Life growth
1	<i>Abelmoschus esculentus</i> (L.) Moench.	Malvaceae	Annual or perennial	Herb
2	<i>Acacia cyanophylla</i> Lindley.	Mimosaceae	perennial	Shrub or small Tree
3	<i>Acacia farnesiana</i> (L.) Willd.	Mimosaceae	perennial	Shrub or small Tree
4	<i>Acacia karroo</i> Hayne.	Mimosaceae	perennial	Small Tree
5	<i>Acacia nilotica</i> (L.) Delile.	Mimosaceae	perennial	Small Tree
6	<i>Acacia tortilis</i> (Forsk.) Hayne.	Mimosaceae	perennial	Small Tree
7	<i>Acer negundo</i> L.	Aceraceae	perennial	Shrub
8	<i>Acokanthera oblongifolia</i> (Hochst.) L. E. Codd.	Apocynaceae	perennial	Shrub
9	<i>Adhatoda vasica</i> Nees.	Acanthaceae	perennial	Shrub
10	<i>Agave americana</i> L.	Agavaceae	Perennial	Herb
11	<i>Agave atrovirens</i> Karw.	Agavaceae	Perennial	Tree
12	<i>Agave attenuata</i> Salm- Dyck.	Agavaceae	Perennial	Herb
13	<i>Agave celsii</i> Hook.	Agavaceae	Perennial	Herb
14	<i>Agave ferox</i> C. Koch.	Agavaceae	Perennial	Tree
15	<i>Agave franzosinii</i> Baker.	Agavaceae	Perennial	Herb
16	<i>Agave kerchovei</i> Lem.	Agavaceae	Perennial	Herb
17	<i>Agave sisalana</i> Perrine ex Engelm.	Agavaceae	Perennial	Herb
18	<i>Aizoon canariense</i> L.	Aizoaceae	Annual or perennial	Herb
19	<i>Alcea rosea</i> L.	Malvaceae	perennial	Herb
20	<i>Allium cepa</i> L.	Alliaceae	Perennial	Herb
21	<i>Allium cepa</i> L. cv. Schallot	Alliaceae	Perennial	Herb
22	<i>Allium fistulosum</i> L.	Alliaceae	Perennial	Herb
23	<i>Allium sativum</i> L.	Alliaceae	Perennial	Herb
24	<i>Allium schoenoprasum</i> L.	Alliaceae	Perennial	Herb
25	<i>Amaranthus retroflexus</i> L.	Amaranthaceae	Annual	Herb
26	<i>Amaranthus tricolor</i> L.	Amaranthaceae	Annual	Herb
27	<i>Amygdalus communis</i> L.	Rosaceae	Perennial	Small Tree
28	<i>Anemone coronaria</i> L.	Ranunculaceae	perennial	Herb
29	<i>Anethum graveolens</i> L.	Apiaceae	Annual	Herb
30	<i>Annona cherimola</i> Mill.	Annonaceae	Perennial	Small Tree
31	<i>Anthyllis barba-jovis</i> L.	Fabaceae	Perennial	Shrub
32	<i>Antirrhinum majus</i> L.	Scrophulariaceae	perennial	Herb
33	<i>Aptenia cordifolia</i> (Linn. f.) N. E. Brown.	Aizoaceae	Perennial	Herb
34	<i>Arachis hypogea</i> L.	Fabaceae	Annual	Herb
35	<i>Araucaria excelsa</i> R. Br.	Araucariaceae	Perennial	Tree
36	<i>Aristolochia elegans</i> Masters.	Aristolochiaceae	Perennial	Herb climbing
37	<i>Armeniaca vulgaris</i> Lam.	Rosaceae	Perennial	Tree
38	<i>Armoracia rusticana</i> (Lam.) Gaertn.	Brassicaceae	Perennial	Herb
39	<i>Artemisia arborescens</i> L.	Asteraceae	Annual	Shrub
40	<i>Avena sativa</i> L.	Poaceae	Annual	Herb
41	<i>Begonia semperflorans</i> Link & Otto.	Begoniaceae	Perennial	Herb
42	<i>Bidens pilosa</i> L.	Asteraceae	Annual	Herb
43	<i>Bilderdykia baldschuanica</i> (Regel.) D. A.	Polygonaceae	perennial	climbing
44	<i>Blackiella inflata</i> (F. Muell.) Aellen.	Chenopodiaceae	Annual	Herb
45	<i>Boehmeria nivea</i> (L.) Gaudich.	Urticaceae	Perennial	Shrub
46	<i>Bombax ceiba</i> L.	Bombacaceae	Perennial	Tree
47	<i>Bougainvillea glabra</i> Choisy .	Nactaginaceae	perennial	Shrub climbing
48	<i>Bougainvillea spectabilis</i> Willd .	Nactaginaceae	perennial	Shrub climbing
49	<i>Brachychiton populneum</i> (Schott. &Endl.) R.Br.	Sterculiaceae	perennial	Tree
50	<i>Brassica juncea</i> (L.) Czern & Coss.	Brassicaceae	Annual or biennial	Herb
51	<i>Brassica napus</i> L.	Brassicaceae	Annual or biennial	Herb
52	<i>Brassica nigra</i> (L.) Koch.	Brassicaceae	Perennial	Herb
53	<i>Brassica oleracea</i> L.	Brassicaceae	Perennial or biennial	Herb
54	<i>Buddleja asiatica</i> Lour.	Buddlejaceae	perennial	Shrub or small Tree
55	<i>Caesalpinia gilliesii</i> (Hook.) Dietr.	Caesalpinaceae	perennial	Shrub
56	<i>Calendula officinalis</i> L.	Asteraceae	Annual	Herb
57	<i>Callistemon citrinus</i> (Curt.) Stapf.	Myrtaceae	Perennial	Tall Shrub
58	<i>Camelina sativa</i> (L.) Crantz.	Brassicaceae	Annual or biennial	Herb
59	<i>Campsis radicans</i> (L.) Seem.	Bignoniaceae	perennial	Shrub climbing
60	<i>Canna edulis</i> Ker- Gawler.	Cannaceae	perennial	Herb
61	<i>Canna indica</i> L.	Cannaceae	perennial	Herb
62	<i>Capsium annuum</i> L.	Solanaceae	Annual or perennial	Herb
63	<i>Capsium frutescens</i> L.	Solanaceae	perennial	Shrub
64	<i>Carpobrotus edulis</i> (L.) N.E.	Aizoaceae	Annual	Herb
65	<i>Carthamus tinctorius</i> L.	Asteraceae	Annual or biennial	Herb
66	<i>Carum carvi</i> L.	Apiaceae	Biennial	Herb
67	<i>Casimiroa edulis</i> Llave.	Rutaceae	Perennial	Tree
68	<i>Cassia occidentalis</i> L.	Caesalpinaceae	perennial	Small Shrub

Table 1 to be continued

69	<i>Casuarina cunninghamiana</i> Miq.	Casuarinaceae	perennial	Tree
70	<i>Casuarina decaisneana</i> F. Muell.	Casuarinaceae	perennial	Tree
71	<i>Casuarina equisetifolia</i> Forst.	Casuarinaceae	perennial	Tree
72	<i>Casuarina glauca</i> Sieb. ex Spreng.	Casuarinaceae	perennial	Small Tree
73	<i>Casuarina stricta</i> Ait.	Casuarinaceae	perennial	Shrub or small Tree
74	<i>Casuarina torulosa</i> Ait.	Casuarinaceae	perennial	Shrub or small Tree
75	<i>Catharanthus roseus</i> (L.) G. Don.	Apocynaceae	perennial	Shrub or Herb
76	<i>Celosia argentea</i> Linn.	Amaranthaceae	Annual	Herb
77	<i>Cenchrus incertus</i> M. A. Curtis.	Poaceae	Annual	Herb
78	<i>Cerasus avium</i> (L.) Moench	Rosaceae	Perennial	Tree
79	<i>Chamaerops humilis</i> L.	Arecaceae	Perennial	Tree
80	<i>Chamomilla racutita</i> (L.) Rauschert.	Asteraceae	Annual	Herb
81	<i>Chenopodium giganteum</i> D. Don.	Chenopodiaceae	Annual	Herb
82	<i>Chorisia crispiflora</i> H. B. & K.	Bombacaceae	Perennial	Tree
83	<i>Chrysanthemum carinatum</i> Schousboe.	Asteraceae	Annual	Herb
84	<i>Cicer arietinum</i> L.	Fabaceae	Annual	Herb
85	<i>Cichorium endivia</i> L.	Asteraceae	Annual or biennial	Herb
86	<i>Cichorium intybus</i> L.	Asteraceae	Perennial	Herb
87	<i>Cinnamomum camphora</i> (L.) T. Nees & berm.	Lauraceae	Perennial	Tree
88	<i>Citrullus lanatus</i> (Thumb.) Mansfeld.	Cucurbitaceae	Annual	Herb
89	<i>Citrus aurantifolia</i> (Christmann) Swingle.	Rutaceae	Perennial	Shrub or small tree
90	<i>Citrus aurantium</i> L.	Rutaceae	Perennial	Small tree
91	<i>Citrus deliciosa</i> Tenore.	Rutaceae	Perennial	Small tree
92	<i>Citrus grandis</i> (L.) Osbeck.	Rutaceae	Perennial	Tree
93	<i>Citrus limetta</i> Risso.	Rutaceae	Perennial	Shrub or small tree
94	<i>Citrus limonia</i> Osbeck.	Rutaceae	Perennial	Shrub or small tree
95	<i>Citrus medica</i> L.	Rutaceae	Perennial	Shrub or small tree
96	<i>Citrus paradisi</i> Macfadyen.	Rutaceae	Perennial	Small tree
97	<i>Citrus sinensis</i> (L.) Osbeck.	Rutaceae	Perennial	Tree
98	<i>Coleus scutellarioides</i> (L.) Benth.	Lamiaceae	Perennial	Herb
99	<i>Colubrina rufa</i> Reiss.	Rhamnaceae	Perennial	Erect shrub or small Tree
100	<i>Consolida ambigua</i> (L.) P. W. Ball & Heywood.	Ranunculaceae	Annual	Herb
101	<i>Corchorus olitorius</i> Linn.	Tiliaceae	Annual	Herb
102	<i>Cordia myxa</i> L.	Boraginaceae	perennial	Big Shrub or Tree
103	<i>Coriandrum sativum</i> L.	Apiaceae	Annual or biennial	Herb
104	<i>Crambe maritima</i> L.	Brassicaceae	Perennial	Herb
105	<i>Crassula lycopodioides</i> Lam.	Crassulaceae	perennial	Small Shrub
106	<i>Crataegus laevigata</i> (Poir) DC.	Rosaceae	Perennial	Shrub
107	<i>Crataegus mexicana</i> Moc.	Rosaceae	Perennial	Small Tree
108	<i>Crataegus pallasii</i> Griseb.	Rosaceae	Perennial	Shrub
109	<i>Crocus sativus</i> L.	Iridaceae	perennial	Herb
110	<i>Crotalaria juncea</i> L.	Fabaceae	Annual	Herb
111	<i>Cucumis anguria</i> L.	Cucurbitaceae	Annual	Herb
112	<i>Cucumis melo</i> L.	Cucurbitaceae	Annual	Herb
113	<i>Cucumis sativus</i> L.	Cucurbitaceae	Annual	Herb
114	<i>Cucurbita maxima</i> Duch.	Cucurbitaceae	Annual	Climbing
115	<i>Cucurbita moscata</i> (Duch.) Duch ex Poir.	Cucurbitaceae	Annual	Climbing
116	<i>Cucurbita pepo</i> L.	Cucurbitaceae	Annual	Climbing
117	<i>Cuminum cyminum</i> L.	Apiaceae	Annual	Herb
118	<i>Cycas revoluta</i> Thumb.	Cycadaceae	Perennial	Tree
119	<i>Cydonia oblonga</i> Mill.	Rosaceae	Perennial	Small Tree
120	<i>Cynara scolymus</i> L.	Asteraceae	Perennial	Herb
121	<i>Cyperus alternifolius</i> L.	Cyperaceae	Perennial	Herb
122	<i>Cyperus papyrus</i> L.	Cyperaceae	Perennial	Herb
123	<i>Datura arborea</i> L.	Solanaceae	perennial	Shrub or small Tree
124	<i>Datura fastuosa</i> Mill.	Solanaceae	Annual	Herb
125	<i>Daucus carota</i> L.	Apiaceae	Biennial	Herb
126	<i>Delonix regia</i> (Bojer.) Rafin.	Caesalpiniaceae	perennial	Large Tree
127	<i>Dianthus caryophyllus</i> L.	Caryophyllaceae	Perennial	Herb
128	<i>Dianthus chinensis</i> L.	Caryophyllaceae	Annual or perennial	Herb
129	<i>Dracaena draco</i> (L.) L.	Agavaceae	Perennial	Tree
130	<i>Duranta repens</i> L.	Verbenaceae	perennial	Shrub
131	<i>Eleusine coracana</i> (L.) Gaertn.	Poaceae	Annual	Herb
132	<i>Eragrostis tef</i> (zucc.) Trotter.	Poaceae	Annual	Herb
133	<i>Eriobotrya japonica</i> (Thumb.) Lindl.	Rosaceae	Perennial	Shrub or small tree
134	<i>Eschscholtzia California</i> Cham.	Papaveraceae	Perennial	Herb
135	<i>Esenbeckia leiocarpa</i> Engler.	Rutaceae	Perennial	Shrub or Tree
136	<i>Eucalyptus camaldulensis</i> Dehnhardt.	Myrtaceae	Perennial	Tree
137	<i>Eucalyptus cosmophylla</i> F. Muell.	Myrtaceae	Perennial	Tall Shrub or small Tree
138	<i>Eucalyptus erithrocorys</i> F. Muell.	Myrtaceae	Perennial	Tall Shrub or medium Tree

Table 1 to be continued

139	<i>Eucalyptus gomphocephala</i> DC. Prodr.	Myrtaceae	Perennial	Tall Tree
140	<i>Eucalyptus leucoxylon</i> F. Muell.	Myrtaceae	Perennial	Medium or tall Tree
141	<i>Eucalyptus leucoxylon</i> var <i>minor</i> F. Muell.	Myrtaceae	Perennial	Medium or tall Tree
142	<i>Eucalyptus rudris</i> Endl.	Myrtaceae	Perennial	Tree
143	<i>Euonymus japonicus</i> Thunb.	Celastraceae	Perennial	Shrub or small Tree
144	<i>Euphorbia heterophylla</i> L.	Euphorbiaceae	Annual	Herb
145	<i>Feijoa sellowiana</i> Berg.	Myrtaceae	Perennial	Shrub
146	<i>Ferula assa- foetida</i> L.	Apiaceae	Perennial	Herb
147	<i>Ficus retusa</i> L.	Moraceae	perennial	Shrub or Tree
148	<i>Fragaria vesca</i> L.	Rosaceae	Perennial	Herb
149	<i>Fraxinus excelsior</i> Linn.	Oleaceae	Perennial	Tree
150	<i>Furcraea selloa</i> C. Koch.	Agavaceae	Perennial	Herb
151	<i>Galinsoga parviflora</i> Cav.	Asteraceae	Annual	Herb
152	<i>Ginkgo biloba</i> L.	Cycadaceae	Perennial	Tree
153	<i>Gisekia pharnaceoides</i> Linn.	Molluginaceae	Annual	Herb
154	<i>Gomphrena globosa</i> L.	Amaranthaceae	Annual	Herb
155	<i>Gossypium arboreum</i> L.	Malvaceae	perennial	shrub or small tree
156	<i>Gossypium barbadense</i> L.	Malvaceae	Annual or perennial	Subshrub or Shrub
157	<i>Gossypium herbaceum</i> L.	Malvaceae	Perennial	Subshrub
158	<i>Gossypium hirsutum</i> L.	Malvaceae	Perennial	Subshrub
159	<i>Grevillea robusta</i> A. Cunn. ex R. Br.	Proteaceae	Perennial	Tree
160	<i>Gynandropsis gynandra</i> (L.) Briq.	Capparaceae	Annual	Herb
161	<i>Haloxylon aphyllum</i> (Minkw.) Iljin.	Chenopodiaceae	Perennial	Tall Shrub or small Tree
162	<i>Helianthus annuus</i> L.	Asteraceae	Perennial	Herb
163	<i>Helianthus tuberosus</i> L.	Asteraceae	Annual	Herb
164	<i>Heliotropium curassavicum</i> L.	Boraginaceae	perennial	Herb
165	<i>Hermodactylus tuberosus</i> (L.) Mill.	Iridaceae	perennial	Herb
166	<i>Hibiscus arnottianus</i> A. Gray.	Malvaceae	Perennial	Large shrub or small tree
167	<i>Hibiscus cannabinus</i> L.	Malvaceae	Annual or perennial	Herb
168	<i>Hibiscus mutabilis</i> L.	Malvaceae	Perennial	Large shrub or tree
169	<i>Hibiscus rosa-sinensis</i> L.	Malvaceae	Perennial	Large shrub or small tree
170	<i>Hibiscus sabdariffa</i> L.	Malvaceae	Annual	Herb
171	<i>Hibiscus schizopetalus</i> (Mast.) Hook.	Malvaceae	Perennial	Tall shrub
172	<i>Hibiscus trianum</i> L.	Malvaceae	Annual	Herb
173	<i>Hordeum distichon</i> L.	Poaceae	Annual	Herb
174	<i>Hordeum vulgare</i> L.	Poaceae	Annual	Herb
175	<i>Ipomoea batatas</i> (L.) Lam.	Convolvulaceae	Perennial	Herb
176	<i>Ipomoea hederacea</i> (L.) R. Jacq.	Convolvulaceae	Perennial	Herb Climbing
177	<i>Iris germanica</i> L.	Iridaceae	perennial	Herb
178	<i>Iris juncea</i> Poir.	Iridaceae	perennial	Herb
179	<i>Jacaranda ovalifolia</i> R.Br.	Bignoniaceae	perennial	Shrub or Tree
180	<i>Jacobinia spicigera</i> (Schlecht.) L. H. Bailey.	Acanthaceae	perennial	Shrub
181	<i>Jasminum azoricum</i> Linn.	Oleaceae	Perennial	Shrub Climbing
182	<i>Jasminum grandiflorum</i> Linn.	Oleaceae	Perennial	Large Shrub
183	<i>Jasminum mesnyi</i> Hance.	Oleaceae	Perennial	Shrub or Climbing
184	<i>Jasminum officinal</i> Linn.	Oleaceae	Perennial	Erect Shrub
185	<i>Jasminum samloac</i> (Linn.) Soland.	Oleaceae	Perennial	Sub erect Shrub or Climbing
186	<i>Juglans regia</i> L.	Juglandaceae	perennial	Tree
187	<i>Kochia scoparia</i> (L.) Schrad.	Chenopodiaceae	Annual	Herb
188	<i>Lablab purpureus</i> (L.) Sweet	Fabaceae	Annual or perennial	Herb
189	<i>Lactuca sativa</i> L.	Asteraceae	Annual or biennial	Herb
190	<i>Lactuca serriola</i> L.	Asteraceae	Annual or biennial	Herb
191	<i>Lagenaria siceraria</i> (Molina.) Standley.	Cucurbitaceae	Annual	Climbing
192	<i>Lagerstroemia indica</i> L.	Lythraceae	perennial	Shrub or Tree
193	<i>Lagunaria patersonii</i> G. Don.	Malvaceae	Perennial	Tree
194	<i>Lantana camara</i> L.	Verbenaceae	perennial	Shrub
195	<i>Lathyrus odoratus</i> L.	Fabaceae	Annual	Herb
196	<i>Lathyrus sativus</i> L.	Fabaceae	Annual	Herb
197	<i>Laurocerasus officinalis</i> Roem.	Rosaceae	Perennial	Shrub
198	<i>Laurus azorica</i> (Seub.) J.A.	Lauraceae	Perennial	Shrub or Tree
199	<i>Lens culinaris</i> Medic.	Fabaceae	Annual	Herb
200	<i>Ligustrum lucidum</i> Ait.	Oleaceae	Perennial	Tall Shrub or Tree
201	<i>Ligustrum ovalifolium</i> Hassk.	Oleaceae	Perennial	Erect Shrub
202	<i>Linum usitatissimum</i> L.	Linaceae	Annual or biennial	Herb
203	<i>Lippia triphylla</i> (L. Herit.) Kuntze.	Verbenaceae	perennial	Shrub or small Tree
204	<i>Luffa cylindrica</i> (L.) M. Roem.	Cucurbitaceae	Annual	Climbing
205	<i>Lupinus albus</i> L.	Fabaceae	Annual	Herb
206	<i>Lyeopersicon esculentum</i> Mill.	Solanaceae	Annual	Herb
207	<i>Malus angustifolia</i> Minchx.	Rosaceae	Perennial	Small Tree
208	<i>Malus sylvestris</i> Mill.	Rosaceae	Perennial	Tree

Table 1 to be continued

209	<i>Malva verticillata</i> L.	Malvaceae	Annual	Herb
210	<i>Malvaviscus arboreus</i> Cav. Diss.	Malvaceae	Perennial	Large shrub or small tree
211	<i>Malvaviscus arboreus</i> Cav. Diss. var. <i>penduliformis</i> (DC.) Schrey.	Malvaceae	Perennial	Large shrub or small tree
212	<i>Matthiola incana</i> (L.) R. Br.	Brassicaceae	Perennial	Herb
213	<i>Medicago lupulina</i> L.	Fabaceae	Perennial	Herb
214	<i>Medicago sativa</i> L.	Fabaceae	Perennial	Herb
215	<i>Melaleuca preissiana</i> Schau.	Myrtaceae	Perennial	Tall Shrub or small Tree
216	<i>Melia azedarach</i> L.	Meliaceae	perennial	Tree
217	<i>Melilotus officinalis</i> (L.) Pall.	Fabaceae	Annual	Herb
218	<i>Mentha piperata</i> L.	Lamiaceae	Perennial	Herb
219	<i>Mentha spicata</i> L.	Lamiaceae	Perennial	Herb
220	<i>Mesembryanthemum crystallinum</i> L.	Aizoaceae	Annual	Herb
221	<i>Mirabilis jalapa</i> L.	Nactaginaceae	perennial	Herb
222	<i>Mollugo cerviana</i> (Linn.) Ser.	Molluginaceae	Annual	Herb
223	<i>Mollugo nudicaulis</i> Lam.	Molluginaceae	Annual	Herb
224	<i>Momordica balsamina</i> L.	Cucurbitaceae	Annual or perennial	Climbing
225	<i>Momordica charantia</i> L.	Cucurbitaceae	Annual or perennial	Climbing
226	<i>Morus alba</i> L.	Moraceae	perennial	Tree
227	<i>Morus nigra</i> L.	Moraceae	perennial	Tree
228	<i>Musa nana</i> Lour.	Musaceae	Perennial	Shrub
229	<i>Myoporum serratum</i> R. Br. Prod	Mypopraceae	perennial	Shrub or small Tree
230	<i>Nectandra grandiflora</i> Nees & Eberm ex Nees.	Lauraceae	Perennial	Tree
231	<i>Nicodemia madagascariensis</i> (Lamk.) Parker.	Buddlejaceae	perennial	Shrub
232	<i>Nicotina rustica</i> L.	Solanaceae	Annual	Herb
233	<i>Nicotina tabacum</i> L.	Solanaceae	Annual	Herb
234	<i>Nigella sativa</i> L.	Ranunculaceae	Annual	Herb
235	<i>Nymphaea odorata</i> Soland.	Nymphaeaceae	perennial	Herb
236	<i>Ocimum basilicum</i> L.	Lamiaceae	Perennial	Herb
237	<i>Onyza bonariensis</i> (L.) Cornq.	Asteraceae	Annual	Herb
238	<i>Onyza canadensis</i> (L.) Cornq.	Asteraceae	Annual	Herb
239	<i>Opuntia imbricata</i> DC.	Cactaceae	perennial	Shrub or Tree
240	<i>Opuntia tuna</i> Mill.	Cactaceae	perennial	Shrub
241	<i>Origanum vulgare</i> L.	Lamiaceae	Perennial	Herb
242	<i>Oryza sativa</i> L.	Poaceae	Annual	Herb
243	<i>Oxalis articulata</i> Savigny.	Oxalidaceae	perennial	Herb
244	<i>Paliurus spina-christi</i> Mill.	Rhamnaceae	Perennial	Shrub
245	<i>Panicum miliaceum</i> L.	Poaceae	Annual	Herb
246	<i>Papaver somniferum</i> L.	Papaveraceae	Annual	Herb
247	<i>Parkinsonia aculeata</i> L.	Caesalpiniaceae	perennial	Shrub or small Tree
248	<i>Passiflora coerulea</i> L.	Passifloraceae	perennial	Shrub
249	<i>Peganum harmala</i> L.	Zygophyllaceae	Perennial	Herb
250	<i>Pelargonium grandiflorum</i> (And.) Willd.	Geraniaceae	Perennial	Shrub
251	<i>Pelargonium odoratissimum</i> (L.) Solard.	Geraniaceae	perennial	Herb
252	<i>Pelargonium peltatum</i> (L.) Soland.	Geraniaceae	Annual or perennial	Herb
253	<i>Pelargonium radula</i> (Cav.) L Her.	Geraniaceae	Perennial	Shrub
254	<i>Pennisetum americanum</i> (L.) Schumann.	Poaceae	Annual	Herb
255	<i>Persea americana</i> Mill.	Lauraceae	Perennial	Tree
256	<i>Persica vulgaris</i> Mill	Rosaceae	Perennial	Large shrub or small tree
257	<i>Petunia hybrida</i> Hort .	Solanaceae	Annual or perennial	Herb
258	<i>Phaseolus vulgaris</i> L.	Fabaceae	Annual	Herb
259	<i>Phlox drummondii</i> W. J. Hook.	Polemoniaceae	Annual	Herb
260	<i>Phoenix canariensis</i> Chabaud.	Arecaceae	Perennial	Tree
261	<i>Photinia serrulata</i> Lindl.	Rosaceae	Perennial	Small Tree
262	<i>Physalis peruviana</i> L.	Solanaceae	perennial	Herb
263	<i>Phytolacca dioica</i> Lour.	Phytolaccaceae	Perennial	Tree
264	<i>Pinus canariensis</i> Sweet ex Sprengel.	Pinaceae	Perennial	Tree
265	<i>Pistacia vera</i> L.	Anacardiaceae	Perennial	Shrub or small tree
266	<i>Pisum sativum</i> L.	Fabaceae	Annual	Herb climbing
267	<i>Plantago major</i> Sp.	Plantaginaceae	perennial	Herb
268	<i>Plumbago auriculata</i> Lam.	Plumbaginaceae	Perennial	Shrub climbing
269	<i>Plumeria acutifolia</i> Poir .	Apocynaceae	perennial	Shrub or small Tree
270	<i>Poa pratensis</i> L.	Poaceae	Annual	Herb
271	<i>Polianthes tuberosa</i> L.	Agavaceae	Perennial	Herb
272	<i>Populus x canadensis</i> Moench.	Salicaceae	Perennial	Tree
273	<i>Portulaca grandiflora</i> Hook.	Portulacaceae	perennial	Herb
274	<i>Prosopis juliflora</i> (Swarlz) DC.	Mimosaceae	perennial	Shrub
275	<i>Prunus cerasifera</i> Ehrh.	Rosaceae	Perennial	Small Tree
276	<i>Prunus domestica</i> L.	Rosaceae	Perennial	Small Tree
277	<i>Prunus japonica</i> Thunb.	Rosaceae	Perennial	Shrub
278	<i>Prunus nigra</i> Ait.	Rosaceae	Perennial	Shrub

Table 1 to be continued

279	<i>Psidium guajava</i> L.	Myrtaceae	Perennial	Shrub or small Tree
280	<i>Pyrus communis</i> L.	Rosaceae	Perennial	Tree
281	<i>Quercus faginea</i> Lam.	Fagaceae	Perennial	Tree
282	<i>Quercus suber</i> L.	Fagaceae	Perennial	Tree
283	<i>Raphanus raphanistrum</i> L.	Brassicaceae	Annual	Herb
284	<i>Raphanus sativus</i> L.	Brassicaceae	Annual or biennial	Herb
285	<i>Raphiolepis indica</i> (L.) Lindl.	Rosaceae	Perennial	Shrub
286	<i>Rhoeo spathacea</i> (Swartz.) Stearn.	Commelinaceae	Perennial	Herb
287	<i>Ricinus communis</i> L.	Euphorbiaceae	perennial	Shrub
288	<i>Rorippa islandica</i> (Oeder.) Borbas.	Brassicaceae	Annual or biennial	Herb
289	<i>Rosa damascena</i> Mill.	Rosaceae	Perennial	Shrub
290	<i>Rosa gallica</i> L.	Rosaceae	Perennial	Low Shrub
291	<i>Rubia tinctorum</i> L.	Rubiaceae	perennial	Herb
292	<i>Rumex lunaria</i> L.	Polygonaceae	perennial	Shrub
293	<i>Ruscus hypophyllum</i> L.	Liliaceae	Perennial	Shrub
294	<i>Ruta graveolens</i> L.	Rutaceae	Perennial	Herb
295	<i>Saccharum officinarum</i> L.	Poaceae	Perennial	Shrub
296	<i>Salix babylonica</i> L.	Salicaceae	Perennial	Tree
297	<i>Salvia coccinea</i> Etlinger.	Lamiaceae	Annual or biennial	Herb
298	<i>Salvia splendens</i> Sellow ex Roem.	Lamiaceae	Perennial	Herb
299	<i>Sansevieria zeylanica</i> Willd var <i>laurentii</i> Hort.	Agavaceae	Perennial	Herb
300	<i>Schinus molle</i> L.	Anacardiaceae	Perennial	Shrub or medium tree
301	<i>Schinus terebinthifolius</i> Raddi.	Anacardiaceae	Perennial	Shrub or medium tree
302	<i>Scolymus hispanicus</i> L.	Asteraceae	Annual or biennial	Herb
303	<i>Scorzonera hispanica</i> L.	Asteraceae	Perennial	Herb
304	<i>Secale cereale</i> L.	Poaceae	Annual	Herb
305	<i>Sechium edule</i> Swartz.	Cucurbitaceae	Annual	Herb
306	<i>Senecio angulata</i> L.	Asteraceae	Annual	Herb climbing
307	<i>Senecio vulgaris</i> L.	Asteraceae	Annual	Herb
308	<i>Sesamum indicum</i> Lnn.	Pedaliaceae	Annual	Herb
309	<i>Setaria italica</i> (L.) P. Beauv.	Poaceae	Annual	Herb
310	<i>Setcreasea purpurea</i> (Schau.) Boom.	Commelinaceae	Perennial	Herb
311	<i>Silene gallica</i> L.	Caryophyllaceae	Annual	Herb
312	<i>Silene rubella</i> L.	Caryophyllaceae	Annual	Herb
313	<i>Sisymbrium officinale</i> (L.) Scop.	Brassicaceae	Annual or biennial	Herb
314	<i>Solanum melongena</i> L.	Solanaceae	perennial	Herb
315	<i>Solanum sublobatum</i> L.	Solanaceae	perennial	Herb
316	<i>Solanum tuberosum</i> L.	Solanaceae	Annual or perennial	Herb
317	<i>Sorghum bicolor</i> (L.) Moench.	Poaceae	Annual or perennial	Herb
318	<i>Sorghum sudanense</i> (Piper.) Stapf.	Poaceae	Annual	Herb
319	<i>Sphaeralcea umbellata</i> (Cav.) G. Don.	Malvaceae	Perennial	Shrub
320	<i>Spinacia oleracea</i> L.	Chenopodiaceae	Annual	Herb
321	<i>Strelitzia reginae</i> Banks.	Strelitzaceae	perennial	Herb
322	<i>Syringa vulgaris</i> L.	Oleaceae	Perennial	Shrub or Tree
323	<i>Tamarindus indica</i> L.	Caesalpiniaceae	perennial	Large Tree
324	<i>Tamarix ramosissima</i> Ledeb.	Tamaricaceae	Annual or perennial	Shrub or small Tree
325	<i>Tanacetum parthenium</i> (L.) Schultz.	Asteraceae	Annual	Herb
326	<i>Taraxacum turcicum</i> Van.	Asteraceae	Perennial	Herb
327	<i>Tecoma stans</i> Juss.	Bignoniaceae	perennial	Shrub
328	<i>Tecoma stans</i> Juss. var. <i>mollis</i> (H. B. & K.) Siddiqi	Bignoniaceae	perennial	Shrub
329	<i>Tecomaria capensis</i> (Thunb.) Spach.	Bignoniaceae	perennial	Shrub
330	<i>Tetragonia tetragonoides</i> (Pallas.) O.	Tetragoniaceae	Annual or perennial	Herb
331	<i>Thevetia yccootli</i> DC .	Apocynaceae	perennial	Shrub or small Tree
332	<i>Thuja orientalis</i> L.	Cupressaceae	Perennial	Shrub or Tree
333	<i>Tilia platyphyllos</i> Scop.	Tiliaceae	Perennial	Tree
334	<i>Trachelospermum jasminoides</i> Lem .	Apocynaceae	perennial	Shrub climbing
335	<i>Tradescantia albiflora</i> Kunth .	Commelinaceae	Perennial	Herb
336	<i>Tradescantia fluminensis</i> Vell.	Commelinaceae	Perennial	Herb
337	<i>Triticum aestivum</i> L.	Poaceae	Annual	Herb
338	<i>Triticum compactum</i> Host.	Poaceae	Annual	Herb
339	<i>Triticum durum</i> Desf.	Poaceae	Annual	Herb
340	<i>Triticum polonicum</i> L.	Poaceae	Annual	Herb
341	<i>Triticum spelta</i> L.	Poaceae	Annual	Herb
342	<i>Tropaeolum majus</i> L.	Tropaeolaceae	perennial	Herb
343	<i>Ulmus umbraculifera</i> (Trautv.) Zielinski.	Ulmaceae	perennial	Tree
344	<i>Ventilago viminalis</i> Hook.	Rhamnaceae	Perennial	Climbing shrub or Tree
345	<i>Verbena tenuisecta</i> Briq .	Verbenaceae	perennial	Herb
346	<i>Veronica hederifolia</i> L.	Scrophulariaceae	Annual	Herb
347	<i>Veronica persica</i> Poiret	Scrophulariaceae	Annual	Herb
348	<i>Veronica polita</i> Fries.	Scrophulariaceae	Annual	Herb

Table 1 to be continued

349	<i>Vicia faba</i> L.	Fabaceae	Annual	Herb
350	<i>Vigna unguiculata</i> (L.) Walp	Fabaceae	Annual	Herb
351	<i>Vitex agnus-castus</i> L.	Verbenaceae	perennial	Shrub
352	<i>Vitis labrusca</i> L.	Vitaceae	perennial	Herb climbing
353	<i>Vitis vinifera</i> L.	Vitaceae	perennial	Herb climbing
354	<i>Xanthium spinosum</i> L.	Asteraceae	Annual	Herb
355	<i>Yucca aloifolia</i> L.	Agavaceae	Perennial	Tree
356	<i>Yucca gloriosa</i> L.	Agavaceae	Perennial	Tree
357	<i>Zaleya pentandra</i> (L.) Jeffrey	Aizoaceae	Annual or perennial	Herb
358	<i>Zea mays</i> L.	Poaceae	Perennial	Shrub
359	<i>Zebrina pendula</i> Schnizl.	Commelinaceae	Perennial	Herb
360	<i>Ziziphus spina-christi</i> Mill.	Rhamnaceae	Perennial	Small Tree
361	<i>Ziziphus jujube</i> Mill.	Rhamnaceae	Perennial	Shrub or Tree

Species arranged alphabetically. These species belong to 253 genera and 89 families (Table 2).

Table 2

A number of families, genera, and species of introducing plants recorded in flora of Libya.

No.	Family	Number of Genera	Number of Species	No.	Family	Number of Genera	Number of Species
1	Acanthaceae	2	2	43	Liliaceae	1	1
2	Aceraceae	1	1	44	Lythraceae	1	1
3	Aizoaceae	4	4	45	Malvaceae	7	15
4	Agavaceae	6	14	46	Meliaceae	1	1
5	Alliaceae	1	5	47	Mimosaceae	2	6
6	Amaranthaceae	3	4	48	Molluginaceae	2	2
7	Anacardiaceae	2	3	49	Moraceae	2	3
8	Annonaceae	1	1	50	Myoporaceae	1	1
9	Apiaceae	8	8	51	Myrtaceae	5	11
10	Apocynaceae	5	5	52	Musaceae	1	1
11	Araucariaceae	1	1	53	Nactaginaceae	2	3
12	Arecaceae	2	2	54	Nymphaeaceae	1	1
13	Aristolochiaceae	1	1	55	Oleaceae	4	8
14	Asteraceae	18	23	56	Papaveraceae	2	2
15	Begoniaceae	1	1	57	Passifloraceae	1	1
16	Bignoniaceae	4	5	58	Pedaliaceae	1	1
17	Bombacaceae	2	2	59	Pinaceae	1	1
18	Boraginaceae	2	2	60	Plantaginaceae	1	1
19	Brassicaceae	8	12	61	Plumbaginaceae	1	1
20	Buddlejaceae	2	2	62	Poaceae	15	21
21	Caesalpiniaceae	5	5	63	Polemoniaceae	1	1
22	Cactaceae	1	1	64	Polygonaceae	2	2
23	Cannaceae	1	1	65	Portulacaceae	1	1
24	Capparaceae	1	1	66	Proteaceae	1	1
25	Caryophyllaceae	2	4	67	Phytolaccaceae	1	1
26	Casuarinaceae	1	6	68	Ranunculaceae	3	3
27	Celastraceae	1	1	69	Resedaceae	1	1
28	Chenopodiaceae	5	5	70	Rhamnaceae	4	5
29	Crassulaceae	1	1	71	Rosaceae	15	22
30	Commelinaceae	4	5	72	Rutaceae	4	12
31	Convolvulaceae	1	2	73	Salicaceae	1	2
32	Cycadaceae	2	2	74	Scrophulariaceae	3	6
33	Cyperaceae	1	2	75	Solanaceae	7	11
34	Cucurbitaceae	7	12	76	Sterculiaceae	1	1
35	Cupressaceae	1	1	77	Strelitzaceae	1	1
36	Euphorbiaceae	2	2	78	Tamaricaceae	1	1
37	Fabaceae	14	16	79	Tiliaceae	2	2
38	Geraniaceae	2	4	80	Tropaeolaceae	1	1
39	Iridaceae	3	4	81	Ulmaceae	1	1
40	Juglandaceae	1	1	82	Urticaceae	1	1
41	Lamiaceae	5	8	83	Verbenaceae	5	5
42	Lauraceae	4	4	84	Vitaceae	1	2
				85	Zygophyllaceae	1	1
					Total	352	361

Six of the above-mentioned families belong to gymnosperms and the rest belong to angiosperms (Table 3).

Table 3

Classification of the introduced species of recorded in flora of Libya

No.	Plant groups	No. of Species	No. of Genera	No. of Families
1	Gymnosperms	3	3	3
2	Angiosperms	358	250	86
3	Dicotyledons	322	226	79
4	Monocotyledons	36	24	7
	Total	361	253	89

The introduced species recorded in the flora of Libya belong to different life forms; 240 species are perennials (66.48%); 88 annuals (66.48%); 16 annuals and perennials (66.48%); 14 annuals and biennials (66.48%); 2 biennials (0.27%); and one is biennials and perennials (0.48%) (Fig. 1).

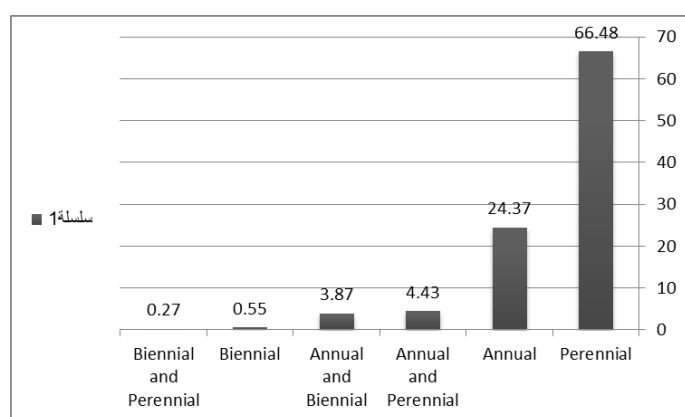


Fig. 1. Life forms of introduced species of recorded in flora of Libya

Most of the recorded species were deliberately introduced for different purpose such as reforestation (*Acacia nilotica* (L.) Delile., *Casuarina equisetifolia* Forst., *Eucalyptus gomphocephala* DC. Prodr., *Pinus canariensis* Sweet ex Sprengel.), food (*Amygdalus communis* L., *Momordica charantia* L., *Cucumis melo* L., *Allium sativum* L.) forage (*Sorghum sudanense* (Piper.) Stapf., *Medicago sativa* L., *Poa pratensis* L., *Brassica nigra* (L.) Koch.), ornamental (*Oxalis articulata* Savigny., *Hibiscus schizopetalus* (Mast.) Hook., *Datura arborea* L., *Myoporum serratum* R. Br. Prod), medicinal (*Tamarindus indica* L., *Salix babylonica* L., *Anethum graveolens* L. *Papaver somniferum* L., *Boehmeria nivea* (L.) Gaudich.), or multipurpose (*Vitex agnus-castus* L., *Melia azedarach* L., *Crocus sativus* L., *Nigella sativa* L., *Bombax ceiba* L.). Some of the recorded species accidentally introduced became invasive species such as weeds and were found to cause great losses for cultivated crops through competition with crops such as (*Cyperus alternifolius* L., *Senecio vulgaris* L., *Conyza canadensis* (L.) Cornq., *Silene gallica* L., *Euphorbia heterophylla* L.,

Veronica persica Poiret., *Cassia occidentalis* L., *Amaranthus retroflexus* L., *Raphanus raphanistrum* L., *Cenchrus incertus* M. A. Curtis., *Bidens pilosa* L. *Xanthium spinosum* L.) (Table 4).

Table 4

Purpose of the introduction of different species recorded in flora of Libya

No.	Uses	Number of species
1	Ornamental	174
2	Multipurpose	35
3	Food	132
4	Medicine	27
5	Extracting oil or aromatic oil	19
6	Forge for animal	10
7	Weed	11
8	Wood	10
9	Fibers	4
10	Chewing tobacco	2
11	Fuel hat	1
12	Dye	1

Finally, this study revealed that the number of species, which may be considered as invasive species, is eleven species (about 3% of the total number of introduced plant species recorded in the flora of Libya, all these species are weeds.

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