

SEED HERBARIUM OF SOME COMMON WEEDS IN EGYPT

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Abstract

Seed identification of 40 common weed species belonging to 20 families, and 38 genera that is very necessary for researchers, farmers, seed production industry and detection of weed seeds in imported or exported plant materials in quarantine work was conducted at the Weed Research Laboratory, in Giza. Full mature specimens of weed seeds were collected from the farms of Shandaweel, Sids, El Serw research stations during 2008/2009 winter and 2010 summer seasons. Description was depending on seed surface, colour, size and shape, family name and taxonomical names. Surface type identification of seeds of these species was recorded according to the scheme adapted from Murley (1951). Seeds were scanned and their pictures included in the text. Such seeds were used as a nucleus of weed seed herbarium of Weed Research Laboratory in Giza which will play as a backbone of visual comparison in weed identification process. Seed herbarium is arranged alphabetically according to families, genera and species for identifying unknown weed seeds in imported grains.

INTRODUCTION

The first step in integrated weed control is the correct identification of weed species, seed bank size in the soil, their density and distribution in the field, where weed seeds are considered the most important agency for the introduction of weeds.

Descriptive botanical terms appropriate to each case are used in the description and identification of seeds. The description of color is according to Stearn (1966) adapted from Saad (1980), there are more than 115 terms, falling in 13 groups for the colour patterns exhibited by plants. These groups are: colorless, white, gray, black, brown, yellow, orange, green, vague and variegation.

On the other hand, for defining the solid form of plants 101 terms are used, according to Stearn, (1966) adapted from Saad (1980) in seed description, for example: conical, prism-shaped, globose cylindrical, cubical, pear-shaped, lens-shaped spindle-shaped, terete, compressed, depressed, discoidal, falcate, angular, trigonous, triquetrate, aneuploid, bladder, etc.

According to surface and appendages, Murley (1951), pictured 29 characters exhibited by the surface of seeds. They are, lineolate, lineate, striate, sulcate, ribbed, undulate, areolate, reticulate-areolate, scalariform, glabulate, favulariate, rugose, ruminant, falsifoveate scrobiculate, foveate foveolate, reticulate- foveate, reticulate, alveolate, punctulate, punctuate, granulate, tuberculate, pustulate, colliculate,

aculeate, verrucate and ocellate. On the other hand, Stearn (1966) enumerated 15 characters for the markings or evenness of seed surface. They include the terms: rugose, netted, half-netted, pitted, lacunose, honey combed, areolate, scarred, ringed, striated, lined, furrowed, aciculated, doted and even. As for, the hair covering and superficial processes, Stearn (1966) recorded 34 terms. Examples are: unarmed, spiny, prickly, bristly, muricated, apiculate, rough, tuberculated, hairy, downy, hoary, shaggy, tomentose, velvety, wooly, hispid flaccose, glanular beaded, strigose, mealy, scaly, silky, cobwebbed, ciliated, fringed, feathery, stinging, leprous, chaffy, etc. As to polish or texture the following terms are used: shining smooth, polished, glittering opaque, viscid, mucous or slimy, greasy, dewy, dusty, powdery, glaucous, whitened (Stearn 1966).

Many researchers as Delorit (1970), Bischof (1978), Saad (1980), Stucky et al. (1981), Davis (1993) and Kholousy et al (2002), gave description of weed seeds depending on size, colour and surface characteristics. As for, the texture or substance, Stearn (1966) enumerated 25 terms. They include memberaneous, corky, spongy, horny, oleaginous, fleshy, waxy, woody, succulent, gelatinouos, mealy etc.

The objective of this work was to identify weed seeds encountered crop yields in Egypt.

MATERIALS AND METHODS

1- Source of the seeds :-

Full mature seed specimens of 40 weed species were collected by 50 g in paper bags, identified according to Tackholm, (1974) from Shandaweel , Sids and El Serw research stations during 2008/2009 winter and 2010 summer seasons. Scientific and common names of those are shown in the results.

2- Weed seeds identification:-

Seed description was carried depending on seed surface according to Figure A adapted from Murley (1951) and Stearn (1966),Bayer, Saad (1980) and Mousa et al. (2008). Seeds were inspected by magnification lens, microscope and binoculars and photos which identified shape (Fig A) and size by computer. The scale is in millimeter. The characteristics are based on observations made at magnification.

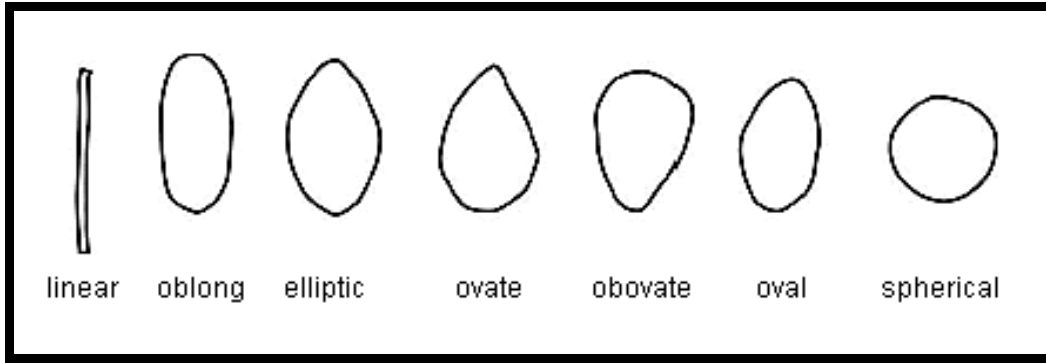


Figure A – Outline shapes (adapted from Felfoldi, p. 276)

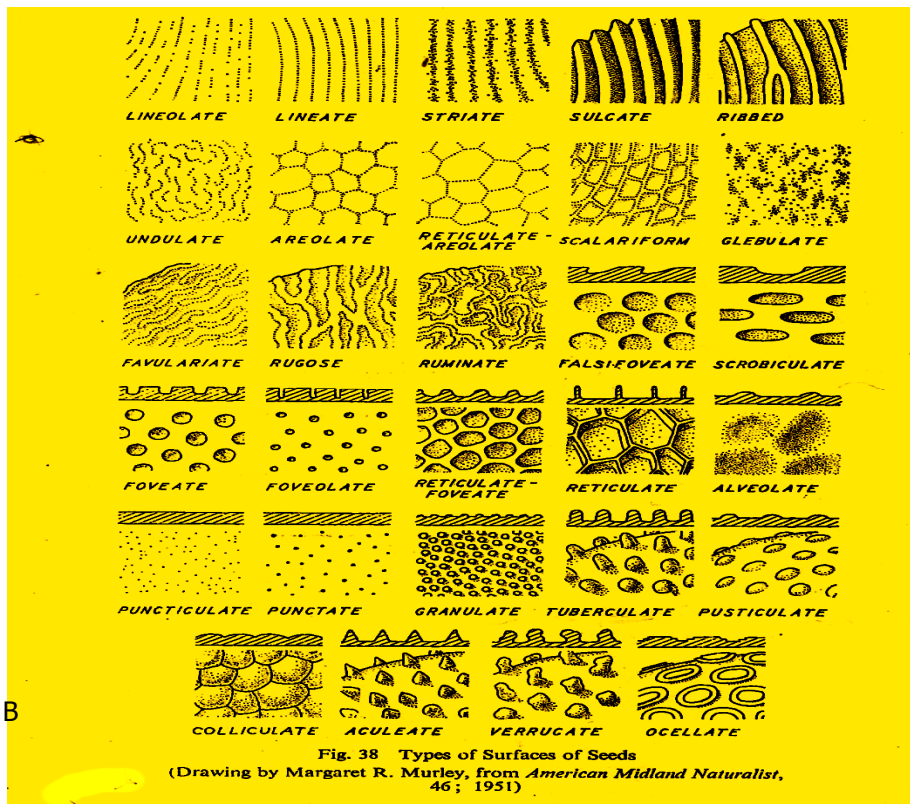


Fig B

Character	States
Seed enclosure	Yes, no
Type of enclosure	Bracts, burrs, pods, other
Length	Numeric (variable)
Width	Numeric (variable)
Color	Black, brown to dark brown, dark reddish brown, light brown/straw colour, yellowish brown, golden/orange, grayish white, red, purple, greenish purple, mottled.
Shape	Oval/circular, rhombic, conical/tapered, kidney, ear, globe star, irregular.
Surface shine	Glossy, semi-gloss, dull.
Surface texture	Smooth, semi-smooth, granular, rough.
Awns	Present, absent
Spines	Present, absent
Pappus	Present, absent
Hairs	Present, absent
Longitudinal ribs/grooves	Present, absent
Areole (horseshoe mark)	Present, absent
Apex	Pointed, rounded, truncated
Base	Pointed, rounded, truncated
Hilum	Distinct, not distinct
Hilum color	Different colour, same as seed
Pits (excluding hilum)	Present, absent
Network of veins	Present, absent
Special features	Usually wrapped with silky threads, caruncle usually covered hilum, extremely light/easily air borne, dust-like, winged, spongy look, shrivelled skin look.

Arranging the seed herbarium

Seed herbarium is placed in the alphabetical order. Families are arranged alphabetically. Genera within the family are then placed in alphabetical order. Then after, the species within each genera is arranged in alphabetical, Stearn (1966).

RESULTS AND DISCUSSION

Seeds of 40 weed species belonging to 38 genera and 20 families were botanically described depending on size, shape, texture and colour of seeds, according

to Long (1910), Murley (1951), Delorit (1970), Bischof (1978), Stucky et al. (1981) Davis (1993) and Martin and Barkley (2000) as follows:

1- Amaranthaceae:

- *Amaranthus hybridus* (Fig.1). Seeds 1x1 mm size, spherical, smooth texture, black.

2- Asclepidaceae

- *Cynanchum acutum* (Fig. 2.1). Seeds 3x3 mm size, shape have 3 angles, foveate in texture, brown.

3- Caryophyllaceae

- *Spergularia marina* (Fig. 3.1). 0.25 x 0.25 mm size, obovate shape, tuberculate in texture, brownish.

4- Chenopodiaceae

- *Beta vulgaris, sza beta* (Fig. 4.1). Seeds 2x3 to 6x5 mm size, irregular woody shape, woody in texture, brownish-greenish.
- *Chenopodium murale* (Fig. 4.2). Seeds 1x1 mm size, spherical shape, smooth in texture, greenish black - brown.

5- Compositae

- *Bidens pilosa* (Fig. 5.1). Seeds 1mmx10 mm size, shape needle with 4 spines, have long spines in texture, dark brown to black.
- *Conyza dioscoridis* (Fig. 5.2). Seeds 1mm x0.5mm size, tube disc and long hair shape, hairy in texture, yellowish.
- *Cichorium pumilum* (Fig. 5.3). Seeds 3mm–1 mm size, cone like shape, reticulate in texture, yellow to brown.
- *Xanthium stramarium* (Fig. 5.4). Seeds Fruits-elliptical shape, Spiny woody - fruit in texture, brown.

6- Convolvulaceae

- *Ipomea* (Fig. 6.1). Seeds 2-2.5x2-3 m size, obovate shape, glebulate in texture, brownish black.

7- Cruciferae

- *Capsella bursa- postoris* (L) Medicus. (Fig. 7.1). Seeds 1x0.5 mm size, elliptical shape, smooth in texture, yellowish brown to Organish.
- *Coronopus nitoticus* (Fig. 7.2). Seeds 4x5 mm size, two seeded capsule, seed remain within fruit shape, wrinkled in texture, yellowish brown.
- *Sinapis arvensis* (Fig. 7.3). Seeds 2.5 mm size, spherical shape, smooth in texture, black.

8. Cuscutaceae

- *Cuscuta pedicellata* (Fig. 8.1). Seeds 1.1–1.2 mm size, Ovate shape, smooth in texture, yellow to brown.

9- Cyperaceae

- *Cyperus difformis* (Fig. 9.1). Seeds 0.2-0.5 mm size, elliptical shape, few gland like around the seed in texture, brownish- yellowish.

10- Euphorbiaceae

- *Euphorbia geniculata* (Fig. 10.1). Seeds 0.5-0.7mm in diameter, spherical with one protojan shape, pustulate in texture, black.
- *Euphorbia helioscopia*, L. (Fig. 10.2). Seeds 1.5x2 mm size, obovate shape, tuberculate in texture.

11- Graminae

- *Avena fatua* (Fig. 11.1). Seeds 0x4 mm size, linear with 2 long spines shape, hairy in texture, yellowish brown.
- *Brachiaria reptans* (Fig. 11.2). Seeds 2 x1 mm size, acute ovate shape, smooth in texture.
- *Cenchrus biflorus* =*C. barbatus* (Fig. 11.3). Seeds 2.5x1.5 mm size, elliptical shape, smooth in texture, brown.
- *Echinochloa colonum* (Fig. 11.4). Seeds 1x2 mm size, acute ovate shape, spiny hairs in texture, yellowish green.
- *Echinochloa crus -galli* (Fig. 11.5). Seeds 2x3 mm size, elliptic shape, smooth in texture, yellowish green.
- *Lolium sp* (Fig. 11.6). Seeds 1.5x0.5 mm size, linnear elliptic shape, spiny surface in texture, yellowish.
- *Panicum coloratum* (Fig. 11.7) Seeds 1.5X2.5 mm size, elliptic shape, smooth in texture, black.
- *Phalaris minor* (Fig. 11.8). Seeds 0.5 x1.00 mm size, acute –ovate shape, smooth in texture, yellow.
- *Polypogon monspeliensis* (Fig. 11.9). Seeds 2x0.5 mm size, oblong terminal with long hair shape, hairy coat in texture, yellowish.
- *Setaria viridis* (Fig. 11.10). Seeds 1.5-2 x 2-2.5 mm size, elliptic shape, tuberculate in texture, greyish black.
- *Sorghum virgatum* (Fig. 11.11). Seeds 2x3 mm size, elliptic shape, smooth in texture, brown to black.

12- Labiatae

- *Mentha microphylla* (Fig. 12.1). Seeds less than 0.5 mm size, ovate shape, few pusticulate in texture, brown.

13- Leguminosae

- *Trifolium resupinatum* (Fig. 13.1). Seeds 1.5x1 mm size, oval shape, smooth in texture, brown.
- *Vicia monantha (Syrian vetch)* (Fig. 13.2). Seeds 2x1.5 mm size, flat-obovate shape, hard smooth surface in texture, black.
- *Vicia sativa* (Fig. 13.3). Seeds 2-3.5 mm diameter, spherical shape, foveolate in texture, black.

14- Malvaceae

- *Hibiscus trionum* (Fig. 14.1). Seeds 2-2.5 lengthx2-2.5 width mm size, kidney shape, tuberculate in texture, greenish black.
- *Malva parviflora* (Fig. 14.2). Seeds 1.5-2x3 mm size, spherical with one pore shape, woody and hairy in texture, yellowish brown.

15- Orobanchaceae

- *Orobanche crenata* spp. (Fig. 15.1). Seeds less than 0.1 mm size, obovate shape, large pusticubte in texture, black.

16- Polypogonaceae

- *Emex spinosus* (Fig. 16.1). Seeds 7x5 mm size, have 3 spines and small pores shape, woody -spiny in texture, reddish green.
- *Polygonum convulvulus* (Fig. 16.2). Seeds 2-2.5x2-4 mm size, obovate shape, irregular pusticulate in texture, greyish black.
- *Rumex dentatus* (Fig. 16.3). Seeds 1.5-2x2-2.5 mm size, 3 angles ovate with sharp apex shape, smooth in texture, dark red.

17- Portulacaceae

- *Portulaca oleracea* (Fig. 17.1). Seeds 0.5x0.5 mm size, spherical -ovate sharp apex shape, verrucate surface in texture, black.

18- Primulaceae

- *Anagallis arvensis* (Fig. 18.1). Seeds 1 mm in diameter, spherical-irregular ovate shape, tuberculate in texture, brown.

19- Tiliaceae

- *Corchorus olitorius* (Fig. 19.1). Seeds 1.5-2 mm, polygons shape, foveate in texture, greenish black - brown.

20- Umbelliferae

- *Ammi majus*, L. (Fig. 20.1). Seeds 2-2.5x0.7-1 mm size, ovate shape (remaining within fruit parts), straightified in texture, green.

1. Amaranthaceae

1.1



Scientific Name: *Amaranthus hybridus*
 Size : 1x1 mm
 Shape : spherical
 Texture : smooth
 Color : black

2. Asclepidaceae

2.1



Scientific Name: *Cynanchum acutum*
 Size : 3x3 mm
 Shape : have 3 angles
 Texture : foveate
 Color : brown

3. Caryophyllaceae

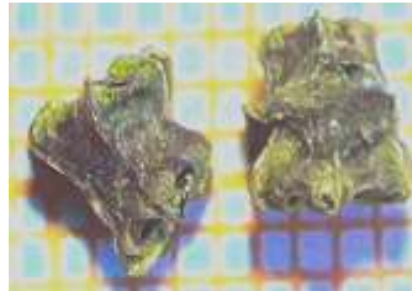
3.1



Scientific Name: *Spergularia marina*
 Size : 0.25x0.25 mm
 Shape : obovate
 Texture : tuberculate
 Color : brownish

4. Chenopodiaceae

4.1



Scientific Name: *Beta vulgaris*
 Size : 2x3 to 6x5 mm
 Shape : irregular woody shape
 Texture : woody
 Color : brownish-greenish

4. Chenopodiaceae

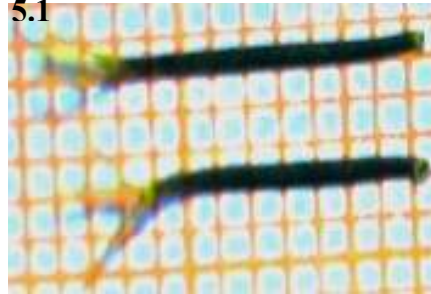
4.2



Scientific Name: *Chenopodium murale*
 Size : 1x1 mm
 Shape : spherical
 Texture : smooth
 Color : greenish black – brown

5. Compositae

5.1



Scientific Name: *Bidens pilosa*
 Size : 1mmx10mm
 Shape : needle with 4 spines
 Texture : have long spines
 Color : dark brown to black

5 - Compositae

5.2



Scientific Name: *Conyza dioscoridis*
 Size : 1 mmx0.5 mm -hair(0.5-5)
 Shape : tube disc and long hair
 Texture : hairy
 Color : yellowish

5.3



Scientific Name: *Cichorium pumilum*
 Size : 3mm – 1 mm
 Shape : Cone like
 Texture : reticulate
 Color : Yellow to brown

5 - Compositae

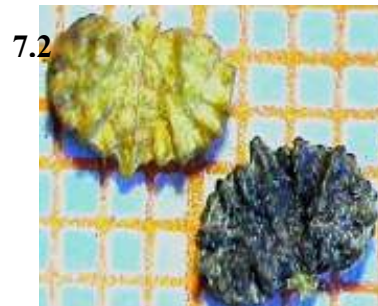
Scientific Name:	<i>Xanthium strumarium</i>
Size	: 2–2.5 cm
Shape	: fruits-elliptical
Texture	: Spiny woody - fruit
Color	: brown

6. Convolvulaceae

Scientific Name:	<i>Ipomea</i>
Size	: 2-2.5x2-3 mm
Shape	: obovate
Texture	: Glebulate
Color	: brownish black

7. Cruciferae

Scientific Name:	<i>Capsella bursa-pastoris</i> (L) Medicus.
Size	: 1x0.5 mm
Shape	: elliptical
Texture	: smooth
Color	: brown



Scientific Name:	<i>Coronopus nitoticus</i>
Size	: 4x5 mm
Shape	: two seeded capsule, seed remain within fruit
Texture	: wrinkled
Color	: yellowish brown

7. Cruciferae

7.3



Scientific Name: *Sinapis arvensis*
 Size : 2.5 mm diameter
 Shape : spherical
 Texture : smooth
 Color : black

8. Cuscutaceae

8.1



Scientific Name: *Cuscuta pedicellata*
 Size : 1.1–1.2 mm
 Shape : ovate
 Texture : smooth
 Color : Yellow to brown

9. Cyperaceae

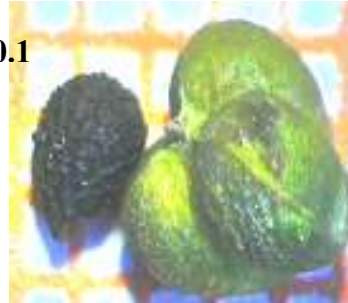
9.1



Scientific Name: *Cyperus difformis*
 Size : 0.2-0.5 mm
 Shape : elliptical
 Texture : few gland like around the seed
 Color : brownish- yellowish

10. Euphorbiaceae

10.1



Scientific Name: *Euphorbia geniculata*
 Size : 0.5-0.7mm in diameter
 Shape : spherical with one protojan
 Texture : pusticulate
 Color : black

10. Euphorbiaceae

10.2



Scientific Name: *Euphorbia helioscopia*, L.
 Size : 1.5x2 mm
 Shape : obovate
 Texture : tuberculate
 Color : yellowish brown and black

11. Gramineae

11.1



Scientific Name: *Avena fatua*
 Size : 0.9x4 mm
 Shape : linear with 2 long spines
 Texture : hairy
 Color : yellowish brown

11 - Gramineae

11.2



Scientific Name: *Brachiaria reptans*
 Size : 2x1 mm
 Shape : acute ovate
 Texture : smooth
 Color : Yellowish to brown

11.3



Scientific Name: *Cenchrus biflorus = C. barbatus*
 Size : 2.5x1.5 mm
 Shape : elliptical
 Texture : smooth
 Color : brown

11 - Gramineae



Scientific Name: *Echinochloa colonum*
 Size : 1x2 mm
 Shape : acute ovate
 Texture : spiny hairs
 Color : yellowish green



Scientific Name: *Echinochloa crus -galli*
 Size : 2x3 mm
 Shape : elliptic
 Texture : smooth
 Color : yellow-green

11 - Gramineae



Scientific Name: *Lolium sp*
 Size : 0.5x1.5 mm
 Shape : linear elliptic
 Texture : spiny surface
 Color : yellowish



Scientific Name: *Panicum coloratum*
 Size : 1.5x2.5 mm
 Shape : elliptic
 Texture : smooth
 Color : black

11 - Gramineae**11.8**

Scientific Name: *Phalaris minor*
 Size : 0.5 x1.00 mm
 Shape : acute –ovate
 Texture : smooth
 Color : yellow

11.9

Scientific Name: *Polypogon monspeliensis*
 Size : 2mmx0.5mm
 Shape : oblong terminal with long hair
 Texture : hairy coat
 Color : yellowish

11 - Gramineae

Scientific Name: *Setaria viridis*
 Size : 1.5- 2x 2- 2.5 mm
 Shape : elliptic
 Texture : tuberculate
 Color : greyish black

11.11

Scientific Name: *Sorghum virgatum*
 Size : 2x3 mm
 Shape : elliptic
 Texture : Smooth
 Color : brown to black

12. Labiatae



Scientific Name: *Mentha microphylla*
 Size : less 0.5 mm
 Shape : ovate
 Texture : few pusticulate
 Color : brown

13. Leguminosae



Scientific Name: *Trifolium resupinatum*
 Size : 1.5x1 mm
 Shape : oval
 Texture : smooth
 Color : brown

13 - Leguminosae



Scientific Name: *Vicia monantha (Syrian vetch)*
 Size : 2x1.5 mm
 Shape : flat-obovate
 Texture : hard smooth surface
 Color : black



Scientific Name: *Vicia sativa*
 Size : 2-3.5 mm diameter
 Shape : spherical
 Texture : foveolate
 Color : black

14. Malvaceae

14.1



Scientific Name:	<i>Hibiscus trionum</i>
Size :	2-2.5 long 2-2.5 width mm
Shape :	kidney shape
Texture :	tuberculate
Color :	greenish black

Malvaceae

14.2



Scientific Name:	<i>Malva parviflora</i>
Size :	1.5-2×3 for seeds
Shape :	spherical with one pore
Texture :	woody and hairy
Color :	yellowish brown

15.1

15. Orbanchaceae

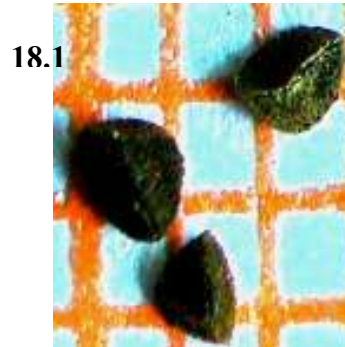
Scientific Name:	<i>Orobanche</i> spp.
Size :	Less than 0.1 mm
Shape :	obovate
Texture :	large pusticubte
Color :	black

16.1 16.- Polypogonaceae

Scientific Name:	<i>Emex spinosus</i>
Size :	7x5 mm
Shape :	have 3 spines and small pores
Texture :	woody -spiny
Color :	reddish green

17. Portulacaceae

Scientific Name: *Portulaca oleracea*
 Size : 0.5x0.5 mm
 Shape : spherical -ovate
 Texture : verrucate surface
 Color : black

18. Primulaceae

Scientific Name: *Anagallis arvensis*
 Size : 1 mm in diameter
 Shape : spherical-irregular
 ovate
 Texture : tuberculate
 Color : brown

19. Tiliaceae

Scientific Name: *Corchorus olitorius*
 Size : 1.5-2 mm
 Shape : polygons
 Texture : foveate
 Color : greenish black - brown

20. Umbelliferae

Scientific Name: *Ammi majus, L.*
 Size : 2-2.5 x 0.7-1 mm
 Shape : ovate (remaining
 within fruit parts)
 Texture : straightified
 Color : green

CONCLUSION

The previous specimens of seeds of these weed species can be used as monograph to be consulted for determination the family, genus and specific identity of the unknown weed seeds consignment with imported grains.

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معشبة لبعض بذور الحشائش الشائعة بمصر

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أحمد مصطفى حساتين - عبده عبيد إسماعيل

المعمل الفرعي لبحوث الحشائش - معهد بحوث المحاصيل الحقلية - مركز البحوث الزراعية -الجيزة -
مصر

اجريت هذه الدراسة لتمييز بذور ٤٠ نوعا من الحشائش التي تنتمي إلي ٣٨ جنس نباتي ،
٢٠ عائلة نباتية والتي تعد أمرا ضروريا للباحثين والمزارعين وصناع التقاوي واعمال الحجر
الزراعي لفحص بذور الحشائش في المواد النباتية المستوردة والمصدرة وذلك بالمعمل الفرعي
لبحوث الحشائش بالجيزة حيث جمعت عينات بذور الحشائش كاملة النضج من هذه الأنواع من
مزارع شندويل وسدس والسرو و تم تمييزها وتقسيمها خلال موسمي ٢٠٠٨/٢٠٠٩ شتوي وصيفي
٢٠١٠.و تم وصف البذور علي أساس شكل وحجم ولون و سطح البذور لعمل مفاتيح لتعريفها تبعا
لهذه الصفات طبقا للنظام المقترح بواسطة (Murley 1951). ثم عمل مسح للبذور بواسطة
الفيديو ميكروسكوب كما هو موضح بالصور الموجودة بمتن البحث وتم ترتيب هذه العينات في
المعشبات ترتيبا هجائيا طبقا للعائلات المختلفة ثم الأجناس ثم الأنواع النباتية لتسهيل عملية التعرف
علي بذور الحشائش وتحديد هل هي من الحشائش المنتشرة بمصر ام انها مجهوله دخلت مع
المستوردات النباتية لدراستها وتحديد مدى خطورتها .