

## 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, trigonouse, triqueter, aneeps turgid, bladdary, etc.

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

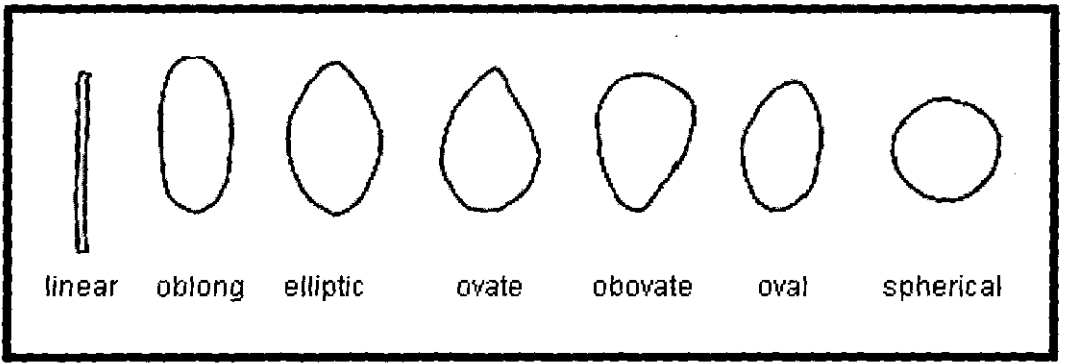


Figure A – Outline shapes (adapted from Felfoldi, p. 276)

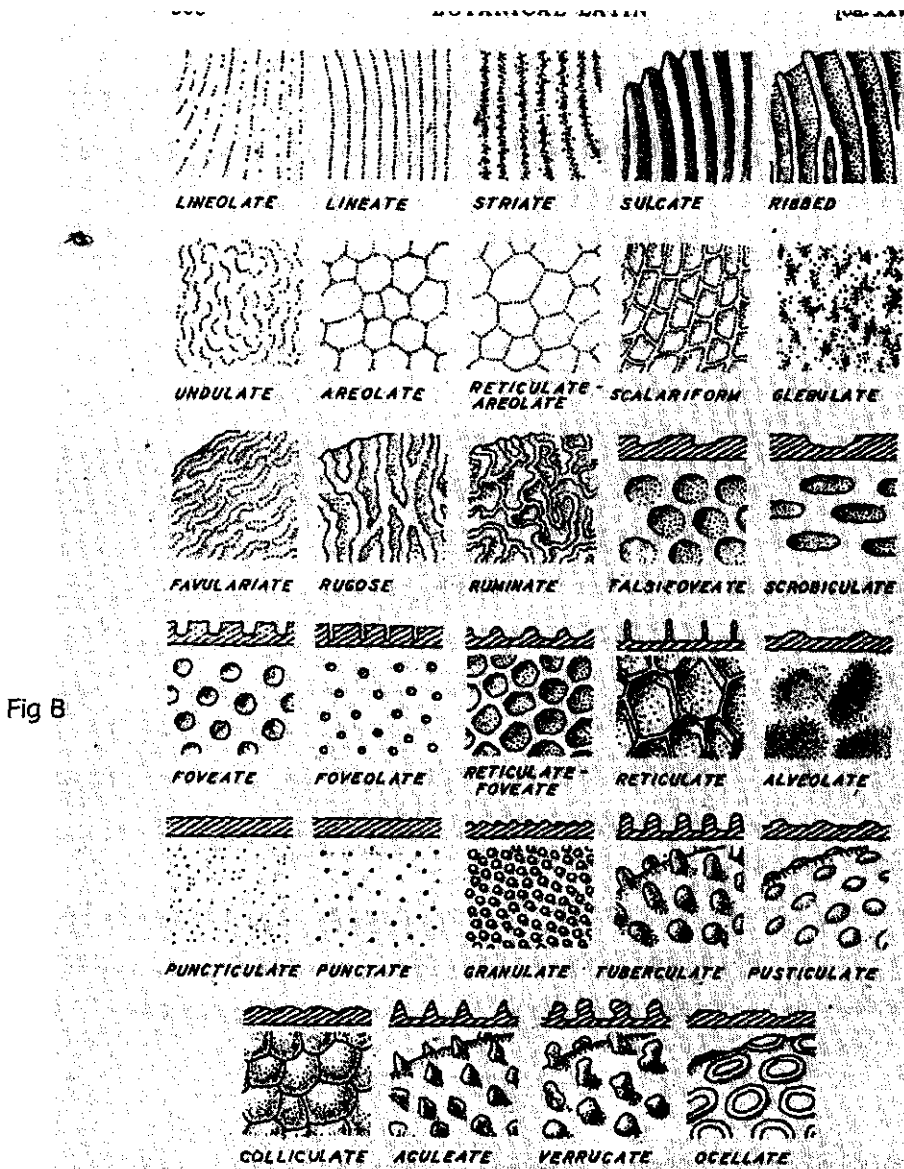


Fig B

Fig. 38 Types of Surfaces of Seeds  
 (Drawing by Margaret R. Murley, from *American Midland Naturalist*,  
 46; 1951)

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, sha 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 protrojan shape, pusticulate 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 convulvuius* (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**

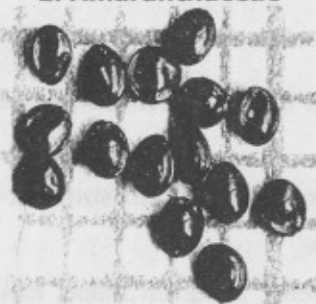
- *Corchorus olitorius* (Fig. 19.1). Seeds 1.5-2 mm, polygons shape, foveate in texture, greenish black - brown.

**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**

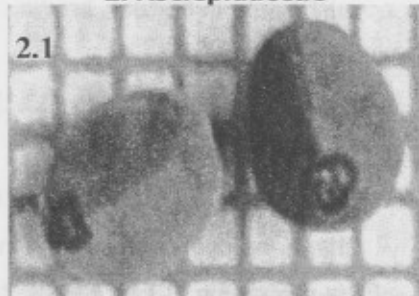
1.1



Scientific Name:	<i>Amaranthus hybridus</i>
Size :	1x1 mm
Shape :	spherical
Texture :	smooth
Color :	black

**2. Asclepidaceae**

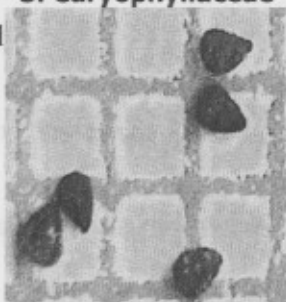
2.1



Scientific Name:	<i>Cynanchum acutum</i>
Size :	3x3 mm
Shape :	have 3 angles
Texture :	foveate
Color :	brown

**3. Caryophyllaceae**

3.1



Scientific Name:	<i>Spergularia marina</i>
Size :	0.25x0.25 mm
Shape :	obovate
Texture :	tuberculate
Color :	brownish

**4. Chenopodiaceae**

4.1



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



**4. Chenopodiaceae**

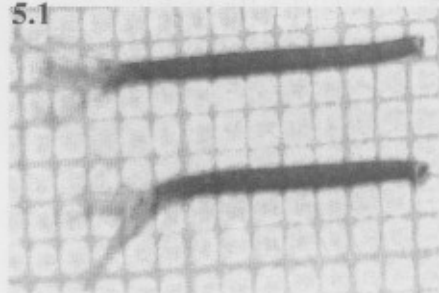
4.2



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

**5. Compositae**

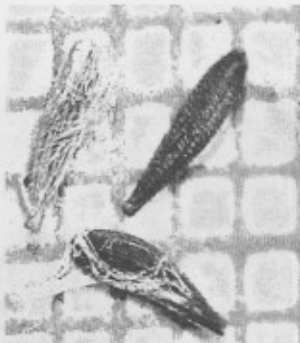
5.1



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

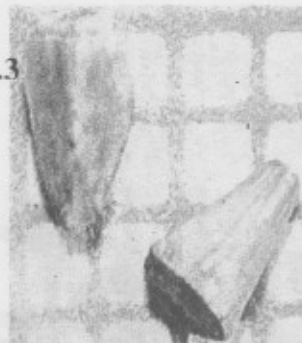
**5 - Compositae**

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

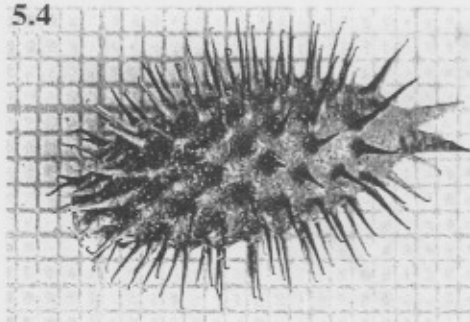
5.3



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

## 5 - Compositae

5.4

Scientific Name: *Xanthium strumarium*

Size : 2-2.5 cm

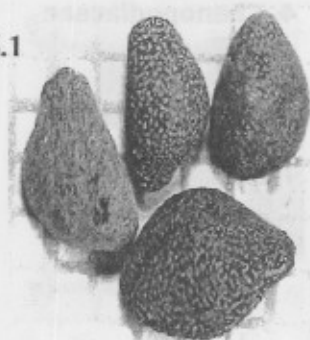
Shape : fruits-elliptical

Texture : Spiny woody - fruit

Color : brown

## 6. Convolvulaceae

6.1

Scientific Name: *Ipomea*

Size : 2-2.5x2-3 mm

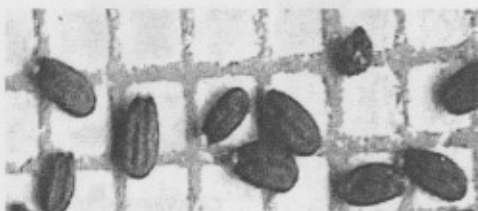
Shape : obovate

Texture : Glebulate

Color : brownish black

## 7. Cruciferae

7.1

Scientific Name: *Capsella bursa-pastoris* (L.)  
Medicus.

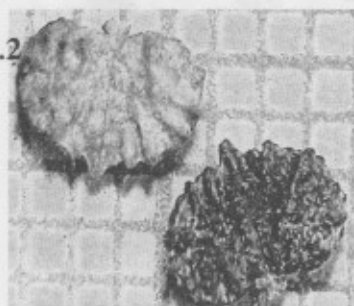
Size : 1x0.5 mm

Shape : elliptical

Texture : smooth

Color : brown

7.2

Scientific Name: *Coronopus nitoticus*

Size : 4x5 mm

Shape : two seeded capsule,  
seed remain within fruit

Texture : wrinkled

Color : yellowish brown

**7. Cruciferae**

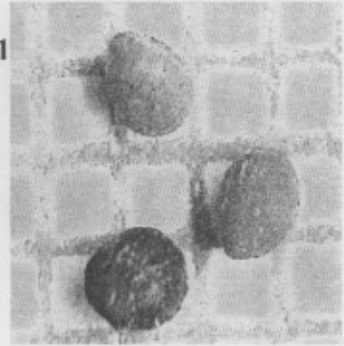
7.3



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

**8. Cuscutataceae**

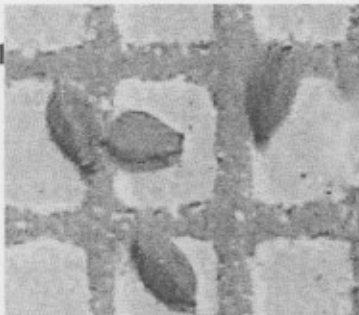
8.1



- 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**

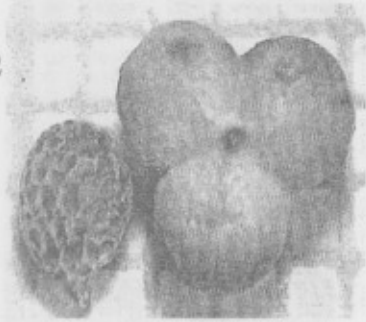
10.1



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

## 10. Euphorbiaceae

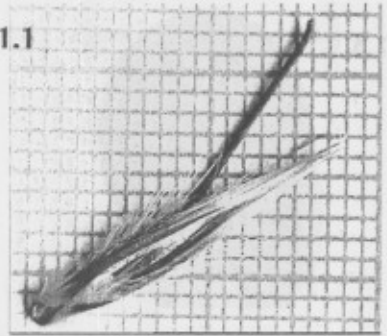
10.2



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

## 11. Gramineae

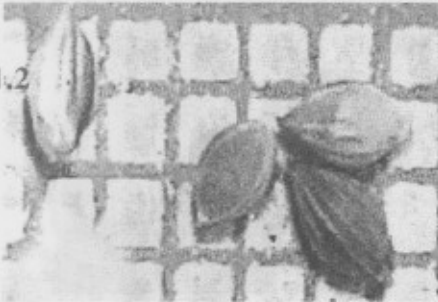
11.1



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

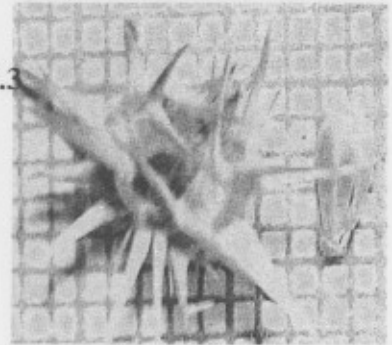
## 11 - Gramineae

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

11.4

Scientific Name: *Echinochloa colonum*

Size : 1x2 mm

Shape : acute ovate

Texture : spiny hairs

Color : yellowish green

11.5

Scientific Name: *Echinochloa crus-galli*

Size : 2x3 mm

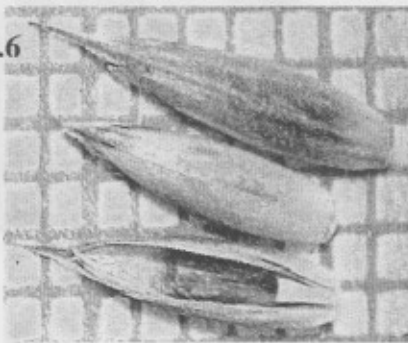
Shape : elliptic

Texture : smooth

Color : yellow-green

## 11 - Gramineae

11.6

Scientific Name: *Lolium sp*

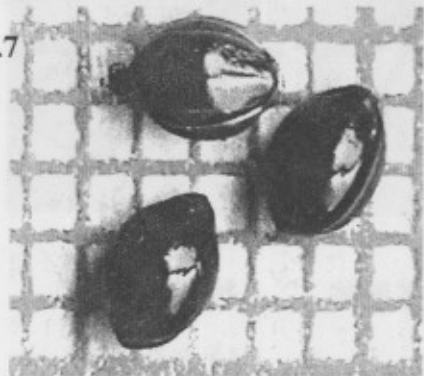
Size : 0.5x1.5 mm

Shape : linear elliptic

Texture : spiny surface

Color : yellowish

11.7

Scientific Name: *Panicum coloratum*

Size : 1.5x2.5 mm

Shape : elliptic

Texture : smooth

Color : black

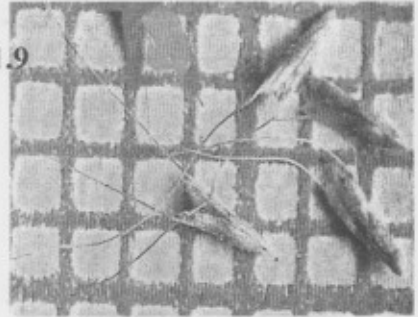
## 11 - Gramineae

11.8



Scientific Name:	<i>Phalaris minor</i>
Size :	0.5 x1.00 mm
Shape :	acute -ovate
Texture :	smooth
Color :	yellow

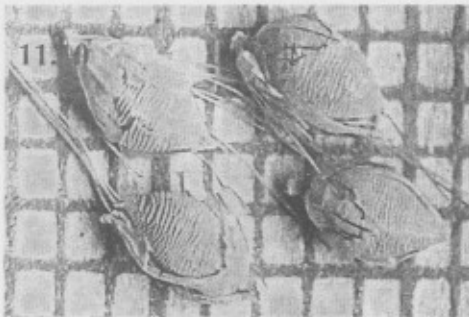
11.9



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

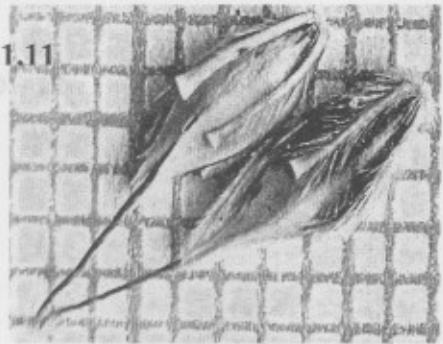
## 11 - Gramineae

11.10



Scientific Name:	<i>Setaria viridis</i>
Size :	1.5- 2x 2- 2.5 mm
Shape :	elliptic
Texture :	tuberculate
Color :	greyish black

11.11



Scientific Name:	<i>Sorghum virgatum</i>
Size :	2x3 mm
Shape :	elliptic
Texture :	Smooth
Color :	brown to black

## 12. Labiatae



Scientific Name: *Mentha microphylla*

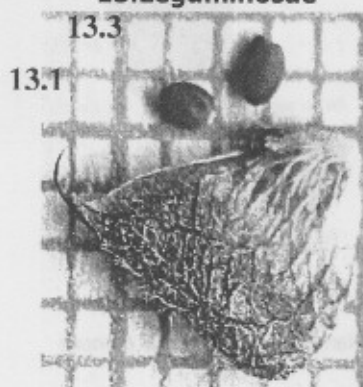
Size : less 0.5 mm

Shape : ovate

Texture : few pusticulate

Color : brown

## 13. Leguminosae



Scientific Name: *Trifolium resupinatum*

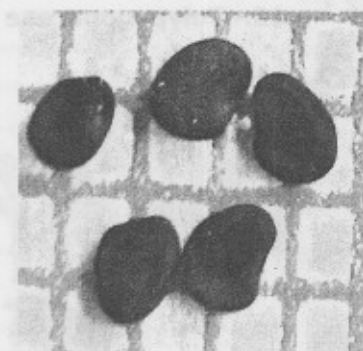
Size : 1.5x1 mm

Shape : oval

Texture : smooth

Color : brown

## 13 - Leguminosae



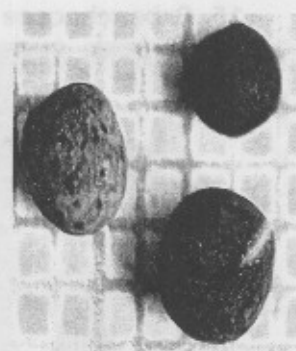
Scientific Name: *Vicia monantha (Syrian vetch )*

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

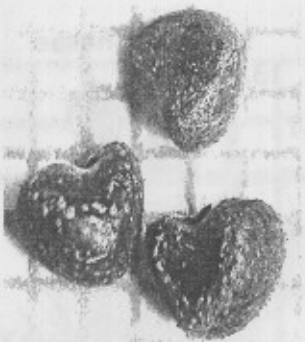
Texture : foveolate

Color : black



**14. Malvaceae**

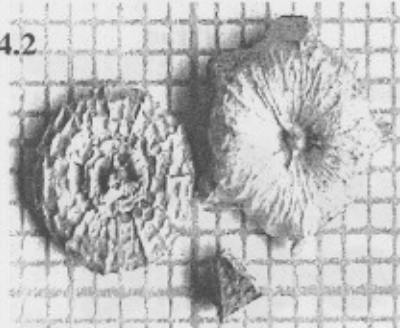
14.1



- Scientific Name: *Hibiscus trionum*
- Size : 2-2.5 long x 2-2.5 width mm
- Shape : kidney shape
- Texture : tuberculate
- Color : greenish black

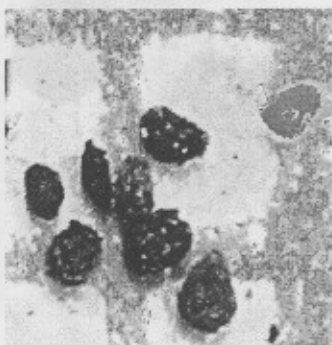
**Malvaceae**

14.2

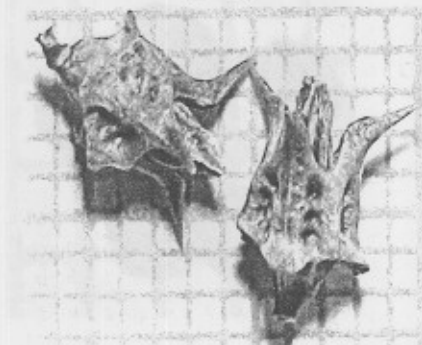


- Scientific Name: *Malva parviflora*
- Size : 1.5-2 x 3 for seeds
- Shape : spherical with one pore
- Texture : woody and hairy
- Color : yellowish brown

15.1

**15. Orbanchaceae**

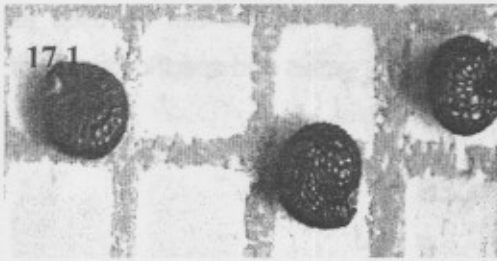
- Scientific Name: *Orobanche* spp.
- Size : Less than 0.1 mm
- Shape : obovate
- Texture : large pusticubte
- Color : black

**16.1 16.- Polygonoaceae**

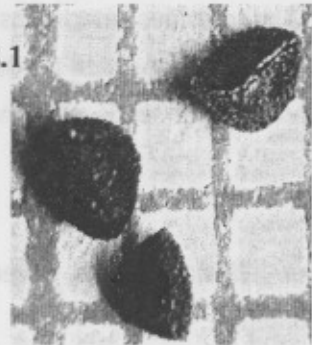
- Scientific Name: *Emex spinosus*
- Size : 7x5 mm
- Shape : have 3 spines and small pores
- Texture : woody -spiny
- Color : reddish green



**17. Portulacaceae**



**18. Primulaceae**



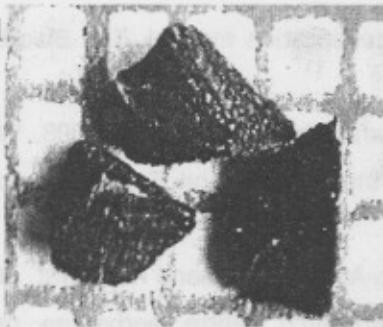
Scientific Name: *Portulaca oleracea*  
 Size : 0.5x0.5 mm  
 Shape : spherical -ovate  
 Texture : verrucate surface  
 Color : black

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

**19. Tiliaceae**

**20. Umbelliferae**

19.1



20.1



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

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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مصر

اجريت هذه الدراسة لتمييز بذور ٤٠ نوعا من الحشائش التي تنتمي إلى 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  
الفيديوميكروسكوب 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 مجهولة دخلت مع  
المستوردات النباتية لراستها وتحديد مدى خطورتها .