دليل للتعرف علي البذور الغريبة المصرية والأجنبية المختلطة بالمستوردات النباتية

Manual for identifying forgeen seeds of imported plant materials

أعداد

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دليل التعرف علي بذور الحشائش المصرية والأجنبية

مقدمة

تعتبر البذرة أهم جزء من النبات لكونها وعاء للجنين الذى يحمل العوامل الوراثية للآباء فتصبح كونها الوسيلة الرئيسية للمحافظة على النوع بل وإنتاج أنواع جديدة عن طريق التربية والتهجينات المختلفة ، وأصبح التعرف على بذور الأنواع النباتية من الأهمية بمكان لضمان نظافة تقاوى المحاصيل من بذور الحشائش. وقد سنت الدول قوانين للحجر الزراعى التى تعمل على منع دخول الآفات والأمراض وبذور الحشائش مع بذور وثمار النباتات المستوردة. وفى مصر صدر لذلك القانون رقم 417 لسنة 1954 والذى عدل بقانون رقم 96 لسنة 1956 ثم توالت القوانين التى تحدد نسب بذور الحشائش المصاحبة لبذور المحاصيل المخلفتة وواكب ذلك تطور آلات نظافة التقاوى من بذور الحشائش معتمدة على الاختلافات فى كثافة وحجم وشكل وسطح البذور بل واللون أيضا وكذلك ضمت المعشبات النباتية جزء مخصص للبذور تفيد فى تصحيح الاسم العلمى للبذور ولا نغفل أن أول خطوة للمكافحة المتكاملة للحشائش هو التعرف على أنواع الحشائش وكثافتها وتوزيعاتها فى الحقل مع التعرف على حجم أو كمية البذور بالتربة لطبيعة خصائص بذور الحشائش من كثافة عالية ، وحيوية عالية وسكون لسنوات عديدة وهذا يستلزم معها دراسة تلك الخصائص لنجاح المكافحة المتكاملة للحشائش فى الحقول.

الزهرة Flower

البذرة هى البويضة المخصبة داخل المبيض والمبيض جزء أساسى من تركيب الزهرة التى تتكون من:

أ- أعضاء عقيمة:

الكأس Calyx: الذى يتكون من السبلات Sepals.

التويج Corolla: الذى يتكون من البتلات Petals.

ب- أعضاء تكاثر:

الطلع Androecium : الذى يتكون من الأسدية Stamens وكل سداة تتكون من خيط Filament ومتك Anthr وبداخله حبوب اللقاح.

المتاع Cynoecium ويتكون من الكرابل Carpels وكل كربلة تتكون من مبيض Ovary وقلم Style وميسم Stigma وتحمل البويضات بداخل المبيض.

الثمره Friut

بعد عمليه الاخصاب تتكون البذره وينضج المبيض مكونا مع البذور ما يسمي بالثمره ويتكون من جدار المبيض الغلاف الثمري، وأحيانا يدخل في تكوين الثمره الغلاف الزهري، أو التخت الذى يحمل الزهرة أو النوره جميعها.

وبعد إتمام الاخصاب يسقط التويج والطلع، وكذا الكأس في اغلب الاحوال، وقد تبقي آثار من هذه الاجزاء ملتصقه بالثمره ، فتظهر آثار الأغلفة الزهرية أسفل الثمرة كما تبدو آثار القلم والميسم في أعلي الثمرة. وبهذا نستطيع ان نميز بعض الثمار من البذور التي يختلط بعضها ببعض، فللثمره نقطتا اتصال احدهما بالتخت، والأخري بالقلم. أما البذور فلها نقطة اتصال واحده هي موضع اتصالها بجدار المبيض.

ولما كان تكون الثمرة، إحدي نتائج إخصاب البيضه ونمو المبيض. كان لنا ان نقول انه لا توجد في عاريات البذور ثمار بالمعني الصحيح، لأنه لا يوجد بها مبايض تحفظ البذور، ولكن في الصنوبريات توجد البذور بين الحراشيف ولذلك يسمي المخروط المتاعي ثمره وإن اختلفت عن الثمار الحقيقيه بطبيعة الحال.

كما إنه في بعض الحالات تنمو الثمره من مبيض وتتكون دون إخصاب ولا يتكون فيها بذور ويسمي بالإثمار البكري Parthenocarpy كما في بعض الموالح وبعض انواع العنب وغيرها.

والثمار إما صادقة أو كاذبة، فإذا تكونت من المبيض وحده سميت صادقه، أما إذا دخل في تكوينها أجزاء أخري من الزهرة كالتخت في الكمثري والتفاح سميت كاذبه.

وتنقسم الثمار تبعاً لنشأتها، فإذا تكونت من زهره واحده بها كربله واحده أو عدة كرابل ملتحمة سميت بسيطة Simple، أما إذا تكونت من عدة كرابل سائبه سميت متجمعه Aggregate كالشليك أما إذا تكونت من النوره سميت الثمره مركبة Composite كما في التين والجميز والتوت.

وإذا كان الغلاف الثمري جافاً سميت الثمره جافة Dry أما إذا كان لحمياًعصيريا سميت الثمرة الطرية Succulent، وفي الحالة الأخيرة تتميز بالغلاف الثمري ثلاث طبقات هي الخارجية والمتوسطة والداخلية Epicarb, mesocarp, endocarp علي الترتيب.

الثمار الجافة

وفيها يكون الغلاف الثمري خشبياً أو جلدياً، ولا يمكن تمييز طبقاته وتنقسم الي ثلاث أقسام.

أ- **جافة غير متفتحة Indehiscent:**

الغلاف الخارجي خشبي أو جلدي لا ينشق ولا يتفتح، وإنما تخرج منه البذور بعد أن يبلي وتكون القصره رقيقة والبذور قليله العدد.

1- **البندقة Nut:** ثمرة بسيطة جافة ذات بذرة واحدة، الغلاف خشبي أو جلدي، تتكون من مبيض سفلي ملتحم الكرابل كما في البندق. والمتاع مكون من ثلاثة كرابل وحجرة واحدة بها بذرة واحدة. أو تتكون من مبيض علوي كما في الفصيله السعدية، المتاع مكون كربلتين أو ثلاث ملتحمه بداخلها بذرة واحده كالبندق والكستناء والبلوط.
2- **سبسلة: Cepsela** تتكون من مبيض سفلي ذي كربلتين ملتحمتين ومسكن واحد وبذرة واحدة وثمار الفصيلة المركبة كلها من هذا النوع، وقد يوجد أعلي الثمرة خصلة شعيرات تسمي الزغب pappus بدلاً من الكأس كما في الجعضيض.
3- **الفقيرة: Achene** الغلاف الثمري جلدي رقيق بداخلة بذرة واحدة وتتكون الثمرة من كربلة واحدة أو يكون المتاع متعدد الكرابل ومنفصلة وتوجد غالباً متجمعة كما في الشقيق والورد.
4- **برة: Caryopsis** الغلاف الثمري ملتحم مع القصرة. وتنشأ الثمرة من مبيض علوي ذي بذرة واحدة كما في النجيليات، وقد تبقي بعض الثمار مغلفة بالقنابع كما في الشعير والأرز أو تصبح عارية كما في القمح.
5- **جناحية: Samara** الغلاف الثمري ممتد علي هيئة أجنحة وهي مكونة من كربلة واحدة كما في ثمرة "أبو المكارم".
6- **كيسية:** الغلاف الزهري مستديم، ينتفخ ويحيط بالثمرة كما في ثمار الفصيلة الحماضية.

ب- **جافه متفتحه: Dehiscent:**

ينتفخ الغلاف الثمري بشكل منتظم ناثراً البذور، ولذا كانت البذور هنا ذات قصرة غليظة تحمي الجنين، ومعظم هذه الثمار تحوي بذوراً كثيرة وتنقسم حسب طريقة أنفتاحها إلي:

1- **جرابية: Follicle** تتكون من كربلة واحدة علوية، تنفتح طولياً علي إمتداد التدريز البطني كما في (العائق).
2- **قرنية: Legume** تتكون من كربلة واحدة علوية تنفتح طولياً علي إمتداد التدريزين البطني والظهري كما في الفصيلة القرنية.
3- **خردلة: Siliqua** ثمرة طويلة علوية مكونة من كربلتين متحدتين، ويوجد داخل الثمرة حاجز رقيق كاذب Replum، وعند نضج الثمرة تنفتح من أسفل إلي أعلي كما في ثمار الفصيلة الصليبية.
4- **خريدلة: Siliqula** تشبه الخردلة ولكنها قصيرة عريضة كما في كيس الراعي.
5- **علبة: Capsule** تتكون من كربلتين أو أكثر المتاع سفلي أو علوي ملتحم الكرابل وتنفتح العلبة طوليا، كما في القطن والداتورة أو عرضيا كما في الحامول. أو بواسطة ثقوب كما في الخشخاش. أو بوسطة أسنان عند القمة كما في القرنفلية.

والإنفتاح الطولي هو الشائع وفيه ثلاث صور:

أ) **مسكنياً: Loculicidal:** علي إمتداد التدريز الظهري كما في البنفسج.

ب) **حاجزياً Septicidal :** علي إمتداد خط الإلتحام كما في الزنبقية.

جـ) **صمامياً** :**Septifragal**: إذا انفصلت الجدر الخارجية للكرابل عن المحور كما في الداتورة.

جـ - جافه منفصلة: Schizoacapic:

وهي ثمار جافة تنشأ من كرابل ملتحمة في أول أمرها، ذات بذور قليلة أو كثيرة، فإذا نضجت الثمرة إنفصلت الكرابل مكونة ثميرات Mericarps في كل ثميرة بذرة واحدة، ولكنها في الغالب لا تنفتح بل تنثر بذورها وأهم صورها:

1) خبازية Carcerulus: تنشأ في كل ثمرة عدة ثميرات تنفصل عن بعضها من الوسط كما في الفصيلة الشفوية والخبازية.
2) رجما: Regma: وفيها يحدث الإنشقاق بقوة، وقد تتفتح الثميرات وتتكون من ثلاثة كرابل كما في الخروع، أو من خمس كرابل كما في الجرانيوم.
3) خيمية: Cremocarp: وتوجد في نباتات الفصيلة الخيمية وتنشأ من مبيض سفلي ذي كربلتين وحجرتين، بكل منها بذرة واحدة قمية، وعند النضج تنشق الثمرة قمياً ألي ثمرتين. وتظل كل منها متصلة من القمة بواسطة حامل كرابلي.

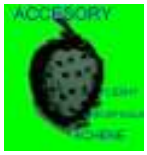
الثمار الطرية Fleshy

في الثمار الطرية يتحول الغلاف الثمري أو طبقات منه إلي نسيج عصيري لبي، وهي علي أنواع:-

1- **حسلة: Drupe** وهي ثمرة نشأت من مبيض علوي في الغالب، لا تنفتح وتتكون من كربلة أو أكثر ملتحمة، بها بذرة واحدة أو إثنتين. ويتميز الغلاف الثمري إلي ثلاث طبقات خارجية جلدية، ومتوسطة لحمية، وداخلية خشبية صلدة. كما في البرقوق والمشمش واللوز والخوخ والنبق، والزيتون، وجوز الهند.
2- **لبية: Berry** هي ثمرة ذات بذور عديدة، نشأت من مبيض علوي أو سفلي، وقصرة البذرة غليظة نوعاً، والغلاف الداخلي بها غير صلد، كما في العنب، الطماطم والبرتقال، والبلح، وهي ناتجه من مبايض علوية. أما الرمان والقرعيات والموز فناتجة من مبايض سفلية.
3- **تفاحية: Pome** وهي ثمرة كاذبة مثل التفاح والكمثري. وقد نشأت من نمو التخت، والغلاف الخارجي جلدي رقيق، والمتوسط لحمي، والداخلي رقيق قرني، وهو وحده المكون من جدار المبيض، ويحيط بالبذور، أما الخارجي والمتوسط فهما من التخت.

Keys and definition of different fruit kinds

1 - Drupe: - A fleshy indehiscent fruit, one-seeded, with the endocarp stony.



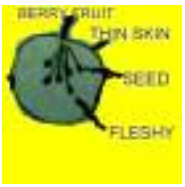
2 – Accessory: - A fleshy fruit like a strewberry, made up of a succulent receptacle covered with several to many pistils, each forming a dry achene-like fruit, sometimes not distinguished from aggregate.

3 – Aggregate: - A fruit with the receptacle not especially fleshy, with several to many pistils, these each becoming fleshy and drupe-like. The blackberry and raspberry are examples. In the left hand drowing the cluster of drupes has been removed leaving the naked receptacle, as accurs in the raspberry.

4 – Syconium: - A fruit made up of a fleshy hollow receptacle bearing inside many small separate flowers, each of which may produce a seed-like nutlet. A Fig is a good example. In the drawing the fruit is shown in longitudinal section.

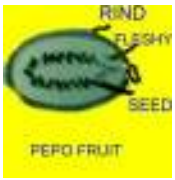
5 – Multiple: - A fleshy fruit formed from several to many separate flowers. These flowers have superior ovaries which may become fleshy, but, other parts of the unit

may also be succulent. The elassic example is borne on the mulberry plant. Such a fruit may resemble an aggregate fruit, but, is not formed from one flower.



6 – Berry: - A fleshy fruit formed from one compound ovary conteining few to many seeds. This fruit appears in the key as formed from a superior ovary, however, the term is of ten loosely used to include pulpy fruits formed from an inferior ovary, but, not resenibling a pepo or pom.

7 – Hesperidium: - This is a berry-like fruit with a thick leathery covering. An orange is a good example.



8 – Pepo: - A fleshy fruit formed from a compound inferior ovary, the outer wall becoming rather hard and tough. Watermelon and cucumber

Have this type of fruit.

9 – Pome: - A fleshy fruit formed from an inferior compound ovarry, the receptacle (or calyx tube) fleshy and thick, the apple is apome.

10 – Schizocarp: - A dry indehiscent fruit made up of 2 or more 1-seeded carpels that separate at maturity leaving a common axis between (the carpophore). Somtetime each segment is called a "mericarp". The drawing to the left shows a cross-section of such a fruit. Some manuals may call this fruit a cremcarp.

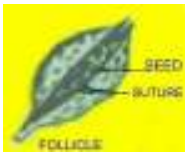
11 – Samara: - A dry indehiscent winged fruit like those on a maple (double samara) or ash (single).

12 – Nut: - A dry indehiscent one-seeded fruit with a hard coat. Often rather loosely used.

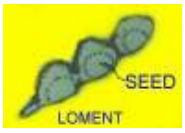
13 – Achene: - A dry indehiscent one-seeded fruit, the seed connected to the pericarp at only one point. The sunflower has achenes. In the figure the seed is shown as if shrunken away from the pericarp.

14 – Caryopsis (grain): - A dry indehiscent one-seeded fruit, the seed connected to the pericarp at all points. The corn kernel is a caryopsis.

15 – Follicle: - A dry one-celled one-carpellate fruit splitting down one side only, as in the milkweed.



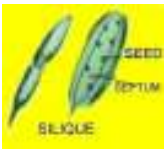
16 – Loment: - A dry one-celled, one-carpellate fruit constricted between the seeds. Otherwise like the more common legume.



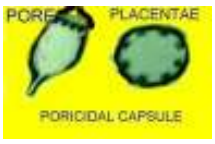
17 – Legume: - A dry one-celled, one-carpellate fruit splitting down two sides. Often it is called a "pod" a loosely used term.

18 – Silicle: - A dry two-celled dehiscent fruit, each half pulling away at maturity leaving a thin central septum. A silicle is usually not more than twice as long as wide. The righthand drawing shows the 2 valves pulled away from the septum and pushed to the sides.

19 – Silique: - A dry two-celled dehiscent fruit each half pulling away at maturity leaving a thin central septum. The length is more than twice the width.



20 – Capsule: - A dry dehiscent fruit made up of more than one carpel. It may be one celled with one line of dehiscence, but, the placentae would be more than one. This is a very common type of fruit.



A. <u>Poricidal Capsule: -</u> One that opens by means of pores, as in a poppy.

B. <u>Septicidal capsule: -</u> One that opens a long the septa by splitting it.

C. <u>Loculicidal capsule: -</u> One that opens a long the middle of the locule.

Pistil(s) compound; 1: - 1-pistillate; with carpels united.

صعوبات التعرف على بذور الحشائش

البذور مثلها مثل أى كائن حى توجد عوامل خارجية تؤثر عليه من حيث الحجم والوزن والشكل واللون والسطح مثل : درجة النضج ، الأمراض ، المناخ ،كذلك مصاحبة بذور المحاصيل لبعض الحشائش التى تنتمى لنفس النوع يجعل هناك صعوبة شديدة للفصل بينها ، لما كان هناك تباين كبير بين أنواع بذور الحشائش فهناك إختلاف ضئيل غير منظور لبعض بذور الحشائش التى تنتمى لنوع واحد وبينها وبين بذور المحاصيل لنفس النوع فهذا يحتاج إلى خبرة الباحث الفاحص ومعرفتة التامة بمفاتيح التعرف على بذور الحشائش مع إستخدام بعض الأدوات المساعدة مثل العدسة المكبرة والميكروسكوب والفيديو بينوكلر.

تمييز البذور Seeds definition

أهمية التعرف على البذور

تعتبر البذور من أهم أجزاء النبات المختلفة فهى وسيلة المحافظة على النوع بما تحمله من العوامل الوراثية للآباء لتعيد الحياة للأجيال الجديدة،كما تعتبر أهم وسيلة للأنتشار على مختلف أجزاء الأرض ،كذلك فهى الوسيلة لانتخاب النباتات التى تحمل الصفات المرغوبة عن طريق التربية والتهجينات المختلفة. لذلك تعتبر البذور هى منشأ الأنواع القديمة والجديدة للنباتات والتى تزيد عن ربع مليون نوع.

ومن الأهمية كذلك معرفة بعض الأجزاء الآتية بالبذرة:

- السرة Hilum : وهى مكان إتصال الحبل السري بالبويضة (البذرة).
- النقير Micropyle : وهى فتحة بجدار البذرة .
- الرافى Raphe : موضع التحام الحبل السري مع الغلاف الخارجي للبويضة ويظهر هذا الالتحام كخط يمتد من السرة إلي الكلازا.
- الكلازا Claza: وهي قاعدة النيوسيلة (موضع نشوء البويضه) وتظهر كبقعة أو نتوء .

تتميز البذور ببعض الصفات الظاهرية وكذلك ببعض الصفات الداخلية ومن أهم صفات التعرف على البذور الشكل والحجم واللون وملمس السطح ويختلف من النعومة واللمعان إلى الخشن أو الغامق أو ما يحملة من نتوءات أو إنخفاضات . وايضا من الصفات الظاهرية وجود أجنحه ، شعيرات ، سفا وتعتبر صفات السرة من حيث الشكل والحجم والوضع علامات مميزة .

وتوجد أيضا بعض الصفات الداخلية مثل شكل الجنين وحجمة وسمك الجدار المحيط به ووجود أو غياب الأندوسبرم المحيط بالجنين.

الصفات الطبيعية للبذور

الحجم:

إما بالقياس: صفر – 2 مم ، 2-5مم، 5-8 مم، 8-12مم، أكبر من 12 مم

أو بالوصف: بالغ الصغر Tiny، صغير جداً Very small، صغير Small، صغير بعض الشيئ Smallish، متوسط Medium، كبير نسبياً Biggish، كبير Big، كبير جداً Very big، له إمتداد Tails .....

اللون Color:

الشاحب colorless – الأصفر Yellow – البني Brown – الأحمر Red – الأسود Black وكل لون له درجات وهذه الالوان هى الشائعة لبذور الحشائش وقد تكون لامعة أو داكنة.

الشكل Shape: بدون شكل واضح No-shape – دمعة Tear drop- كروي Spherical globose – له جانبين أو 3 جوانب أو 4 جوانب- مضلع Ribbed – بيضة Egg – مستطيل Oblong – مجنحة Winged - دائري Round- مسطح Flat- كلوي Kidney- هلال Crescent – إهليجي Elliptical- غير منتظم Irrigular- قلم Linear- بيضي Ovate- مجعد Wrnked.

القوام Texture:

لسطح البذرة وما يحمله من إمتدادات أو ما يلتصق به من جزء من الغلاف الزهري: -

ناعم Smooth - خشن rough- عليه شعر خشن دقيق Bristly- أثر ندبة السرة distinictive (ندبه Scar- سن أو ممر أو حز Noth) أخدود علي أحد سطحي البذرة Grooved- قمة مرتفعة (شفه مرتفعة) Ridged- خصلة شعر Tuft or Pappus عقدي nodular.

وتوجد صفات أخري مساعده:

الجنين Embryo شكل وموقع وحجم الجنين ولونه.

السرة Hilum وهو موضع اتصال الحبل السري بجدار البويضة.

Seeds:

Mature seeds are usually not yet present on a plant that bears the flowers necessary for identification. However, in some genera like Mentzelia and Epilobium seed characters may actually be used as categories in the key. In such cases seeds may be obtained from more mature individuals or even from fruits of the pereding year. The various seed Testing Laboratories have developed a technique whereby they can identify the seeds and small fruits of common weeds when they come in as contaminate in crop seeds, but, here the actual possibilities are limited of course. Many different kinds of seed are sold to farmers and homeowners each year. So, most be assured of getting correct of seed, it is important to be able to identify the seed needed. Also, if a mixure of seed is present, it is important to be able to determine if weed seed are mixure. Some seeds of these weeds are poisonous to human and animals. Seeds have different characteristics, some seeds are long, short, flat, round or three cornered while others are smooth or rough and seed weeds have solid color, two-toned or multi-colored

Seeds vary in different ways, the commonest ones listed below: -

1 – Size: - The coconut has a very large seed, the orchid a very small one.

2 – Hairs: - Some seeds bear hairs such as in Epilobium (fireweed) and Asclepias (milkweed), these functions in aiding the distribution of these objects by wind.

3 – Wings: - Some seeds as well as some fruit have wings, like those borne by some species of Mentzelia (stickleaf); these may be used in classification.

4 – Shape: - The typical shape is round or oval, but, seeds may vary widely in this respect.

5 – Color: - Seeds may vary strikingly in color, but, sometimes the difference may be so subtle that it can be perceived only by trained eyes like those of an expert seed analyst. An example of a conspicuous color is found in a species of Sophora (coral bean) which has a bright scarlet seed.

6 – Surface markings: - Seeds may have very elaborate and striking designs and surface sculpturings, these often taking the form of raised or indented tracery.

7 – Hilum and **raphe: -** The scar where the seed broke away from the fruit (hilum) and the ridge that appears adjacent to it (raphe) often vary in shape, prominence, position and act.

8 – Embryo: - The position, size, shape and number of the cotyledons (Goosefoot family). This means that mature seeds and fruit are necessary in order to secure a positive check on this gharacters, which means a rather close study under a dissecting microscope or good hand lens.

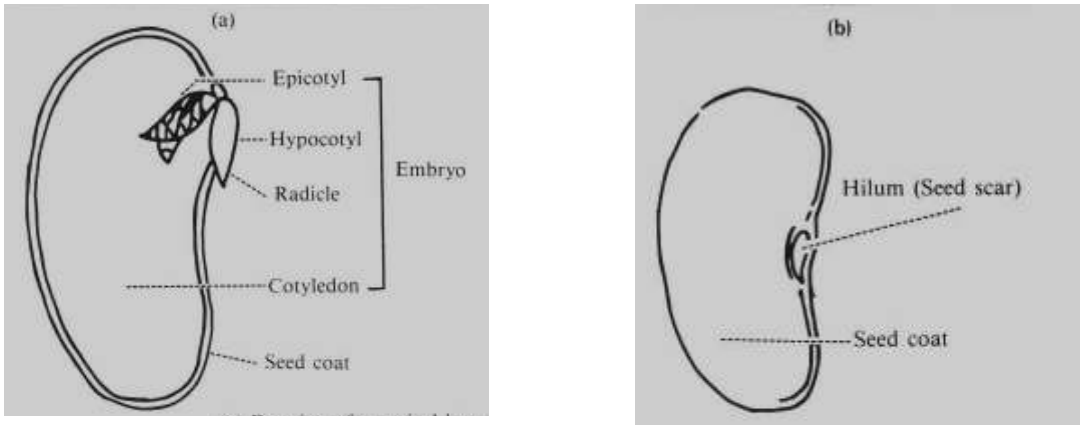
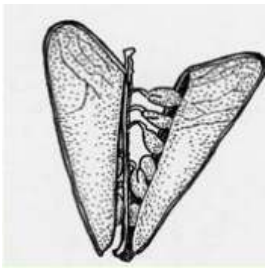
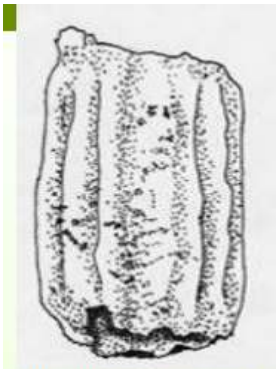


Figure (1): Legume seed a): showing one cotyledon presented (b): showing external features

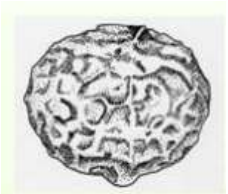
Family Brassicaceae: Mustard family



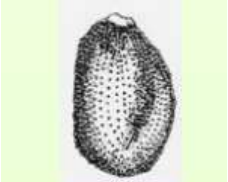
Capsella bursa-pastoris
silicle with seeds



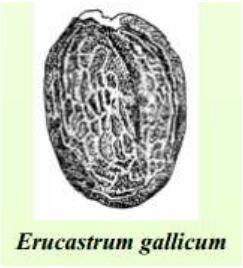
Raphanus raphanistrum
segment of silique



Neslia paniculata
indehiscent silicle



Camelina microcarpa



Erucastrum gallicum

Thlaspi arvense

Nasturtium officinale

Grassy seed: – produced in spikelet (cluster), in one group of grsses the spikelets contain several seeds arranged along a common axis called rachis. When mature the spikelet break to parts, each seed retaining a piece of the rachiilla, which is a stem-like structure extending up from the base of the seed on the grooved side. Its presences, shape, size and position are valuable in identification. In another class of grasses, each spikelet contains one seed only, therefore, the rachilla may be abortive or absent. Most of the grass seed including oats and barley, appear in the chaff after harvest. That is the seed are covered by two dried chaffy called the glumes. The outside, larger glume, on the back of the seed is called the lemma. The inside glume on the front of the seed is the palea. The lemma usually laps over and partially covers the palea. The characteristic of these parts are usually laps over and partially covers the palea. The characteristics of these parts are useful in identification. The seed of some grasses are naked or only partially covered after harvested, which is an aid in identification.

Some grass seed have awons attached to the lemma. Others have hairs (pubescence) on the base of the seed. The presences or absence of these features are also used in identification. Seeds also differ in size, color and shape ((Figer 2).

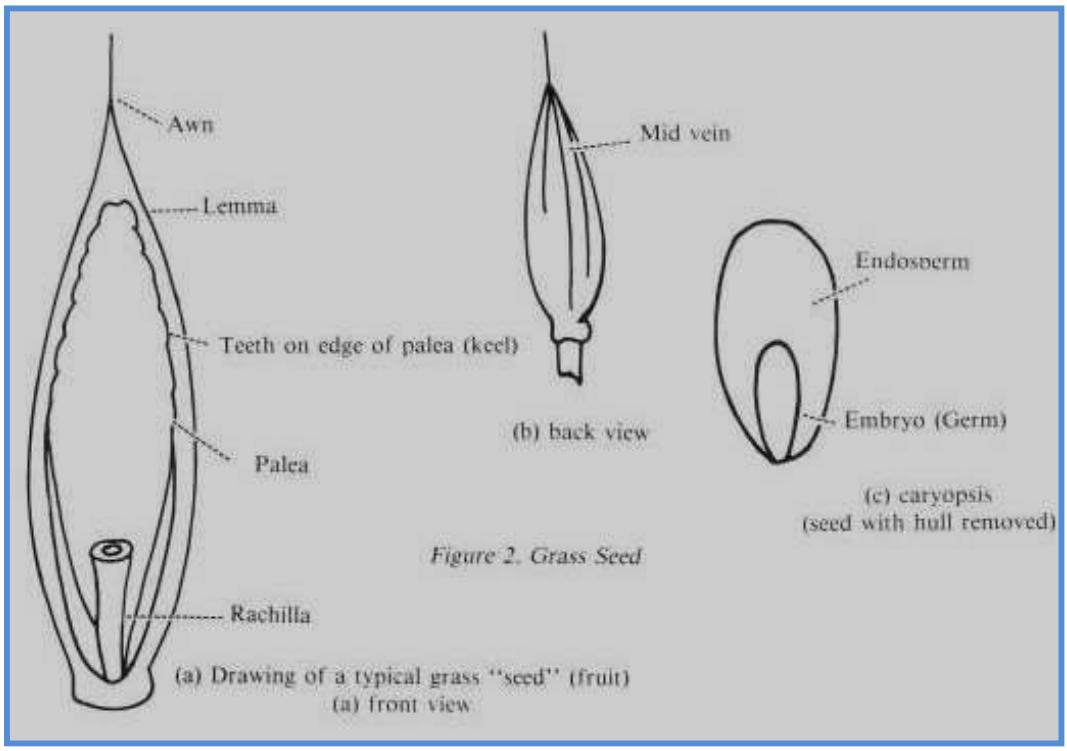


Figure (2)

Reference

Book "**Plant and seed Identification**". The Unv. Of Tennessee Agr. Etension Service PB 1046, pp. 16 – 18.

Weed Research Central Laboratory - Agricultural Research Center

1- Mandate:

Increasing contributions of basic and applied weed research in increasing agriculture production through weed control in 15 million feddans by minimizing yield losses caused by weeds which estimated by 15-20% of national agriculture production.

2 -Objective:

The objective is to improve field and horticulture crops productivity through weed control research and technology transfer.

3- Current research:

The activities of weed research workplan included main 8 subjects and 33 research points which conducted by weed research laboratory staff in cooperation with other institutes of ARC and other administrations of ministry of agriculture i.e. extension, pest control and agriculture quarantine to develop weed control recommendations which should be applied in 15 million feddans, and increasing its productivity by 15-20% according to the application of integrated weed management.

Subject 1: Integrated weed management in field crops.

Subject 2: Integrated weed management in horticulture crops.

Subject 3: Biological and ecological studies for key weed species.

Subject 4: Integrated weed management in ditehbanks and branched canals and drains.

Subject 5: Study the nature of orobanche and dodder parasitisms.

Subject 6: Use computer programs in weed research and its applications.

Subject 7: Evaluation the efficacy of herbicides on weed control in field and horticulture crops.

Subject 8: Estimation yield losses in field and horticulture crops in Egypt.

Subject 9: Inspection of contamination imported and exported plant materials with weed seeds and weed risk assessment of noxious and poison weed species and invasive alien plants and weeds in quarantine services.

Achievements of Weed Research laboratory:

2– In the field of inspection of imported wheat and maize shipments :-

More than 1100 imported samples from wheat and maize shipments come from Agriculture quarantine were inspected to estimate the degree of weed seeds contamination in

wheat . 89.8% of there samples were accepted, 10.2% of them were refused from wheat shipments due to its has level of contamination by weed seeds (more than 25 seeds/kg wheat sample) and had been cleaned again to less than permissible level.

3 - Weed Risk Analysis

In the field of weed risk assessment :-

Seeds of *Ambrosia artemisifolia* and *A. trifida* species pre – entry assesmentrecorded a serious quarantine species. These weed species was not presented in Egypt for this reason weed risk analysis had been carried out in Laboratory during the last period by determining (A) Weed entry (b) weed establishment and (c) its economic impact. Results had indicated that degree scale referring to be considered as quarantine weed and any imported materials to Egypt (should be free from seeds of these species).

1. Number of work plans to prioritize harmful organisms list to regulate and monitor.

There are 5 plans:

a) Inspection of Sample as the following: -

b) - Screaning test for sampling and inspection forgeen seeds in the sampling of plant materials under study.

c) Identifying foreegn seeds by the following methods: -

d) 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.

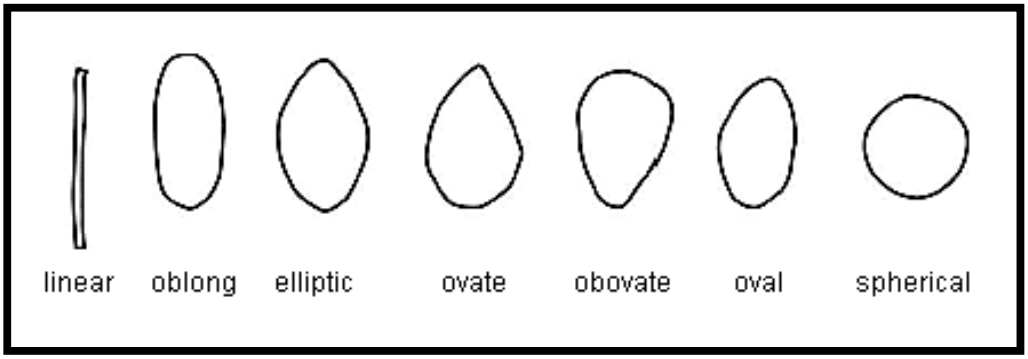


Figure 3 – Outline shapes (adapted from Felfoldi, p. 276)

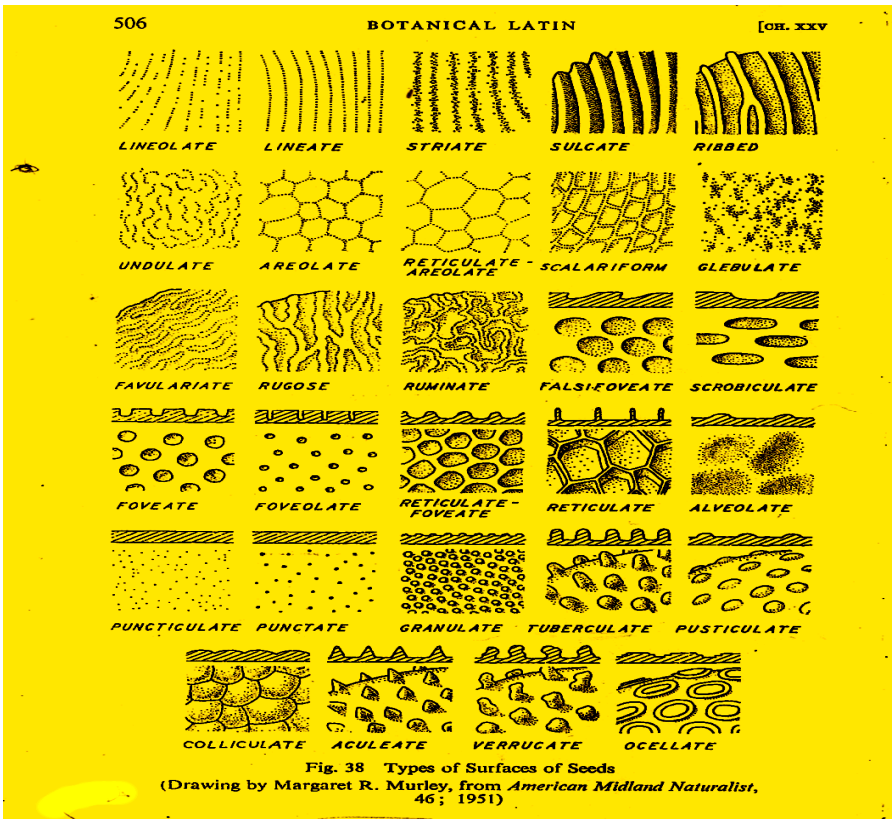


Figure 4 – Description for different tixure

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.

Then classification these forgeen seeds to three classes as the following: -

1- Variants seeds of growing crops.

2- Seeds of weeds presented and distribution in growing soil of Eggypt.

3- Seeds of weeds presented and rarely distribution in growing soil of Egypt.

4- Seeds of weeds not presented in growing soil of Egypt.

e) Collection information about risk assessment of a new forgeen seed weeds which did not presente in Egypt countries which distribution of these forheen weeds.

f) Studying the ability of different types of quarantine weeds to localize and outbreak in the country.

g) Response of quarantine invading weeds to the weed control plan.

2. Number of Pest Risk Assessment realized.

The risk of the following weeds are assessed Ragweed (*Ambrosia* spp.) – Wild Oats (*Avena fatus*), - *Phalaris*, Bind weed (*Convolvulus erubescens*), Rye grass (*Lolium* spp.) by the following scientific methods for studeing of weed risk assessment as following:

b. Method of detection

Weed seed detection was carried out by video microscopes and magnified lens and the count was carried out as no. / kg of grains.

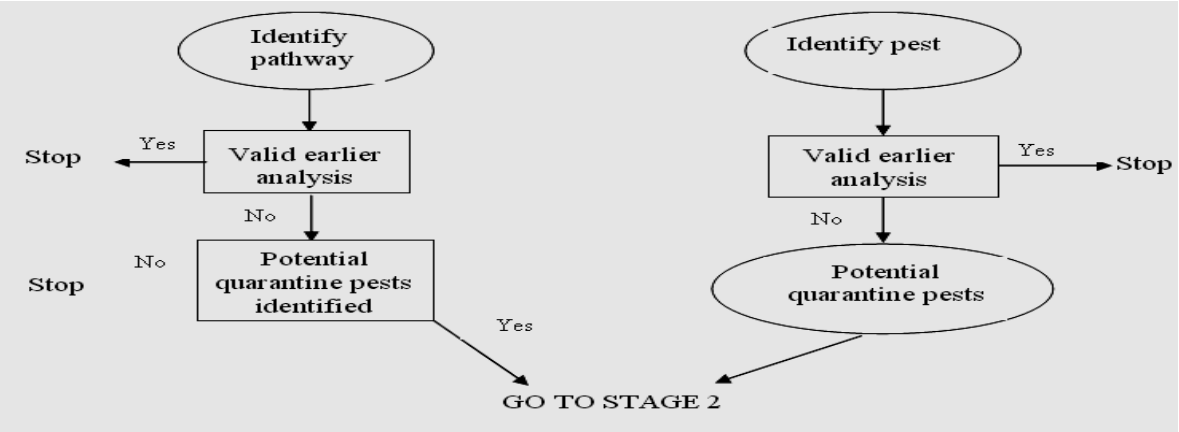
c. Weed risk assessment

Plant protection services and their quarantine sections should be able to determine the likelihood of introducing or spreading invasive species and also to determine adequate measures to minimize their potential harm. The three steps indicated in IPPC pest risk analysis have to figure Pest risk analysis flow chart (from FAO, 1996) (Appendix 1).

The WRA is based on the answers to 44 questions, according to the scoring format (as shown in appendix 2) covering of weed attributes in order to screen for taxi that are likely to become weeds of the environment and/or agriculture. The questions are divided into three sections producing identifiable scores that contribute to the total score (Witold 2001).

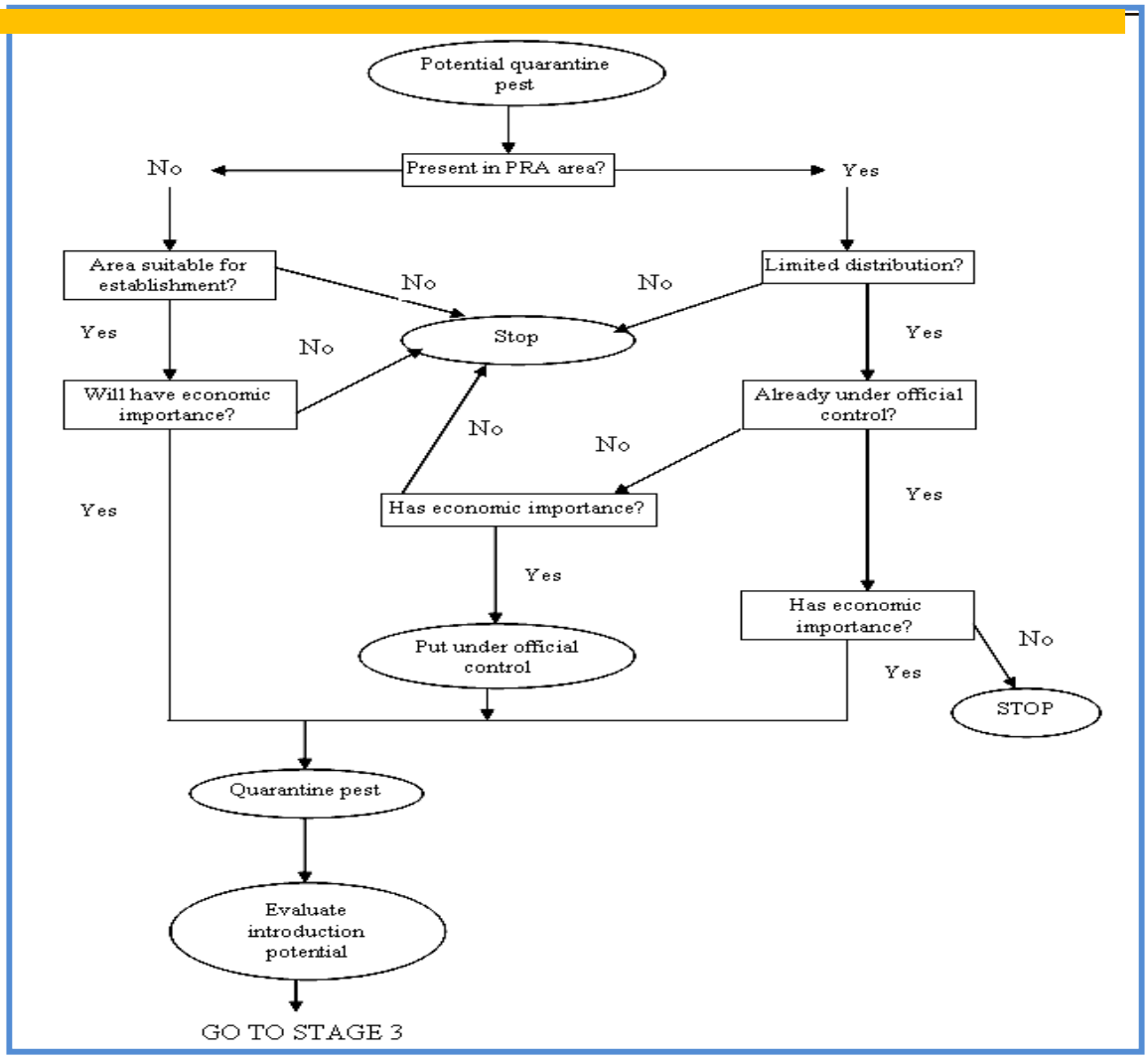
Stage 1:- identification of the pathway that may allow the introduction and spread of the exotic plant.

Stage1:-initiation

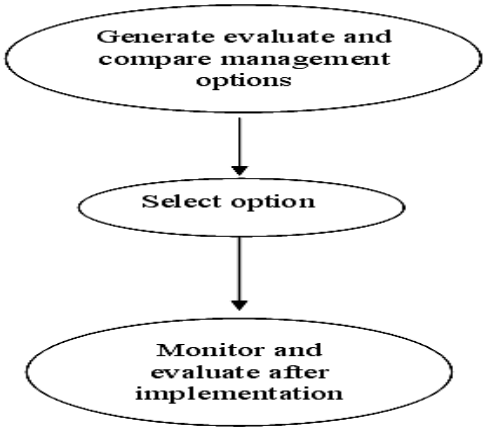


Stage 2:- pest risk assessment, which consists of considering all aspects of each plant and in particular, available current information about its geographical distribution, biology and economic importance. This information is then used the establishment, spread and economic importance potential in the endangered area and finally, characterization of the potential of introduction

Stage 2: Weed risk Assessment



Stage 3:- pest risk management determining phytosanitary measures to be applied to effecprotect the endangered area.



WRA area

The WRA area is the territory of Egypt.

Weed Risk Analysis (WRA) of the territory of Egypt (as WRA area) was carried out on the basis of information compiled in the format of EPPO PRA Guideline no. 1 "Check-list" of information required for PRA (OEPP/EPPO, 1993) (Part A) with some modification caused by the nature of the pest - weeds are not considered by the author of standard "Check-list" to be analyzed. Appendix (1): -

1. Probability of introduction (Entry): -

- As a contamination of plant material being in trade.

1.1. How many pathways could the weed be carried on?
(Few = 1, many = 9)

1.2. How likely are the pests to be associated with the pathway at origin?
(Not likely = 1, very likely = 9)

1.3. Is the concentration of the pests on the pathway at origin likely to be high?
(Not likely = 1, very likely = 9)

1.4. How likely are the pests to survive existing cultivation and commercial practices**?**
(Not likely = 1, very likely = 9)

1.5. How likely are the pests to remain undetected during inspection or testing?
(Not likely = 1, very likely = 9)

1.6. How likely are the pests to survive other existing phytosanitary procedures?
(Not likely = 1, very likely = 9)

1.7. How likely are the pests to survive in transit?
(Not likely = 1, very likely = 9)

1.8. Are the pests likely to multiply during transit?

(Not likely = 1, very likely = 9)

1.9. How large is movement along the pathway?

(Not large = 1, very large = 9)

1.10. How widely is the commodity to be distributed throughout the WRA area?

(Not widely = 1, very widely = 9)

1.11. How widely spread in time is the arrival of different consignments?

(Not widely = 1, very widely = 9)

1.12. How likely are weed to be able to transfer from the pathway to a suitable crop - with plant material in trade?

(Not likely = 1, very likely = 9)

1.13. Is the intended use of the commodity likely to aid introduction - with plant material in trade?

(Not likely = 1, very likely = 9)

Establishment

1.14 How many kinds of crops where the pests could develop are present in the WRA area?

(**One or few = 1, many = 9)**

1.15. How extensive are the crops where the pests could develop in the PRA area?

(Rare = 1, widespread = 9)

1.16. How similar are the climatic conditions that would affect Weeds' establishment in the WRA area and in the area of origin?

(Not similar = 1, very similar = 9)

1.17. How similar are other a biotic factors in the WRA area and in the area of origin?

(Not similar = 1, very similar = 9)

1.18. How likely are the pests to have competition from existing species in the PRA area for its ecological niche?

(Very likely = 1, not likely = 9)

1.19. How likely is establishment to be prevented by natural enemies already present in the PRA area?

(Very likely = 1, not likely = 9)

1.20. If there are differences in the crop environment in the WRA area to that in the area of origin are they likely to aid establishment?

(Very likely = 1, not likely = 9)

1.21. Are the control measures, which are already used against other pests during the growing of the crop likely to prevent establishment of the pests?

(Very likely = 1, not likely = 9)

1.22. Is the reproductive strategy of the pests and duration of life cycle likely to aid establishment?

(Not likely = 1, very likely = 9)

1.23. How likely are relatively low populations of the pests to become established?

(Not likely = 1, very likely = 9)

1.24. How probable is that the pest could be eradicated from the PRA area?

(Very likely = 1, not likely = 9)

1.25. How genetically adaptable are the pests?

(Not adaptable = 1, very adaptable = 9)

1.26. How often have the pests been introduced into new areas outside their original range?

(Never = 1, often = 9)

2. Economic impact assessment

2.1 . How important is economic loss caused by the pests within their existing geographic range?
(Little importance = 1, very important = 9)

2.2. How important is environmental damage caused by the pests within their existing geographic range?
(Little importance = 1, very important = 9)

2.3. How important is the social damage caused by the pests within their existing geographic range?
(Little importance = 1, very important = 9)

2.4. How extensive is the part of the PRA area likely to suffer damage from the pests?
(Very limited = 1, the whole PRA area = 9)

2.5. How rapidly are the pests liable to spread in the PRA area by natural means?
(Very slowly = 1, very rapidly = 9)

2.6. How rapidly are the pests liable to spread in the PRA area by human assistance?
(Very slowly = 1, very rapidly = 9)

2.7. How likely is it that the spread of the pests could be contained within the PRA area?
(Very likely = 1, not likely = 9)

2.8. How likely are the pests to have significant effect on producer profits due to changes in production costs yields etc. in the WRA area?
(Not likely = 1, very likely = 9)

2.9. How likely is the pest to have a significant effect on consumer demand in the WRA area?
(Not likely = 1, very likely = 9)

2.10. How likely is the presence of the pests in the PRA area to affect exports markets?
(Not likely = 1, very likely = 9)

2.11. How important would other costs resulting from introduction be (e.g. costs of research, advice)?
(Little importance = 1, very important = 9)

2.12. How important is the environmental damage likely to be in the PRA area?
(Little importance = 1, very important = 9)

2.13. How important is the social damage likely to be in the PRA area?
(Little importance = 1, very important = 9)

2.14. How probable is that natural enemies, already present in the PRA area, will affect populations of the pest if introduced?
(Very likely = 1, not likely = 9)

2.15. How easily can the pests be controlled?
(Easily = 1, very difficulty = 9)

2.16. How likely are control measures to disrupt existing biological or integrated systems for the control of other pests**?**
(Not likely = 1, very likely = 9)

2.17. How likely are control measures to have other undesirable side effects?

(Not likely = 1, very likely = 9)

2.18. Are the pests likely to develop resistance to plant protection products?
(Not likely = 1, very likely = 9)

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Family: Amaranthaceae
Alternanthera pungens
Fruit 1–1.5 mm long, seed is amber colored, rounded and flattened laterally, may be found enclosed within bracts which are straw colored, 1 mm wide, brownish, globe-shaped.

Family: Amaranthaceae
Alternather sessilis
Seeds lenticular, ovate in outline, 0.9–1.5 mm long, 0.8–1 mm wide, 0.3–0.6 mm thick, with marginal hilar notch at broad end, hilum small, inconspicuous, testa glossy, smooth, dull orange or dark brown to black, with faintly visible reticulation, embryo peripheral, visible on surface under testa, encircling perisperm.

Family : - Astraceae
Ammania aegyptiaca
Seed triangular to ovate shape, 0.25 – 0.5 mm diameter, brown to black color**.**

Family : Brassicaceae
Capsella bursa-pastoris
Seed is 0.5 to 0.75 mm long, 0.5 mm wide , oblong with rounded ends shape, usually a red-brown, can be rusty red with a darker hilum area, distinct, large-celled net pattern (reticulum) of squares or longer-thanwide cells.

Family : - Caryophyllaceae
***Cerastium vulgtum* (L.)**
Seeds 0.5-0.8 mm size, triangular or angular-oboval shape, surface with short tubercles in texture, reddish brown

Family: Caryophyllaceae
Silne aegyptiaca
Seeds 0.5 – 1.2 mm size, kidney shape, Vein in texture, Yellowish-tan, and soon weather to an olive brown

Caryophyllaceae
silene dioica
rounded, kidney shaped, 0.5-1.5 mm long; dark tipped, cone shaped tubercles (warty bumps) in concentric rows, increasing in size away from the hilum (seed base); base of tubercles bordered by zig-zag pattern

Caryophyllaceae
Silene latifolia subsp. alba
compressed kidney shaped, 0.5- 1 mm; rounded, irregular shaped tubercles (warty bumps) concentric from hilum (seed base)

Caryophyllaceae
Silene noctiflora
Seeds rounded, kidney shaped discs, 0.5-1.5 mm long; ridged margins; lanceolate tubercles (warty bumps) in concentric rows

Family: Caryophyllaceae
Silene pratensis
Seeds 1 - 1.5 mm size, kidney shape, surface flattened on one side in texture, straw, brown to black .

Family: Caryophyllaceae
Silene vulgaris subsp. vulgaris
Seeds compressed kidney shaped, 0.5- 1 mm; rounded, irregular shaped tubercles (warty bumps) concentric from hilum (seed base).

Family: Caryophyllaceae
Spergularia marina
Seeds 0.25 x 0.25 mm size, obovate shape, tuberculate in texture, brownish.

Family: Cruciferae
***Sisymbrium irio*, L**
Seed 0.9 x 0.5 mm size, long ovate, light yowlish,

Cyperaceae
***Cyperus alopecuroides* Rottb**
Seed 0.5 x 1 mm size, oblong, yollow, brown to black color.

Cyperaceae
***Cyperus difformis*, L**
Seed 0.2-0.5 mm size, elliptical shape brownish – yellowish.

Family : Chenopodiaceae
Chenopodium ambrosoides
Seeds 0.7x 0.9 mm size, spherical, smooth texture, black

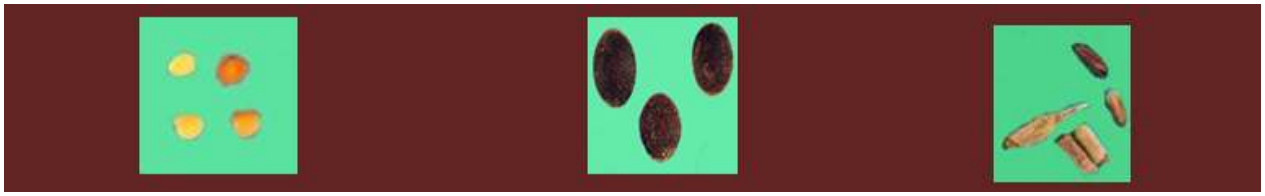
Family: - Clusiaceae
Hypericum perforatum
Oval seed, end of the seed is rounded, giving the entire seed a cylindrical appearance, dark brown or black seeds 0.6 – 0.7 mm long.

Family: Cruciferae
Rorippa islandica
Seeds 0.6 x 0.9 mm, kidney shape, brown color.

Family : Euphorbiaceae
Euphorbia arguta
Seeds 0.5 – 1 mm, black, ovate seed coat, and surface have tuberculation.

Family : - Euphorbiaceae
Euphorbia chamaesyce
Seeds obovate, 1 x 0.5 mm size, one end pointed, the surface tuberculate, brown color.

Family : - Euphorbiaceae
Euphorbia hirta
Seeds 0.5 – 0.9 x 0.9 - 1 mm size glossy brown, with 4 – 5 angled.



Family : Fabaceae
Trifolium glomeratum
Seeds 1-1.2 mm size, yellow to pale brown in color. Seed is round or spoon shaped, with the seeds being flattened. Seed surface is smooth, round shape.

Family : - Hydrophyllaceae
Ellisia nyctelea
Seeds 0.8-1 mm long, nearly round shape, surface pitted or veined in texture, dark brown or nearly black

Family: Lythraceae
Lythrum salicaria
seed is an irregular shape, .75 mm in size, often angular, light tan, amber colored and finely pitted, with longitudinal indentation along the surface, a papery coat partially covers the seed, (Hickman 1993).

Family: Labiatae
Mentha microphylla, C.Koch
Seeds less than 0.5 mm size, ovate shape, few particulate in texture, brown.

Family : - Moraceae
Morus alba
Seeds 0.8 - 1 mm long, tight , elongated cluster shape, surface glassy in texture, white to Reddish brown

Orobanchaceae
***Orobanche crenata* Forssk**
Seeds less than 0.5 mm size, obovate shape, large pusticulate in texture, black.

Family: Papaveraceae
Papaver somniferum
The kidney shaped seed may be white to dark brown in color, surface is covered with many regular shaped indentations, round, brown or black color, 0.7 mm, reniform, net-ridged,

Family: Poaceae
Agrostis canna
Seeds 0.3x0.9 mm size, yellowish to. Brown color.

Family : Poaceae
Eragrostis cilianensis
Seeds 0.5 x 0.7 mm size, acute ovate shape, brown color.

Family: Poaceae
Sporobolus cryptandrus

Seeds 0.7 x 0.5 mm size, elliptic shape, smooth in texture, brown color.

Family : Portulacaceae
***Portulaca oleracea* (L.)**

Seeds 0.6-0.8 mm size, circular or slightly kidney shape, with rows of small tubercles, glossy or dull in texture, black.

Family : - Ranunculaceae
Ranunculus abortivus

Seeds 0.8 - 1 mm size, oval or circular shape, surface glassy in texture, white to Reddish brown

Family: Scrophulariaceae
***Striga* spp.**

Seeds elliptic, ovate, oblong, occasionally D-shaped, triangular, rhombic, or irregular; often twisted or angled from crowding or position in capsule; tiny, dustlike, 0.2–0.6 mm long, 0.1–0.3 wide and thick. Orange to golden-brown, light to dark brown, or gray to blackish; sometimes sparkling with colored light at high magnification, surface glabrous.

Family : Fabaceae
Kummerowia stipulacea

Seeds, 0.8 – 1 mm long, oval to oblong shape, legume ovoid or elliptic, ca. 3 mm, usually 2.5-3 × as long as calyx, slightly compressed.

Family : Fabaceae
Kummerowia striata

Seeds, 1 mm long, ovat to oblong shape, legume ovoid or elliptic, ca. 3 mm, usually 2.5-3 × as long as calyx, slightly compressed.

Family : - Amaranthaceae
***Amaranthus albus* (L.)**
Seeds 1-1.2 mm size, oval or circular shape, surface smooth, glossy in texture, reddish brown or black.

Family : Amaranthaceae
***Amaranthus blitoides* (L.)**
Seeds 1-1.5 mm size, Oval or circular shape, Wrinkled to froma net-like pattern on the sides in texture, Reddish brown or black.

Family : - Amaranthaceae
Amaranthus graecizans
Seeds 1.5 mm size, Lens shape, Small notch at the narrow end in texture, Dark brown to black.

Family : - Amaranthaceae
***Amaranthus hybridus* (L.)**
Seeds 1-13 mm size, Oval or circular shape Surface smooth, glossy in texture, Reddish brown to black

Family : - Amaranthaceae
***Amaranthus palmeri* (L.)**
Seeds 1-1.5 mm size, Oval or circular shape, Surface smooth, glossy in texture, Reddish brown.

Family : Amaranthaceae
***Amaranthus powellii* (L.)**
Seeds 1-1.3 mm size, Oval or circular shape, Surface smooth, glossy in texture, Reddish brown or black.

Family : Apiaceae
***Ammi majus* L**
Seeds oblong- or egg-shaped segments, 1.5 - 2 mm long, with pale ridges.

Family : - Apiaceae
Conium maculatum
Seeds 1.5 - 2.25 mm size, Oval , flattened on one side shape have conpi couous wavy ribs in texture, Pale brown

Family : - Apiaceae
Coronopus squamatus
Seeds 1.5 x 0.75 mm size, Oval or ablong shape, flattened on one side wavy ribs in texture, Pale black .

Family: - Asteraceae
***Anthemis cotula*, L**

Seeds 1.2–1.8 mm size, conical often slightly curved square or otherwise angular, surface with distinctive lengthwise ridges and inconspicuous tubercles light tan to brown

Family: - Asteraceae
***Chrysanthemum balsamita var. leucanthemum* (L.)**
Seeds 1.5-2 mm, narrowly oboval, bearing a tubercle at the apex, dark brown to black with white longitudinal ribs, usually covered with white spots

Family: - Asteraceae
***Cichorium pumilum*, Jacq**

Seeds 1–3 mm size, cone like shape, reticulate in texture, yellow to brown.

Family: - Asteraceae
***Conyza bonariesis* (L.) Cronquist**

Seeds are light brown, 1.5 - 2 mm long and thin (about 0.5 mm), and tufted by a parachute of 16 – 20 fine hairs 4 – 6 mm in length that assist in the aerial dispersion of this weed.

Family: - Asteraceae
Eclipta prostrata,* (L.) = *Eclipta alba,*(L.*) Hassk.
Seeds 1 x 2 mm size, surface, oblong tuberculated, brown to black.

Family: - Asteraceae
***Gnapholium luteo - album* , L**

Seeds 1x0.5mm size, tube disc and long hair shape, hairy in texture, brown.

Family: Asteraceae
***Parthenium hysterophorus* L.**
Seeds are striped grey to black and a narrow diamond shape, 2 mm long and flattened. They have a brown tuft on the end formed from 2 broad scales 0.5 mm long. Seeds are tightly grasped in a brown outer coat

Family: Asteraceae
***Senecio glaucus,* L.**
Seed 1x0.5mm size, tube disc and long hair shape, hairy in texture, yellowish to brown.

Family: Asteraceae
***Sonchus oleraceus* L.**
Seeds are 1 - 3 mm long, up to 1 mm wide brown, light with white parachutes of silky hairs, 6 - 7 mm long which allow them to be dispersed in the wind.

Family : - Brassicaceae
Barbarea vulgaris
Seeds 1-1.1 mm size, broadly oval shape, natch at one end in texture, dull grayish-brown.

Family : - Brassicaceae
Berteroa incana
Seeds 1 mm size, circular shape, surface narrowly winged flatted in texture, granular and purplish brown.

Family : Brassicaceae
***Brassica juncea* (L.) Czern. et Coss**
Seeds length 1.6-3 mm, width 1.2-2.1 mm, outline - nearly round or oval, obliquely-oval shape, prominent reticulations in texture, yellow to dark yellow with a small percentage of dark brown and slightly rough seeds

Family : Brassicaceae
***Brassica napus* L.**
Seeds length 1.1-2.6 mm, width 1.3-2.3 mm, outline - approximately spherical, obliquely-spherical, squarish shape, faintly reticulated, may be barely discernable in texture, reddish (especially when immature), grey, grey-black, black

Family : Brassicaceae
***Brassica rapa* L.**
Seeds length 1.5-2 mm, outline - oval, oblong, obliquely-oblong, occasionally spherical shape, seeds are reticulated but in some cases reticulation is faint or obscured in texture, mixed colors including yellow, yellow-brown, red-brown, red-grey, dark brown and mottled colors.

Family : Brassicaceae
Cardaira draba
Seed is 1 - 1.25 mm long, 0.75 mm wide , oblong with rounded ends to oval shape, slightly flatlened granular in texture, reddish-brawn.

Family: Brassicaceae
Carrichtera annua
Seeds globe-shaped, 1–1.5 mm long, compressed, dark brown, are generally found within a rounded seed pod. A flattened style extends from the centre of the pod, this may be as wide as the rounded part of the seed. fruit 6–8 mm long, upper segment leaf-like, lower segment 3-veined, 2–4 mm long and 3–4 mm wide.

Family : - Cruciferae
***Lepidium virginicum* (L.)**
Seeds 1-1.5 mm size, oval to obovate in outline, frequently with one margin convex and the other straight, a single central groove runs inwared from the hilum to about one-fourth of the seed, surface is dull, finely granular in texture, orange to reddish-brown .

Family : Brassicaceae
Lepidium spp.
Seed 1.5 – 2 mm long, amber colored with a matt finish. A distinctive light colored rim appears as a narrow wing along the curved edge of the seed spoon shaped.

Family: Brassicaceae
Neslia paniculata
Seed 1 – 1.5 mm size, yellow to brown depending upon maturity. A veined surface on a round seed with a short apical point. Often found in cream coloured pods at maturity.

Family : Brassicaceae
***Rorippa* spp.**
Seeds 1-1.3 mm size, pear shape, Slightly flattened and roughened in texture, dark red or brown .

Family : Brassicaceae
***Sinapis alba* L.**
Seeds 12-1.5 mm, oval shape, smooth with no radical ridge or groove in texture, yellowish-tan to orange-brown color.

Family : Brassicaceae
***Sinapis arvensis* L.**
Seeds diameter 1.3-1.7 mm, outline - spherical, occasionally immature seeds are oval shape, general appearance is smooth with no radical ridge or groove in texture, highly variable; tan, orange-brown, red-brown, brown, grey, black

Family: Brassicaceae
Sisymbrium officinale
Seed is reddish brown in color with a matt appearance oval in shape with an angular appearance.. The small seeds are short-cylindrical in shape, slightly flattened, reddish brown, and about 1 mm. in length. The root system consists of a taproot. This plant spreads by reseeding itself.

Family: - Brassicaceae
***Sisybrium thellingii* O.E.Schulz**
Seeds are brown color, egg-shaped, 1 -1.5 mm in length.

Family : Brassicaceae
***Thlaspi arvense* L.**
Seeds length 1.6-2 mm, width 1.1-1.4 mm, outline - oval, ovate or obovate shape, seed surface flatted covered with distinct concentric ridges or loops like a fingerprint in texture, dark reddish-brown to black.

Family: Caryophyllaceae
***Saponaria officinalis* L.**
Seeds 1.5 – 2 mm, fruits are many-seeded capsules. Seeds are dull-black and roundish or kidney-shaped.

Family: Caryophyllaceae
Silene noctiflora
Seeds 1/16 inch (1.25 mm) kindey knobby surface, roughened with rows of fine tubercles, grayish brown.

Family: Caryophyllaceae
***Silene pallida* ,(Dumortier), Pire.**
Seeds brown-red, 1 mm kidney or spherical shaped.

Family: Caryophyllaceae
***Silene rubella*, L**
Seeds 1.0 – 1.5 mm long, globular, brown color.

Family : - Caryophallaceae
***Spergula arvensis* (L.)**
Seeds 1-1.8 mm size, circular or nearly so, ellipitic shape, surface dull in texture, dark br Gray to black with a light- brown marginal wing and numerous light flecks.

Family: - Caryophyllaceae
***Stellaria media*, L.**
Seeds brown-red, 1.2 mm kidney or spherical shaped, pinched hilum (seed base); covered in angular-rounded tubercles (warty bumps).

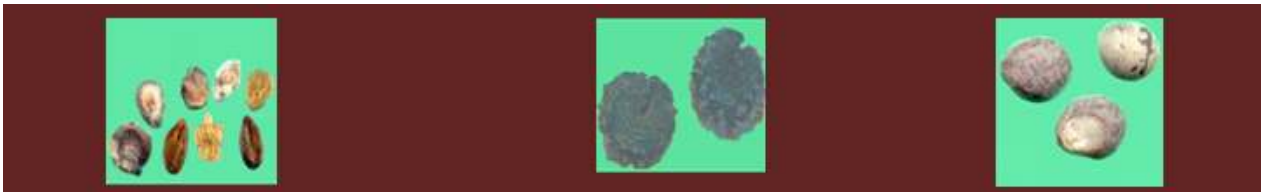
Family : - Caryophallaceae
Symphoricarpos occidentalis
Seeds 1 - 1.5 mm size, egg shape, surface flattened on one side in texture, straw .

Family: - Chenopodiaceae
Atriplex muelleri
Seeds 1 - 1.5 mm diameter, brown color, teardrop shaped..

Family : - Chenopodiaceae
***Chenopodium album* (L.)**
Seeds 1.2-1.6 mm size, circular shape, Veiny in texture, surface slightly roughened, glossy, black

Family: - Chenopodiaceae
***Chenopodium murale* ,L.**
Seeds 1x1 mm size, spherical shape smooth in texture, greenish black-brown.

Family : - Chenopodiaceae
***Chenopodium* spp**
Seeds 0.8- - 1.5 mm size, circular shape, surface glossy in texture, yellow to black.



Family : - Chenopodiaceae
Kochia scoparia

Seeds 1-1.2 mm size, oval shape, surface flattened, markings and are often enclosed in a hull texture, yellow to grayish - brown.

Family :- Cleomaceae
***Gynandropsis gynandra* L.**

Seeds 1.5 – 2 mm dimension, spherical shape, tuber collate surface, dark color.

Family : - Convolvulaceae
***Dichondra repens* var. *carolinensis* (Michx.) Choisy**
Seeds 1.8-2.2 mm size, oval shape, surface smooth but dull in texture, yellow to brownish.

Family : - Convolvulaceae
Convolvulus sepium
Seeds 3/16 inch (1.25 mm) rough flattened on one side and rounded on the others, black to dark brown.

Family : - Cruciferae
Daucus carota* subsp. *carota
Seeds 1 - 1.5 mm size, oval shape, surface longitudinal bristly ribs in texture, yellowish brown

Family : - Cruciferae
Daucus carota subsp. sativus
Seeds 1 - 1.5 mm size, oval shape, surface longitudinal bristly ribs in texture, yellowish brown .

Family : - Cruciferae
Erysimum cheiranthoides
Seeds 1-1.2 mm size, Oblong shape, surface flattened, markings and are often enclosed in a hull in texture, medium yellow or reddish-brown .

Family : - Cruciferae
Sisymbrium altissimum
Seeds 1 mm size, shape: oblong shape, surface slightly roughened, glossy, dark reddish-brown

Family : - Cruciferae
Sisymbrium loeselii
Seeds 1 mm, broadly oval, rough, dull, grayish-brown.

Family : - Cruciferae
Symphoricarpos occidentalis
Seeds 1 – 1.5 mm, egg flattened on one side straw

Family : Cuscuataceae
Cuscuta pedicellata
Seeds 1.1–1.2 mm size, Ovate shape, smooth in texture, yellow to brown.

Family: Cyperaceae
Carex lasiocarpa
Seeds 1-2 mm, trigonous nut, strongly punclate

Family: Cyperaceae
***Cyperus bifax* C.B. Clarke**
Seeds are light brown in color, 1.4 mm in length.

Family: Cyperaceae
***Cyperus eragrostis* Lam.**
Seed is dark brown, about 1.2 mm in length.

Family: Cyperaceae
***Cyperus rotundus* L.**
Seeds are brown to almost black in color 1.8 mm in length.

Family: Cyperaceae
Eleocharis palustris
Seeds 1-1.5 mm long, biconvex nut, yellowish-brown.

Family : - Euphorbiaceae
Acalypha gracilens
Seeds 1-1.5 mm size, nearly round shape, reddish – brown or grayish.

Family :- Euphorbiaceae
***Acalypha virginica* L.**
Each pistillate flower matures into a 3-celled seed capsule; each cell of the capsule contains a single ovoid-oblongoid seed about 1-2 mm. long.

Family: - Euphorbiaceae
***Aleurites moluccana* (L.) Willd.**

The fruit is globose or bi-globose, with 1-2 large, heavy seeds. Kukui tree ears two heavy crops each year. (Stone, B. 1970. The flora of Guam. Micronesica.) Fruit an indehiscent drupe, almost spherical, 5 cm or more in diameter, with thick, rough, hard shell making up 64-68% of fruit; difficult to separate from kernels; containing 1-2 hard-shelled black seeds.

Family : Euphorbiaceae
Chamaesyce drummondii
(Boiss.) D.C. Hassall
Seeds readily separate when mature, with each seed roughly a 1/3rd segment of a sphere, about 2 mm long.

Family : - Euphorbiaceae
Chamaesyce maculata

Seeds 1.1-1.6 mm long, oblong or oboval shape, surface pitted with transverse ridges in texture, Dark brown to black.

Family : - Euphorbiaceae
Euphorbia esula
Seeds 1-1.5 mm size, ovoid shape, dark line on one side and a yellowish appendage at the point in texture, light gray to brownish.

Family : - Euphorbiaceae
***Euphorbia geniculata,* Ortega**
Seeds 1 - 0.9 mm in diameter, spherical with one praetorian shape, particulate in texture, black.

Family : - Euphorbiaceae
***Euphorbia helioscopia,* L.**
Seeds 1.5-2 mm size, obovate shape, tuberculate in texture.

Family : - Euphorbiaceae
Euphorbia marginata pursh
Seeds 2 mm long, rough shape, light gray to dark brown.

Family : - Euphorbiaceae
***Euphorbia maculat* (L.)**
Seeds 1.5 - 2 mm size, oblong or oboval shape, surface pitted with transverse ridges in texture, yellowish brown.

Family : - Euphorbiaceae
***Euphorbia peplus*, L.**
Seeds 1 - 1.5 mm size, oval shape, surface longitudinal bristly ribs in texture, yellowish brown.

Family : - Euphorbiaceae
Euphorbia serrata
Seeds 1 - 1.5 mm size, nearly round shape, surface longitudinal bristly ribs in texture, dark brown to black.

Family : - Euphorbiaceae
Euphorbia spp
Seeds 1 - 1.5 mm size, oval shape, surface longitudinal bristly ribs in texture, yellowish brown.

Family : - Euphorbiaceae
Ricinus communis
Seeds fruit is burr like, with spines covering the entire surface. Three smooth and mottled seeds are contained within the burr and are released upon maturity, spoon shaped, seeds ovoid, tick-like, shiny, 0.5–1.5 cm long, carunculate, vari-color with base color white, gray, brownish, yellow, brown, red, or black.

Family : - Fabaceae
***Alhagi maurorum,* Medic**
Seeds 1.2-1.5 mm size, kidney shaped, dark brown, surface softly.

Family : Fabaceae
Medicago lupulina
Seeds 1/16 inch, 1.6 mm bean both sides smoothly rounded and have a point at the hilum Greenish to orangish- brown.

Family : - Fabaceae
Medicago sativa
Seed is tan to brown in colour, kidney shaped with a matt surface. Often seeds are found in a curled pod. The seed roughly oval (scra lies in board indetiation near one end or kindly shape twisted the congaxes (scar lies in middle of a didtinct notch). Colour greenish yellow or light brown, length 1.5 mm and width 2.5 mm to 3mm.

Family : Fabaceae
Medicago scutellata
Seeds are yellow to brown, shiny, kidney shaped with one end a more definite hood. The seed pod varies in color depending upon environment although is generally cream in color and appears similar to a snail shell.

Family : Fabaceae
Melilotus albus
Seeds 1 - 1.5 mm size, oval shape, surface longitudinal bristly ribs in texture, yellowish brown

Family : Fabaceae
Melilotus indica
Seeds 1.5 – 2 mm diameter, spherical shape, dark yellow to light brown.

Family : Leguminosae
***Melilotus siculus* (Turra) B. D. Jacks. = *M. messanensis* (L.) All.**
Seeds 1.3 X 1.0 mm size, dark brown color, surface foveolate in texture.

Family : Fabaceae
Robinia pseudocacia

Seeds 1-1,5 mm long, kidney shape, surface elongated and glassy in texture, dark brown.

Family: Leguminoseae
Swainsona spp.

The seed coat is often light to dark brown in colour. The seed is flat and kidney shaped with a pitted surface. The hairy, ovoid fruits are 13–20 mm long and 9–10 mm wide, enclose up to 20 seeds.

Family : Fabaceae
Trifolium campestre
Seeds 1.5-2 mm spherical or long kidney shape, surface elongated and glassy in texture, yellowish to dark brown color.

Family : Fabaceae
Trifolium dubium
Seeds 1.3 - 1.8 mm size, oval shape, surface longitudinal bristly ribs in texture, yellowish brown color.

Family : Fabaceae
Trifolium fragiferum
Seeds 1 - 1.5 mm size, oval shape, surface longitudinal bristly ribs in texture, yellowish, oil to brown color.

Family : Fabaceae
Trifolium hirtum
Seeds 1.5-2 mm, oval or long, kidney shape, surface elongated and glassy in texture, pal yellow to dark brown.

Family : Fabaceae
Trifolium hybridum
Seeds 1.5 - 2 mm size, oval shape kidney shape, surface longitudinal bristly ribs in texture, pal to dark brown color .

Family : Fabaceae
Trifolium incarnatum
Seeds 1 - 1.5 mm size, oval shaped and plump, surface longitudinal bristly ribs in texture, yellow to brown-yellow color and glossy.

Family : - Fabaceae
Trifolum resupantum
Seeds 1.5x1 mm size, oval shape, surface smooth texture, light yellowish to oil color.

Family : Leguminosae
Trifolium subterraneum
Seed 1.5 – 2 mm, round in shape with alight tapering at one point which creates a kidney shape. The surface is smooth and matt black in appearance. A white hilum is often visible.

Family : Leguminosae
***Trigonella hamosa,* L**
Seeds 0.5 x 1.5 mm width, oblong shape, dark color.

Family : - - Fabaceae
Vicia monantha
Seeds 1 – 1.5 mm size, flat-obovate shape, hard smooth surface texture, black color

Family : Geraniaceae
***Geranium carolinianum* (L.)**
Seeds 1.5-2 mm long, oblong shape, surface elongated with a fine network of veins in texture, light brown to dark brown .

Family : Geraniaceae
Geranium dissectum
Seeds 1 - 1.5 mm size, long, oblong, cervical shape, surface dull in texture, surface dull in texture grayish brown to reddish brown.

Family : Geraniaceae
Geranium solande

Seeds 1 - 1.5 mm size, shaped like an orange wedge, one surface convex and two surfaces flat, smooth texture, green oil to black color

Family : Geraniaceae
***Geranium solanderi* var. solanderi Carolin**
Seeds are dark brown to almost black, 1.5 – 2.5 mm in length and covered with fine pits that are not obvious to the naked eye.

Family : Labiatae
Lamium amplexicaule

Seeds 1 - 1.25 mm long, speckled shape, Smooth , 3 - angled in texture, dark grayish-brown, shiny.

Family: Labiatae
***Lamium amplexicaula,* L Egypt**
Seeds 1.5 – 2.4 mm long, above in outline blunt apically three angle in cross section, dark brown to black occasionally with white grainutes.

Family : Labiatae
Leonurus cardiaca
Seeds 1 mm long, oval, traingular nutlers shape - sided, seed have hairs at one end in texture, dark red or brown .

Family : : Labiatae
Prunella vulgaris
Seeds 1-1.3 mm size, pear shape, Slightly flattened and roughened in texture, dark red or brown.

Family: Lamiaceae
Marrubium vulgare
The seed appears black, sometimes speckled and with a matt finish. The base of the seed is rounded and the tip tapers to a point, spoon shaped. 'seeds' (1-2.5 mm long) are brown or black in colour, egg-shaped (i.e. ovoid) or pear-shaped (i.e. pyriform), and have a slightly rough surface texture

Family: Lamiaceae
Salvia verbenaca
Seeds are dark brown with a dull surface. The seed is round with a slightly tapered point at one end.

Family: Malvaceae
***Hibiscus verdcourtii* Craven**
light- to mid-grey or brown kidney-shaped seeds that are 2 mm and1.5 mm wide that have a pimpled seed surface.

Family: Malvaceae
***Hibiscus tridactylites* Lindley**
shiny black kidney shaped seeds 3 mm long by 2 mm wide.

Family : - : **Malvaceae**
***Malva neglecta* Wallr**
Seeds 1.3-1.8 mm size, Kidney in outline or appearing circular with a deep marginal notch shape Surface finely roughened in texture, Reddish brown to black

Family : Malvaceae
Malva parviflora
Seeds are red to brown color, rounded and kidney shape, 1 – 2 mm in diameter.

Family : - Malvaceae
Malva rotundifolia
Seeds 1 – 1.5 mm size, Kidney, in outline or appearing circular with a deep marginal notch shape, in texture, dark brown.

Family: -. Malvaceae
***Sida alba* ,L.**
Seeds t 1.2 x 1.6 mm size, segment sector shaped, with two spines like projections at the apex, reddish brown, surface careened with a net worn of reins.

Family : - : **Malvaceae**
***Sida spinosa* (L.)**
Seeds 1.8-3 mm size, Sector shape, Surface covered with a network of veins in texture, Brown or reddish brown.

Family : Onagraceae
Gaura biennis var pitcher
Seeds 1 - 1.5 mm size, angled shape, light brown.

Family : Onagraceae
***Oenothera biennis* (L.)**
Seeds 1.4 - 2 mm long,, sharply angular, irregular shape, surface dull and slightly wrinkled, ridged and some time winged in texture, reddish brown or grayish brown .

Family : -Oxalidaceae
***Oxalis corniculata,* L.**
Seeds 1.5 x 1 mm, epically rounded basally pointed brown surface distinctly transversely ridged.

Family : Oxalidaceae
***Oxalis stricta* (L.)**

Seeds 1 - 1.5 mm size, oval shape, surface distinctly transversely ridged in texture, brown.

Family : Papaveraceae
Argemone intermedia sweet

Seeds 1 - 1.5 mm size, round shape, surface netted veining and have short pointed tips in texture, dark gray to black .

Family: Papaveraceae
Argemone ochroleuca* Sweet ssp. *ochroleuca
Seeds small round dark brown to black speckled seeds to 1.5 mm in diameter, brown or black, globular in shape and with a tiny pointed apex. The surface of the seed is covered with regularly shaped pits, round shape.

Family: -. . Plantaginaceae
***Plantago lagopus,* L.**
Two seeds/ fruit, 1 – 1.5 mm long, narrowly ovate to elliptic in outline, surface glassy.

Family: - Plantaginaceae
***Plantago major* , L.**
Seeds ovate flatted in its end 1 – 1.5 mm in size, brown, smooth in surface, boot shape.

Family : Plantaginaceae
Plantago rugelii
Seeds 1.4 - 2 mm long,, oval to elliptic shape, surface granular in texture, dark brown to black with a white spot in the middle of one surface.

Family : Plantaginaceae
Plantago virginca
Seeds 1 - 1.5 mm size, oval to elliptic shape, surface glassy in texture, brown with a yellowish-white.

Family: - Poaceae
Agrostis Capillaris
Spikelets (flower clusters in grasses) are 1.5-3.5mm in length and purplish brown to greenish in color (Edgar & Forde, 1991). Seed heads are usually 15cm long with spreading branches with tiny, brown seeds (NZPCN, 2010). Grain 1 mm long.

Family: - Poaceae
Agrostis gigantea
Grain oblong, brown color, 1.2 mm long.

Family: Poaceae
Agrostis stolonfera
Grain 1.5 mm in length and purplish brown to greenish in color, oblong shape.

Family: - Poaceae
Alopecurus genigulatus
Grain oblong, brown color, 1.5 mm long.

Family: Poaceae
Anthoxanthum odoratum
Grains dark brown, 1.5 – 2.5 mm long bent awns extending from the base.

Family: Poaceae
Brachiaria reptans

Grain 2 x1 mm size, acute ovate shape, smooth in texture.

Family: Poaceae
***Cenchrus bifllorus,* Ro. = *C. barbatus*, Schum.**

Grain 1.2 x 1 mm size, elliptical shape, smooth in texture, brown.

Family: - Poaceae
***Cynodon dactylon* (L.)pers**

Grain: 2 x 0.5 mm size, distinctly flattened, elliptic or lance shaped, hairy on the keel, strews color.

Family: - Poaceae
Cynodon dactylon* var*. aridus

Grain: 1.5 x 0.9 mm size, distinctly flattened, oval or elliptic shaped, smooth surface, dark brown color.

Family: - Poaceae
Cynodon dactylon* var *dactylon

Grain: 1.5 - 2 mm long, distinctly flattened, oblong shaped, smooth surface, dark brown color.

Family: - Poaceae
***Dactyloctenium aegyptium,* (L.) P. Beauv. = *Cynosurus aegyptius* L.**

Grain 1 x 1 mm, round, ovate to wedge – shaped, reticulate with brown red color.

Family: - Poaceae
***Dactyloctenium radulans* (R.Br) P.Beauv**
Seeds are 1 mm in length and light brown with a very rough seed coat and short beak above the embryo.

Family: - Poaceae
***Desmostachya bipinnata,* (L.)stapf**

The spikelets are 1.5 – 2 mm long, grains oblong, 0.5 x 1.5 mm, green yellow color.

Family: Poaceae
Digitaria ischaemum

Spikelet scales hairy, oval shaped, inner scales dark brown or black, 1.5-2 mm.

Family: - Poaceae
***Dinebra retroflexa,* (Vahl.) panz.**
Spikes variable in size the lower ones up to 8 cm, Grain 1.2 x 1 mm size, The spikelet are 2 – 3 mm long, grain elliptical shape, and smooth in texture, yellow to creamy color.

Family: Poaceae
Echinochloa colona
The spikelets are 2 – 3 mm long. Seeds – in contrast to barnyard grass, the seed covering does not have a stiff bristle-like hair (an awn) and the seed is pale brown color, 2 mm in length.

Family : Poaceae
Echinochloa colonum
Seeds 1.9 x 1.8 mm size, acute ovate shape, spiny hairs in texture, yellowish green.

Family: Poaceae
Echinochloa crus -galli
Seeds 1.2 x 1 mm size, elliptic shape, smooth in texture, yellowish green.

Family: - Poaceae
Echinochloa esculenta
Seed is round with pints at both ends of seed. The seed is glossy and dream to grey in color. The seed is generally found covered in a papery coat which is easily removed.

Family: - Poaceae
***Eleusine indica* (L.) Gaertner**
1-1.8 mm, oval surface covered with curved ridges, reddish brown to reddish black.

Family: - Poaceae
Eragrostis curvula
Grain oblong, pal brown color, 1.2 mm long.

Family: Poaceae
Eragrostis trichodes
Grain oblong, dark brown to black color, 1-.1.7 mm long.

Family: Poaceae
***Imperata cylindrica,* (L.)P. Beauv**
Grain oblong, brown color, 1.2 mm long.

Family: - **Poaceae**
Nassella trichotoma
Grain oblong, brown color, 1.2 mm long.

Family: Poaceae
Eremochloa ophiuroides
Grain oblong, brown color, 1.5 mm long.

Family: Poaceae
Panicum coloratum
Seeds 1.5X2.5 mm size, elliptic shape, smooth in texture, black.

Family: Poaceae
Paspalum dilatatum

Spikelet 1.8-2.2 mm in size, broadly elliptic to ovate shape, spikelet scales smooth texture, straw or brown color, 1.5 – 2 mm long, 2 – 2.5 mm wide, white, soft hairs.

Family: Poaceae
Paspalum setaceum var stramineum
Spikelet 1.5-2 mm in size, broadly elliptic to ovate or oblong shape, spikelet scales smooth texture, pale brown color, 1.5 – 2 mm long, 2 – 2.5 mm wide, white, soft hairs.

Family: Poaceae
Phleum pratense

Grains oblong shape, straw to dark brown color, 1.5 mm long.

Family: Poaceae
Poa annua, L

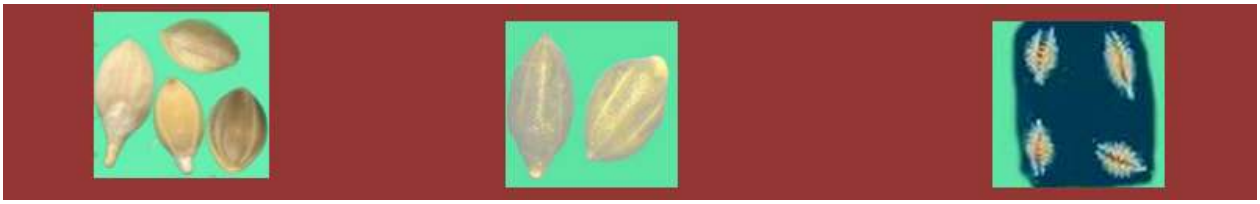
Triangular in green cross section, 1 mm length and 0.6 – 0.9 wid, red color, smooth surface.

Family: Poaceae
Polypogon monspeliensis (L.), Desf..

Grains 2x0.5 mm size, oblong terminal with long hair shape, hairy coat in texture, yellowish.

Family: Poaceae
Saccharum spontanium

Seeds 1.3x0.9 mm size, cup and long hair shape, hairy in texture, yellowish to brown.



Family: Poaceae
Staria italic subsp. viridis

Spikelet 1.75 mm long, 1 mm wide, narrow elliptic shape straw or brown.

Family: Poaceae
***Setaria viridis,* (L.) P.Beauv**

Spikelet 1.8-2.2 mm, broadly elliptic to ovate, spikelet scales smooth straw or brown, grain 1.5-2 x 2-2.5 mm, elliptic shape, tuberculate in texture, greenish to yellowish.

Family: Poaceae
Tragus australianus

Spikelets are oval shaped with both ends tapering, yellow-brown and covered with numerous small spines. Lemma surface glabrous or indumented, Palea 2-nerved, without keels, lodicules present, grain 1.2–2.1 mm long.

Family: - Polygonaceae
Acetosella vulgaris
Seed is round with tapering occurring at both ends giving the seed a triangular appearance when viewing from either end of the seed. Seed is brown in color and dull in appearance, angular shape. Seeds 1 mm size.

Family: Polygonaceae
Emex australis
Achiness have three spine hard, brown woody capsules contains the seeds. The capsule is covered with deep irregular indentations, angular shape, each achiness and approximately 5 mm long but distal achiness only 1-2 mm long

Family: - Polygonaceae
***Persicaria lapathiflolia* (L.) Gray**
Brown seeds, 1.5 - 2 mm in length.

Family: - Polygonaceae
***Polygonum equisetiforme,* Sibth &Sm.**
Seeds 1.5 – 2 mm long, triangular shape in green cross section, surface glassy, black color.

Family: - Polygonaceae
Polygonum patulum

Seeds have three flat sides, are shiny and reddish-brown in colour. Part of the seed is often covered by a dry papery material, angular shape. Seeds size 1 – 2 mm length.

Family: - Polygonaceae
***Rumex acetosella* (L.)**

Seeds 1 - 1.5 mm size, oval shape network of veins visible on the surface texture, reddish brown.

Family: - Polygonaceae
***Rumex crispus* (L.)**
Seeds 1.5-3 mm, oval, surface glossy, brown.

Family: - Polygonaceae
***Rumex dentatus,* L**
Seeds retained with achene, 1.5-2.5 mm long, oval in outline tapered to a short apex, triangular in green cross section, surface glassy.

Family: - Polygonaceae
***Rumex obtusifolius* (L.)**
Seeds 1.5-2.5 mm, oval, surface glossy, brown

Family: Portulacaceae
***Trianthema portulaca*, Strum**
Seeds 1.5 mm, spherical, black.

Family: Primulaceae
***Anagallis arvensis,* L.**
Seeds 1 mm in diameter, spherical irregular ovate shape, tuberculate in texure brown.

Family : Ranunculaceae
Ranunculus spp.
Seed 1. – 2 mm size, generally found inside pale flat brown fruits which appear pitted with a small hook at one end. The fruit has a distinctive pale border around the perimeter., round shape.

Family: - Resedaceae
Reseda lutea
The seed is straw-colored, sometimes appearing dark brown to black. The seed surface is shiny, and the hilum is cream coloured, kidney shape.. There are mostly 20-30 brown and shining seeds per capsule, each about 1.5 mm long

Family: Resedaceae
Reseda pruinosa
Seeds 1 x 1 mm size, spherical - ovate sharp apex shape, verrucate surface in texture, black.

Family : Rosaceae
Duchesnea indica
Seeds 1 - 1.5 mm size kidney shape, surface finely pitted and semi glossy in texture, reddish brown.

Family : Rosaceae
Potentilla recta
Seeds 1 – 1.2 mm size, some whit kidney shape, surface small and minutely ridged in texture, brown with a yellowish-white to dark brown.

Family: - Rosaceae
Rosa arkansana.
Seeds 1.4 - 2 mm long,, irregular shape, surface granular in texture, brown .

Family : Rubiaceae
***Galium aparine* L.**
Seeds 1- 4 mm long, outline - spherical, oval or kidney shaped - sided, nearly smooth, lightly netted, covered with stiff hooked spines 0.8 mm (*aparine*) long in texture, grey, grayish-brown, buff, brown.

Family : Rubiaceae
***Galium* spp., L.**
Seeds 1.2-2.5 mm size, outline - spherical, oval or kidney shaped, nearly smooth, lightly netted in texture, covered with stiff hooked spines 0.2mm (*spurium*) long , brown, grey-brown Inner surface.

Family: Rubiaceae
Galium tricornutum
The seed is generally found within a dry, light to dark brown globular shaped fruit which has a dimpled surface and a hooked stem attached. Fruit warty, big, 1.5-3 mm, dry fruit 2-carpelled with recurved hooked prickles or smooth.

Family: -. Solanaceae
***Hyoscyamus muticus*, L.**
Seeds: 1 x 1.5 mm size, brown dark color, surface tuberculate.

Family : Solanaceae
Nicotiana tabacum

Seeds 1 – 1.2 mm long, oval shape, rough surface, color ranges from light brown to dark brown.

Family: Solanaceae
Lycopersicon esculentum var. esculentum
Seeds 1.4 - 2 mm long,, irregular shape, surface granular in texture, white to light brown .

Family: - Solanaceae
Physalis angulata

Seeds: Cotyledons broad-oval, with tip, margin entire, petiolate, with marked mid vein, first leaf, oval margin serrate.

Family : Solanaceae
Physalis heterophylla
Seeds 1 - 12 mm long, oval shap, surface flattened, yellow.

Family: Solanaceae
***Physalis minima* L.**
Seeds **:** Roughly circular, flattened, yellow seeds 2 mm across.

Family : Solanaceae
***Solanum carolinense* (L.)**
Seeds 1.5-2.5 mm long, round or oboval shape, surface smooth and glossy in texture, orange to dark or light yellow orange to dark or light yellow.

Family: - Solanaceae
Solanum dullcamara
Seeds 1 mm long, disk-shaped, surface glassy in texture, light yellow.

Family: - Solanaceae
***Solanum nigrum* (L.)**
Seeds 1.2-1.8 mm long, round or oboval round or oboval shape, surface roughened with a network of veins in texture, pale yellow to dark brown.

Family: - Solanaceae
Solannum rostratum
Seed 1 mm long,, dull shape, surface thick, pitted, wrinkled and flattened in texture, black.

Family : - Solanaceae
Solanum melongena
Seed 2 - 3 mm long, kidneys or spherical shape, surface smooth and glossy in texture, light creamy yellow to brown.

Family: - Solanaceae
Solanum ptycanthum
Seeds 1.2-1.8 mm long, round or oboval round or oboval shape, surface roughened with a network of veins in texture, pale yellow to dark brown .

Family: - Solanaceae
Withania somnifera
Seeds bright red, globular, berry, which is about 1 -2 mm in diameter.

Family: Tiliaceae
Corchorus olitorius
Seeds 1.5-2 mm, polygons shape, foveate in texture, greenish black - brown.

Family: Typhaceae
***Typha domingensis,* Pers**
Fruit minute, surrounded by single, thin hairs towered the base, seeds 1.3x0.9 mm size, yellowish to brown. oblong-elliptic, elongate whorled white pappus may be present; small, conical nipple on truncate end.

Family : Verbenaceae
***Lippia nodiflora*, (L.) Michx**.
1 x 1.5 mm size, oblong – ovate green yellow to black color, smooth surface.

Family: Verbenaceae
***Phyla canescens* (Kunth) Greene**
light brown seeds, 1.8 mm in length.

Family : Verbenaceae
Verbena bracteata
Seeds 1.5 – 1.8 mm long, oblong shape, surface two flat sides and one rounded side, dark brown.

Family : Verbenaceae
Verbena hastata
Seeds 1.5-3 mm long, oblong shape, surface 2 flattened on 2 sides and rounded on the other, reddish - brown.

Family: - Verbenaceae
***Verbena* spp.**
Seeds 1.2-1.8 mm long, round or oboval round or oboval shape, surface roughened with a network of veins in texture, pale yellow to dark brown.

Family: - Verbenaceae
Verbena stricta
Seeds 1.5-3 mm long, oblong shape, surface 2 flatted sides and 1 rounded, dark brown .

Family: Verbenaceae
Verbena urticifolia
Seeds 1 -2.6 mm long, nearly oval shape, surface smooth in texture, dark reddish- brown.

Family: Zygophyllaceae
***Tribulus micrococcus* Domin**
Seeds have 2 short very spines that spread near the tip 0.5 - 2.5 mm long.

Family: Zygophyllaceae
***Zygophylum coccineum*, L.**
Ovate shape, 1 x 2 mm, dark brown color with thick coat obovate, rough surface.

Family: - Amaranthaceae
***Alternanthera nodiflora* R.Br**
Seeds are brown and covered in fine protrusions, elongated shap, 1.1 mm in length and 3 mm in width.

Family: Apiaceae
Conium maculatum
Seed 2 – 3 mm long, oval shaped, flattened on one side, have conpi couous wavy ribs in texture, pale brown color.

Family: Convolvulaceae
***Ipomoea pes-caprae*, L**
Seeds size 3x3 mm, has 3 angles, foveate in texture, brown.

Family: - Asteraceae
Acroptilon repens
Seeds are dull and curved with scattered faint longitudinal grooves, yellowish-grey color, Spoon shaped, smooth or ribbed, and 2 to 4 mm long. Each seed has a deciduous pappus composed of bristles that are barbed below, feathery above, and 6 to 11 mm long (Watson 1980, Keil 2006, Kravchenko 2009, Klinkenberg 2010).

Family: Asteraceae
***Arctotheca calendula* (L.) Levyns**
Seeds are dark brown, 2.7 mm long and 1 mm wide, are enveloped in a brown cotton like mass and are difficult to extract from this envelope.

Family: Asteraceae
Centaurea melitensis
Seeds are brown to grey, with longitudinal ribs running along the seed. A pappus of bristles is present as is a hooked pointed at the other end of the seed, 1/8 inch (2.25 mm) long, lack bristles, and are straw-colored with dark brown spot.

Family: Asteraceae
***Conyza dioscoridis*, (L.) Desf .**
Seeds 2 - 2.5 x 0.5mm size, tube disc and long hair shape, hairy in texture, yellowish to brown.

Family: Asteraceae
Eupatorium rugosum

Seeds 2.5 long, cigar-shaped, tipped texture with a tuft of white hairs brown or black color.

Family: Asteraceae
Gutiernezia sarothrae

Seeds 2.5 – 3 mm long, Oblong or egg, broad end at top.

Family: Asteraceae
***Heterotheca subaxillaris* (Lam.) Britt and Rusby**
Seeds 2.5-3 mm, oblanceolate in outline, apex or smooth and lacking apicalbristles, yellowish brown to purplish brown.

Family: Asteraceae
Lactuca sativa
Seeds about 2.5 - 3 mm long, , teardrop or oblong shaped, curved, straw to brown color.

Family: Asteraceae
Lactuca serriola
Seeds 2.4 mm long, oblong shaped, soft texture with white tuft of bristles arises at the end of the beak brownish color.

Family: Asteraceae
Sonchus asper
A single seed is contained within the fruit, which is reddish-brown and has longitudinal ribs. A ring of hairs can be found at the tip of the fruit, spoon shaped, wrinkled achenes 2.5-4mm long and 1.5mm wide. Achenes have 3 (or rarely 4-5) longitudinal ribs on each face (Hutchinson *et al*., 1984). Mature seeds have a white feathery pappus (8mm long) that collectively form a white puff ball, similar to dandelion (Grubben & Denton, 2004).

Family: Asteraceae
***Taraxacum officinale* Weber**
Seeds 2-4 mm long, Narrowly oblanceolate shaped in outline, oval in cross section, texture apical beak tipped with a tuft of white hairs, yellow or brown color

Family: Boraginaceae
Amsinckia spp.
Seed 2.8 – 3.5 mm long and 2 – 2.5 wide, dull greyish-brown to dark-brown and covered with wart-like protuberances, angular with some rounding at one end and tapering to a point at the other, spoon shaped.

Family: Boraginaceae
***Echium indica* L.**
Seeds – a rough, angular brown seed 2.7 mm in length.

Family: Boraginaceae
Echium plantagineum
Seed is dark brown and has a wood appearance, with two flat sides and one curved edge. The surface of the seed is rough and pitted and is greyish-brown to dark brown in color, spoon shaped. The 'seeds' (2-3 mm long) are brown, grey or black in colour, woody, three-angled, and roughly textured (i.e. strongly wrinkled and pitted).

Family: Boraginaceae
Heliotropium europaeum
Seed is dark brown, lens shaped in cross section fruit consists of 4 rough surfaced nutlets, which may appear brown or green depending upon maturity. Seed-like segments of fruit (mericarps) ovate, brown, 2 mm long, 1–1.5 mm wide, black to brown. Almost globular to tear shaped, about 1 mm diameter. Surface warty.

Family: Brassicaceae
Conringia orientalis
Seed length 2.2-2.8 mm, width 1.0-1.3 mm, spoon shaped and reddish-brown to dark brown in color. Seed surface is smooth, with a single longitudinal indent along the seed, spoon shaped.

Family: Cactaceae
***Opuntia tomentosa* Salm-Dyck**
Seeds are glossy black, irregularly shaped, 2.5 - 3 mm in length.

Family: Cannabinaceae
Cannabis sativa
Seeds 2.5 - 3 mm size, egg shaped, vein texture, yellowish-tan and soon weather to an olive brown color.

Family: Caryophyllaceae
***Agrostemma githago* (L.)**
Seed size 2-4 mm, Triangular to circular shaped, surface covered with sharp tubercles in texture, poisonous, black or brown color.

Family: Caryophyllaceae
***Vaccaria hispanica = Saponaria vaccaria* L.**
Seed diameter 2.0 to 2.7 mm, dark brown to black, rounded with a smooth surface, which if finely pitted with shallow indentations, round shape.

Family : - Chenopodiaceae
Atriplex canescens

Seed diameter 2 - 3 mm, outline - oval or spherical shape, faintly reticulated in texture, light creamy yellow to yellow lack.. lens shaped in cross section, circular in outline; 1-3 mm wide; dull, dark brown to black; outline of ring-shaped embryo clearly visible.

Family : - Chenopodiaceae
Beta vulgaris

Seeds 2 x 3 mm to 6 x 5 size, irregular shape, woody in texture, brownish-greenish color .

Family: Cyperaceae
***Scirpus* spp**
rounded trigonous, 2-5 mm long; beak up to 0.5 mm long; bristled Image Tags: emergent date-with-caution bristled beaked seed trigonous rostrate

Family: - Euphorbiaceae
***Euphorbia davidii* Subils**
Seeds that are around 2.6 mm long, covered in small wart like growths and mottled light brown or grey in color.

Family: Euphorbiaceae
***Euphorbia planiticola* D.C.Hassall**
Seeds are 2.7 mm
in length, angular, light brown and deeply pitted

Family : Fabeaceae
***Cullen tenax* (Lindl.) J.W. Grimes**
Seeds a black, shinny bean-like seed 2.5 – 3 mm long enclosed in tight rough blank pod.

Family: Fabaceae
Lotus corniculatus
Seeds ovate shaped, 2 mm long; variable color; prominent hilum (attachment scar), seed terrestrial dateable hilum-conspicuous

Family: Fabaceae
Lotus uliginosus
Seeds 2 - 3 mm long, ovate or like an orange shape, surface convex dull but smooth in texture, yellow to dark brown to black.

Family: Fabaceae
Medicago intertexta
Seeds large, kidney shaped, yellow, brown to black, 2 – 3 mm long.

Family: Fabaceae
***Medicago polymorpha* L.**
Bean-shaped seeds that are 2 – 4 mm long and 1 mm wide.

Family: Fabaceae
Medicago sativa ssp. sativa
The seeds are a typical bean shape, light- to mid-brown in color, 2 – 3 mm in length,

Family: Fabaceae
***Rhynchosia minima* (L.) DC.**
Seeds kidney-shaped grey, brown, black or mottled in colour seeds 2 - 3 mm long.

Family: Fabaceae
Vicia grandiflora
Seeds 2.8-3.2 mm size, oval or spherical shape, surface with short hairs and /or fine bumps in texture, dark brown to black.

Family: Fabaceae
Vicia Sativa
Seeds 2.8-3.2 mm size, oval or spherical shape, surface with short hairs and /or fine bumps in texture, dark brown to black.

Family: Iridaceae
Homeria spp.
Seeds are formed in cylindrical capsules and appear dark brown. Two sides are flattened and one end tapers to a point, angular shape. **Seeds** are brown**,** angled, and numerous in the capsule. The angles have membranous transparent ridges, too poorly developed to be called wings. Apart from size, seeds of different species are indistinguishable morphologically (Goldblatt, 1981).

Family: Lamaceae
Salvia reflexa
The seed is ovate, smooth, dull and yellow-grey to tan in colour, often contained in the granular fruit pod with longitudinal veins protruding from the surface, and tapered at both ends, angular shape. Seed size 2.5-3 mm long and 1-1.5 mm wide.

Family: Lamaceae
Salvia officinallis
Seeds spherical to elliptic compressed-triangular shaped, 2-2.5 mm long; surface marbled with streaks and/or netted lines, dark brown to black color.

Family: - Lamiaceae
***Stachys arvensis* (L.) L.**
Seeds are dark brown and lightly mottled, 2 – 2.5 mm long.

Family: - Liliaceae
***Bulbine semibarbata* (R.Br.) Haw**
Seeds are dark in color, about 2 mm in diameter, 2.6 mm long and distinctly 3-sided.

Family : - Malvaceae
Abelmoschus esculentus
Seeds 2 - 3 mm size, oval or spherical shape, faintly reticulated in texture in texture, Straw or gray brown.

Family: - Malvaceae
Abelmoschus ficulneus
(L.) Wight & Arn. Ex Wight
Seeds 2.5 – 4 mm in diameter, covered in hairs, dark brown to black spherical shape.

Family:Malvaceae
***Anoda cristata* (L.) Schlecht**

One per fruit segment, 2.8-3.2 mm long, kidney-shaped in outline, dark brown to black, surface with short hairs and fine bumps**.**

Family:Malvaceae
***Anoda cristata* (L.) Schlecht**

Seeds are brown to black, broadly kidney-shaped, are 2 to 4 mm long and 3 mm wide.

Family : - Malvaceae
Callirhoe involucrata
Seeds 2 mm size, Oval shape, Wrinkled to from net-like pattern on the sides in texture, Reddish brown.

Family : - Malvaceae
***Hibiscus trionum* (L.)**
Seeds 2 mm size, Kidney shape, surface finely granular and covered with small tubercles in texture, black.

Family: Malvaceae
***Sida corrugata* Lindl**
The segments are brown, 2 – 4 mm in diameter and have a highly corrugated surface.

Family : Mimosaceae
***Neptunia gracilis* Benth.**
Flattened seeds 2 – 5 mm in length, dark brown and glossy, with a peak at the en Seeds 2.8-3.2 mm size, lens shape, surface glossy in texture, black.d.

Family : - Phytolaccaceae
Phytolacca americana
Seeds 2.8-3.2 mm size, lens shape, surface glossy in texture, black.

Family : Plantaginaceae
Plantago aristata
Seeds 2.5 – 3 mm long,, oval to elliptic shape, surface finely pitted and shallowly transversely gooved near the middle of the convex surface in texture, brown with a yellowish-white.

Family : Plantaginaceae
Plantago lanceolata

Seeds 2.2 –3 mm long , boat-shaped, surface shiny with a scar in the center of the concave side in texture, brown to dark brown.

Family: - Poaceae
Axonopus fissifolius

Grain oblong, brown color, 2-3 mm long.

Family: - Poaceae
***Digitaria sanguinalis* (L.) Scop. = *Panicum sanguinale* L.**
Grain oblong-obovate, brown-yellow color. Spikelet 2.8-3.2 mm, elliptic, scales hairy, : inner scales green or light brown.

Family : Poaceae
***Diplachne fusca* (L) P. Beeau V.**
Grain 0.5 x 2.1 mm, grayish green

Family: - Poaceae
Echinochloa frumentacea
Grain oblong, brown color, 2-3 mm long.

Family: - Poaceae
Glyceria grandis
Sub fossil specimen; grain obviate, prominent indent at base of seed, 2 persistent, recurved stigmas, reddish-brown, brown color, 2 - 3 mm long.

Family : Poaceae
Hordeum distichon
Grain cream, brightness will vary depending upon variety. Seeds are elongated and extremely uniform in shape. The awn is brittle and infrequently found attached to the husk adhering to the seed.

Family: - Poaceae
Hordeum jubatum
Grain oblong, brown color, 2-3 mm long. 2-3 mm, langand hairy at the tip yellow**.**

Family: - Poaceae
***Leptochloa dubia* (L.) Kunth**
Floret 2.5 – 5 mm long, fringed with short silky-white hairs. Seeds are pale brown in colour and 2 - 3 mm in length.

Family : Poaceae
Leptochloa fusca subs. fusca
(L.) Kunth
Seeds are pale brown in color and 2 - 3 mm in length.

Family: - Poaceae
***Panicum capillare* (L.)**

Grain 2-2.5 mm, spikelet elliptic shaped, spikelet scales in texture, straw color.

Family: - Poaceae
Panicum dichotomiflorum

Grain 2.5- 3 mm, spikelet elliptic oblong shaped, Still enclosed in the spikelet scales in texture, straw color.

Family : Poaceae
Panicum maximum

Lemma of lower sterile floret similar to upper glume, ovate, glabrous, or pubescent; acute. Fertile lemma oblong, dorsally compressed, 2.5–5 mm long, indurate.

Family : Poaceae
Panicum miliaceum subsp. miliaceum

Caryopsides are 2-3 mm long, spherical or oval, dirty-yellow, spikelets 2-flowered, about 4.5 mm. long; glumes strongly nerved, glabrous.

Family : Poaceae
Panicum miliaceum subsp. ruderale

Caryopsides are 2.5-3.2 mm long, spherical or oval, dark brown to black color spikelets 2-flowered, about 4.5 mm. long

Family : Poaceae
Panicum virgatum

The fertile lemma is 2.5–3.5 mm. long, ovate, convex along its outer surface, vein less, membranous, and acute at its tip. The grains have adherent pericarps.

Family : Poaceae
Paspalum boscianum

Spikelet 2-2.2 mm, broadly elliptic to ovate, spikelet scales smooth straw or brown, grain 2 x 2.1 mm, elliptic shape, tuberculate in texture, dark brown to black color.

Family : Poaceae
Paspalum laeve

Spikelet 1.8-2.2 mm, broadly elliptic to ovate, spikelet scales smooth straw or brown, grain 1.5 x 2-2.5 mm, elliptic shape, yellowish to brownish color.

Family : Poaceae
Pennisetum glaucum
Grain oblong, brown color, 2 - 2.2 mm long, creamy white light to dark brown blue/gray and purple.

Family : Poaceae
Phalaris arundinacea
The grains are 2.5 - 4 mm. in length, narrowly ellipsoid-lanceoloid in shape, and light-colored.

Family : Poaceae
Phalaris aquatica
Seed is hard and covered with fine hairs when maturity, glossy, two fertile lemmas are attached to the base of the seed, light brown color. Cream to pale brown, smooth and shiny, flat, about 3mm long.

Family : Poaceae
Phalaris minor
The seed is grey and shiny with hairs on the surface, similar to Paradoxa grass, but has only one sterile lemma attached to the base of the seed (Paradoxa Grass has two), and is slightly tear shaped.

Family : Poaceae
Phalaris paradoxa
The seed is shiny and straw colored, with two sterile lemmas attached to the base. Seeds are often contained within spikelets. Spikelets occurring in groups up to 6 sterile surrounding 1 fertile spikelet. Unlike Lesser Canary Grass, these seeds do not have fine hairs.

Family : Poaceae
Poa bulbosa
Individual culms can produce all spikelets, all bulblets, glumes and lemmas are arranged into two ranks that are columnar and overlapping. The narrow glumes and lemmas are keeled; the glumes are 2-3.5 mm. long, while the lemmas are 2.5-3.5 mm. long.

Family : Poaceae
Poa compressa
Spikelets are 2-4 mm long, mature grains are about 1.5 mm. long, ellipsoid in shape, grooved along one side, and light tan to brown.

Family : Poaceae
Setaria faberi
Grains that are about 2.75 mm. long, 1.75 mm. across, and 1.00 mm. thick; these grains are ovoid in shape, flattened along one side, and pale-colored.

Family : Poaceae
Setaria italica
Spikelets about 3 mm long and usually smooth, shiny upper lemmas.

Family : Poaceae
Setaria parviflora
Spikelets green to pale green, 2-2.5 mm long, oblong with 2 florets. Seeds pale, dull, 1 mm long by 1 mm wide and remain tightly enclosed in the husks.

Family : Poaceae
Setaria pumila
The spikelets are in pairs, not in distinct long-and-short combinations, 2.0-2.8 mm long often bright yellow in color, but sometimes dark purple-brown.

Family : Poaceae
Sporobolus airoides
Grain oblong, dark brown color, 1.5 – 2 mm long. spikelets distal on the branches, 1.5-2 mm. long, obtuse; glumes nerved, unequal, acute, glabrous, the 1st. ca. oval, half as long as spikelet, the second as long as spikelet.

Family : Poaceae
Sporobolus neglectus

Spikelets 2-2.5 mm long, Each fertile spikelet produces a tiny grain that is about 1 mm. long and ovoid-oblongoid in shape; it is small enough to be blown about by the wind.

Family: Polygonaceae
Fallopia convolvulus* (L.) Á.Löve = *Polygonum convolvulus
Seeds have the same general shape and are tightly enclosed in these heads, smooth, glossy black 2.5 – 4 mm in length.

Family : Polygonaceae
Polygonum argyrocoleon

Seeds retained with achene, 2-2.5 mm long, oval in outline tapered to a short apex, triangular in green cross section, surface glassy.

Family : Polygonaceae
***Polygonum aviculare* (L.)**
Seed 2-2.5 mm long, oval shape, surface finely roughened but glossy in texture, reddish brown.

Family: Polygonaceae
***Polygonum pensylvanicum* (L.)**
Seeds 2.8-3.5 mm long, circular to broadly oval shape, surface smooth and glossy in texture, black.

Family : Polygonaceae
***Rumex obtusifolius* (L.)**
Seeds 2-2.5 mm long, circular to broadly oval shape, surface glossy in texture, brown.

Family : Rubiaceae
Diodia teres
Seeds 2.5 - 4 mm long, hairy, oval shape surface lacking ribs and furrows in texture, light,grayish-brown.

Family : - Solanaceae
***Datura stramonium* (L.)**
Seeds 2-3 mm long, kidney shape, surface rough with a network of ridges and fine pits rough with a network of ridges and fine pits in texture, dark brown to black.

Family : - Solanaceae
***Physalis minima* L. var. indica**
Seeds broad-oval with tip margin entire, 2 -3 mm long, cream to yellow color

Family : - Scrophulariaceae
Verbascum thapsus
Seeds 2 - 4 mm long, obovat shape, surface of each seed is marked with wavy ridges in texture, dark brown.

Family: Urticaceae
***Urtica urens* L.**
Seeds – are a pointed oval shape, flattened, light brown, 2 – 2.5 mm long.

Family: Zygophyllaceae
***Tribulus terrestris* L.**
A wood straw coloured brown burr with two to four sharp spines, encapsulating up to 5 light brown, egg shaped seeds. Often the woody burr does not release the seeds, angular shape. Seeds are yellow, variable in shape but more or less ovoid and 2-5 mm long.

Family: Aizoaceae.
***Trianthema portulactastrum* L.**
Seed small, round, brown to dull black, flattened, snail-shaped , 3- 5 mm long and 1.8 – 2.5 mm wide.

Family: Apiaceae
Daucus glochidiatus
Seed is cream coloured, covered in spikes and tapers to a narrow point at one end. When mature the seeds split longitudinally, fruit Schizocarp (of 2, 1-seeded mericarps), 3-5 mm long, with barbed prickles.

Family: Apiaceae
Bifora testiculata
Seed is rounded with a nose-like protuberance, including two small holes in the rounded side. One end of the seed is rounded and the other tapers to a short point. The seed surface is greyish-brown and is pitted with 3 longitudinal ridges. Remains enclosed in the skull like pod. Cream or whitish yellow with 3 darker stripes on the back. Spherical to tear shaped, 4 mm diameter. Surface dimpled, wrinkled, grooved and hairless with two holes near the beak.

Family: - Apiaceae
Coriandrum sativum
Seeds length ranges between 3 to 5 mm, cream to brown color, rounded with longitudinal indentations. The tip of the seed ends as a small point, and the base is flattened.

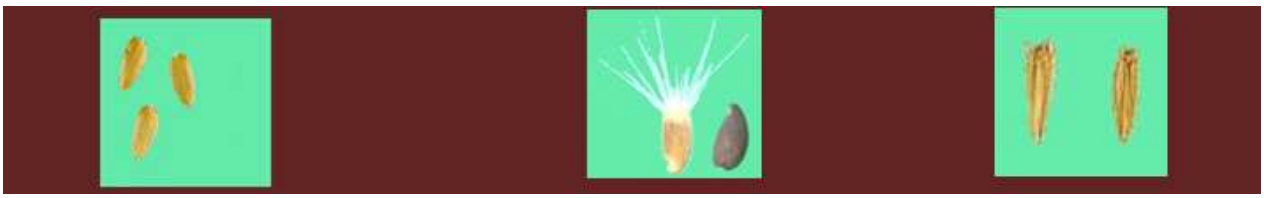
Family: Asphodelaceae
Asphodelus fistulosus
These seeds are black and triangular with one curved side and two flattened sides. The surface is wrinkled and deep oval indentations along the three sides, angular shape. seeds, 3-4 mm long

Family : - Asteraceae
Ambrosia artemisiifolia (L.)
Seeds 3 - 4 mm long, Apex with a central protuberance surrounded by several shorter projections shape, surface rough in texture, Straw or gray brown.

Family : - Asteraceae
***Ambrosia* Spp.**
Seeds 3 - 4 mm size, apex with a central protuberance surrounded by several shorter projections shape, surface rough in texture, Straw or gray brown.

Family : - Asteraceae
Carduus aconthoides
Seed 3 mm long, oblong striate shaped, texture slightly curved with a protrusion for the attachment of the pappus, color straw

Family : - Asteraceae
Centaurea cyanus (L.)
Seeds 3-3.8 mm long, Obovat in outline, broadly elliptic shape, Covered with short fine spreading hairs throughout, surface glossy in texture, cream color.



Family: - Asteraceae
Centaurea repens
Seeds 3 mm long, ovate shaped, smooth and flattened in texture, grayish to yellow color.

Family : - Asteraceae
Centaurea solstitialis
Seeds 3 – 4 mm. long, Oval shape, surface rough in texture, Straw or gray brown to black.

Family : - Asteraceae
Chondrilla juncea.
Seed is yellow and wedge shaped with ribs and grooves running longitudinally, a ring of bristles may be present above the ring of teeth-like projections, called achenes or cypselas) are cylindrical, 8-10 mm long (including a conspicuous 3-6 mm long narrow beak or column).

Family: - Asteraceae
Cirsium arvense
Seeds 3 - 4 mm size, elongated shape, slightly curved in texture, straw to dark brown.

Family : - Asteraceae
Cirsium undulatum
Seeds 3 - 4 mm long, angular shape, slightly flattened smooth, slightly curved in texture, tan to dark brown with a conspicuous yellow

Family : - Asteraceae
Cirsium vulgare
Seeds 3 – 5.5 mm long, oblong shape, flattened and curved tipped with long white hairy plume in texture, light straw color.

Family: - Asteraceae
Helianthus grosseratus
Seeds compressed-oblong, 3-4 mm long; dark lengthwise streaks/stripes/mottles; smooth Image Tags: terrestrial seed dateable speckled striped striate.

Family: - Asteraceae
***Scolymus maculatus* L.**
Seeds – are papery, 3 – 7 mm long, wedge shaped and light brown with some darker speckling.

Family: Boraginaceae
Bugglossoides arvensis
This seed is covered with many indentations and is a cream to brown color. The base of the seed is flattened and the tip narrows to a point, spoon shaped. : 4 nutlets, basally attached, gray-brown, 3 mm long, wrinkled, pitted, with a prominent keel on the inward facing side.

Family: - : Brassicaceae
Myagrum perfoliatum
Seed case is spoon shaped and contains two seeds. The seed case is hard and cream to reddish in color. Longitudinal ribs run along the seed case, a small point protrudes from the case. The seeds are small (3 mm long) and are oval shaped (Hewson 1982; Entwisle 1996).

Family: - Brassicaceae
Raphanus raphanistrum
Seed may be found free or within the seed pod. Pods are segmented, cream or grey and cylindrical and contain several seeds. Seeds are gold to brown and have a pitted surface. Seeds ovoid to globe-shaped, to 3 mm long, net-like veins on surface, red to yellow-brown.

Family: - Brassicaceae
***Rapistrum rugosum* (L.) All.**
Seed pods are bulbous in shape 3 – 10 mm long and 3 – 4 mm in diameter, with a short beak at the end 2 – 3 mm long, borne on stalks 2- 5 mm long. Pods contain 1 - 3 seeds that are retained within the pod at maturity.

Family: - Caesalpiniaceae
***Senna barclayana* (Sweet) Randell**
Broadly bean shaped, flattened seeds 3 – 4 mm in diameter, color varies from mottled whitish/brown to brown.

Family: Chenopodiaceae
***Salsola kali* L.**
Seeds – are papery cresents to semi-circles, 3 – 4 mm across, and about 1 mm thick.

Family : - Convolvulaceae
Convolvulus arvensis
Seeds 3 - 4 mm long, egg shape, surface rough-coated with two flat sides and one side rounded in texture, dark ,grayish-brown.

Family : - Convolvulaceae
***Ipomoea coccinea* (L.)**
Seeds 3 - 4 mm long, like an orange wedge, one side strongly convex and two sides flat, seed scar horseshoe shape, Covered with short fine spreading hairs throughout, surface finely roughened in texture, dark brown to black

Family : - Convolvulaceae
***Ipomoea lacunose* (L.)**
Seeds 3.5-4.5 mm long, Like an orange wedge, ne surface convex and slightly angular and the other surfaces flat shape, surface dull but smooth in texture, dark brown to black.

Family: Convolvulaceae
***Ipomoea plebeia* R.Br.**
Brown seeds 3 – 5 mm in length, have a light brown strip running down their length.

Family: Convolvulaceae
***Polymeria pursilla* R.Br.**
Seeds are3 – 3.5 mm in diameter, light brown, spherical in shape and covered with short, dense hairs.

Family : - Euphorbiaceae
***Croton glandulosus* (L.)**
Seeds 3-3.5 mm long, Oval like an orange wedge, Tan with black splotches in texture, Reddish – brown or grayish.

Family: Fabaceae
***Aeschynomene indica* L.**
Seeds are dark brown, about 3.8 mm in length.

Family: Fabaceae
Calocephalus sonderi
Flower heads are bright yellow and made up of hundreds of florets. The flower head is soft and round.

Family : - Fabaceae
***Crotalaria dissitiflora* Benth.**
Seeds are yellow and 3 mm long. The loose seeds rattle in the seed head when shaken.

Family: Fabaceae
Lupinus angustifolius
Seeds are round with a smooth surface which is mottled with brown speckles, degree of mottling will vary, some seeds will appear nearly all cream. Per Duke's (1981), 6-8 mm long, yellow-brown, dark brown, or gray with yellow spots.

Family: Fabaceae
Lathyrus hirsutus
Seeds 3.5-4.5 mm long, Like an orange wedge, ne surface convex and slightly angular and the other surfaces flat shape, surface dull but smooth in texture, dark brown to black.

Family: Fabaceae
Lathyrus sylvestris
Seeds 3 - 4 mm long, egg shape surface rough-coated with two flat sides and one side rounded in texture, dark ,grayish-brown.

Family: Fabaceae
***Macroptilium lathyroides* (L.) Urb**
Seeds 3 - 4 mm long, and mottled orange/brown in color.

Family: Fabaceae
***Sesbania canabina* (Retz.) Pers**
Smooth, dark-green to brown, cylindrical seeds 3 – 4 mm long.

Family: Fabaceae
Vicia sativa subsp. sativa
Seeds are round and seed coat color varies between varieties, being brownish-grey to reddish-brown. When the seeds are split the centre color also distinguishes between varieties, some are orange and others beige, wild vetch seeds are smaller in size 2 mm, seeds are globose or somewhat compressed, 3 to 5 mm in diameter, smooth, dull or velvety, greenish gray to maroon or black, rarely yellowish white.

Family: Fabaceae
***Vicia villosa* Roth. ssp.**
Seeds 3 – 6 mm wide, light to dark brown and may be mottled, with a black strip running around the outside edge from the embryo to the end.

Family: Fumariaceae
***Fumaria densiflora*, DC.**
Seeds 2.5 – 3.5 mm long, tube shaped, white green color, rough surface.

Family: Liliaceae
Allium vineale
This seed is generally found enclosed in cream colored, shiny bracts. The seed in the bract appears plump, and tapers to points at both ends, spoon shaped. Seeds are black and 3-4 mm long.

Family : Liliaceaee
Alnus incana and A. rubra
Seeds winged on margins, narrower than body; elliptic to obovate, irregular shaped; 2-4 mm long; wings may be damaged/missing in macrofossil samples.

Family: Malvaceae
***Abutilon theophrasti* Medik**

Seeds dark brown to nearly black kidney-shaped seeds, to 3 mm long and 2.5 mm wide.

Family : - Malvaceae
Sphaeralcea coccinea

Seeds 3x2 mm size, Nearly circular shape, Net-veinson the sides and flattened and deeply notched in texture, Dark brown to black.

Family: - Nyctaginaceae
***Boerhavia dominii* Meikle & Hewson**
Seeds 3 - 4 mm in length, brown, and have5 prominent darker brown ribs.

Family: - Poaceae
Achnatherum hymenoides
spikelets 1-flowered, articulate above the glumes; glumes ovate-acuminate, 3-nerved, subglabrous, 5-9 mm. long, subequal; lemmas dark, 3-4 mm. long, copiously hairy, with a stout awn 4-6 mm. long; stamens 3, the anthers with a tuft of hair at the tip; lodicules 3, 2 mm. long, two broadly wedge-shaped, the third, fruits utricle.

Family: Poaceae
Bothriochloa bladhii
Spikelets elliptic; dorsally compressed; 3–4 mm long, narrowly ellipsoid and somewhat flattened in shape, the grain exteriors are usually covered with short fine hairs, very light, they can be blown about by the wind in open areas.

Family: - Poaceae
Bothriochloa ischaemum
Fertile perfect florets are replaced by grains (about 3.0 mm. in length) that are narrowly ellipsoid and somewhat flattened in shape; the grain exteriors are usually covered with short fine hairs. Because the grains are very light, they can be blown about by the wind in open areas.

Family: - Poaceae
Cenchrus incertus
The seed heads of spiny burs are 2-8.5 cm wide and 4.1-7.0 mm long to the tip of the spikelets. The spines of only one kind are flattened and spread over the body of the bur. Grain oblong, brown color, 1.2 mm long

Family: - Poaceae
Chloris divaricata
Small, narrowly egg shaped to spindle shaped in outline, somewhat triangular, 1.5mm long. Translucent. Pointed tip.

Family: Poaceae
Chloris gayana
Seed heads – consist of 6 to 18 spikes spikes positioned at the top of the stems. Spikes are 5 – 10 cm long and arranged in a spreading to erect hand. Both lemma and palea are awned, with awns up to 6 and 3 mm in length. Seed (enclosed in lemma and palea) is light brown in color, 3.6 mm in length.

Family: Poaceae
***Dichanthium annulatum*, (Forssk.) stapf.**
Spikelet oblong, obtuse or truncate, keel not winged, median vein present; grain 0.9 – 3 mm siz, oblong-obovate, brown-yellow color. Caryopsis oblong to obovate, dorsally compressed, approximately 2 mm long (Wagner et al., 1999).

Family: - Poaceae
Festuca ovina var. ovina

Grain oblong, straw to pal brown color, 3 mm long. Lemmas rounded on the back; hilum elongated

Family: Poaceae
Poa trivialis

Grains 3-4 mm long, oblong, brown color, Spikelets 2 - 4 - flowered, with woolly hairs at the base. Spikelets thinner than *P. pratensis,* oblong, or ovate; laterally compressed; 3–6 mm long; breaking up at maturity

Family: - Poaceae
Poa pratensis
Grain oblong, brown color, 3 -4 mm long. Spikelets woolly hairs at the base, oblong, or ovate; laterally compressed; 3–6 mm long; breaking up at maturity.

Family: - Poaceae
Sorghum x almum
Seed slightly larger than in Johnson grass, brown, ovate, 3.3 – 4 mm long, 2–2.3 mm broad.

Family : Poaceae
Sorghum virgatum
Seeds 2x3 mm size, elliptic shape, smooth in texture, brown to black, caryopsis with adherent pericarp. Hilum punctiform. Endosperm farinose. Disseminule comprising a rhachis internode.

Family: Poaceae
***Urochloa panicoides* P.Beauv**
Seeds are light in color, about 3 mm in length.

Family: - Poaceae
Urochloa platyphylla
Spikelets pedicellate, sessile or subsessile, dorsally compressed or terete, less than 3 mm wide, solitary at rachis nodes, Rachilla or pedicel glabrous, Glumes present, Lemma becoming indurate, enclosing palea and caryopsis, Lemma 5-7 nerved, Lemma glabrous, Lemma apex truncate, rounded, or obtuse, Lemma awnless, Lemma straight, Palea longer than lemma, Fruit - caryopsis.

Family: - Poaceae
Vulpia bromoides
This slender, cream to brown colored seed has a long awn extending from one end. Often the awns break off when mature.

Family : Polygonaceae
***Fagopyrum esculentum* (L.)**
Seeds 3 - 4 mm size, oboval to oblong shape network of veins visible on the surface texture, reddish to dark brown.

Family : Rubiaceae
***Diodia virginana* (L.)**
Seeds 3.5-4.5 mm long, hairy broadly elliptic hairy broadly elliptic, surface longitudinally furrowed in texture, light brown.

Family: - Rubiaceae
Galum mollago
Seeds 3-4 mm size, oboval to oblong shaped, Roughened with small protuberances from the surface texture, reddish – brown or grayish.

Family : Rubiaceae
***Richardia scabra (*L.)**
Seeds 3-4 mm long, oval shaped roughened with small protuberances from the surface roughened with small protuberances from the surface roughened with small protuberances from the surface, Reddish – brown or grayish.

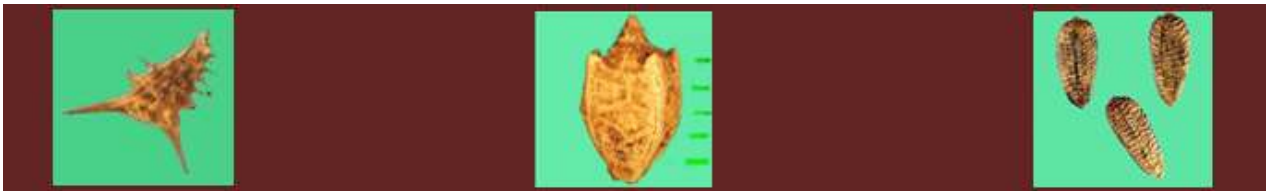
Family: Solanaceae
***Datura ferox* L.**
Seeds are kidney shaped, black or grey, pitted and 3.5 - 5 mm long.

Family: Solanaceae
***Datura inoxia* Mill.**
The seeds resemble small pebbles and are black, pitted and 3 - 5 mm in length.

Family : - Apocynaceae
Apocynum cannabinum
Seeds 4.5 - 6 mm size, elongated shape, tuft of hair attached to the end in texture, brown.

Family : - Asclepiadaceae
Asclepias tuberosa
Seeds 4.5 – 5 mm long, flat shape, seeds have tufts of silky harrsat one end in texture, brown.

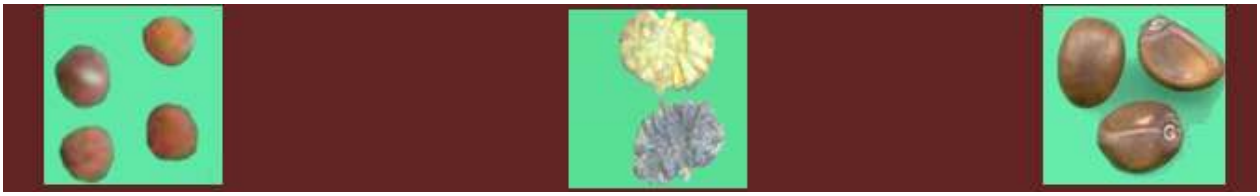
Family : - Asclepiadaceae
Asclepias verticillata
Seeds 4 – 4.5 mm long, flat shape, Tuft of fine hair at the tip in texture, brown.



Family: - Asteraceae
Acanthospermum hispidum
Seed, 3 – 4 mm long, generally found enclosed in the wedge shaped yellow to dark brown burr. The surface of the burr is covered in short, hooked spines with two large spines at the ends. angular shape. Size 6 mm long and covered with numerous short, stiff, hooked spines, with two much longer spines at the apex.

Family : - Asteraceae
Ambrosia trifida
Seeds 4 - 5 mm long, Apex with a central protuberance surrounded by several shorter projections shape, surface rough in texture, Straw or gray brown .

Family: - Asteraceae
Onopordum acanthium
Seeds spoon shaped, 4-7 mm (0.2 in.) long, ovate in outline, appearing cream with small dark brown markings. Seeds may be slightly curved and seed size varies with maturity.



Family: Brassicaceae
Brassica tournefortii
The surface of the seed is brown and covered with many veins which divide the surface of the seed. Single seeds are often found in hardened cream colored seed pod which is deeply veined and round shape. The pedicels of the fruits are 4 to 10mm long and diverge stiffly from the stem at a forty-five degree angle (Sanders and Minnich, 2000).

Family: Brassicaceae
Coronopus niloticus
Seeds x5 mm size, two seeded capsule, seed remain 4 within fruit shape, wrinkled in texture, yellowish brown.

Family : - Convolvulaceae
Calonyction muricatum
Seeds 4 - 5 mm long, like an orange wedge, surface convex and slightly angular and the other surfaces flat shape, surface dull but smooth in texture, dark brown to black.

Family: Convolvulaceae
Calystegia sepium
Seeds 4.5 - 6 mm long, like an orange wedge, one surface convex and two surfaces flat, seed scar horseshoe shape surface densely covered with minute hairs in texture, dark brown to black..

Family: Convolvulaceae
Convolvulus erubescens
Seed is dark brown, rounded on the back and has two flat faces, coat is not of a uniform color, has veins running through the coatm angular shape. is an egg-shaped to spherical, papery capsule, 5 – 10 mm long and wide containing four dark-brown to black angular seeds that are up to 4 mm long. The seeds may be warty, smooth, or covered in short hairs.

Family : - Convolvulaceae
Convolvulus sepium
Seeds 4 – 5 mm long, rough shape, surface lattened on one side and rounded on the others in texture, dark brown to black

Family : - Convolvulaceae
***Ipomea* alba**
Seeds 4 -5 mm long, egg shape, surface dull but smooth in texture, Straw or gray brown.

Family : - Convolvulaceae
***Ipomoea hederacea* (L.) Jacq**
Seeds 4.5 - 6 mm long, like an orange wedge, one surface convex and two surfaces flat, seed scar horseshoe shape surface densely covered with minute hairs in texture, dark brown to black..

Family: Convolvulaceae
***Ipomoea lonchophylla* J.M.Black**
Seeds angular downy seeds 4 - 6 mm long.

Family : - Convolvulaceae
Ipomea pandurata
Seeds 4.5 – 5 mm long, flattened, oval shape, surface covered with soft white hairs making them appear fringed in texture, red brown.

Family : - Convolvulaceae
***Ipomoea purpurea* (L.) Roth**
Seeds 4 - 5 mm long, Like an orange wedage, one side strongly convex and the other two sides flat, seed scar horseshoe shape, surface dull, finely granular in texture, dark brown to black dark brown to black.

Family : - Convolvulaceae
***Ipomea* spp**
Seeds 4.5 - 6 mm long, like an orange wedge, one surface convex and two surfaces flat, seed scar horseshoe shape surface densely covered with minute hairs in texture, dark brown to black..

Family: Convolvulaceae
***Ipomoea triloba* L.**

Dark brown, angular seeds 4 mm in length.

Family: - Convolvulaceae
Macroptilium atropurpureum
(Moç. & Sessé ex DC.) Urb.
Dark-brown to black angular seeds that are up to 4 mm long, may be warty, smooth, or covered in short hairs.

Family: - Fabaceae
***Cajanus cajan* (L.) Millsp**

Seeds are ovoid, 4 - 7 mm in length and reddish-brown.

Family : Fabaceae
***Cassia obtusifolia* (L.)**
Seeds 4-5 mm, angular with six or eight flattened shape, surface running along the long axis of the seed in texture, light brown.

Family : - Fabaceae
Lens culinaris
Seeds 4.5 - 6 mm long, like an orange wedge, one surface convex and two surfaces flat, seed scar horseshoe shape surface densely covered with minute hairs in texture, dark brown to black..

Family:Fabaceae
Mimosa pigra
Seeds appear a yellow to brown ochre colour, rounded and easily identified by a glossy surface. The seeds are contained within brown, rectangular pods which have a prickly surface, oval shape The seeds are brown or olive green, oblong, flattened, 4mm to 6mm long, and 2mm wide (Walden *et al*. 1999).

Family : - Fabaceae
***Trifolium repens* (L.)**

Seeds 4 – 5 mm long, kidney or circular shape, surface smooth and lightly shiny in texture, straw or Light reddish brown.

Family: Fabaceae
***Vigna lanceolata var. filiformis* Benth.**
Seeds black and roughly oval-shaped seeds, 4 mm long and 3 mm wide.

Family: Fabaceae
***Vigna lanceolata var. latifolia* Benth.**
Seeds brown and oval bean shaped seeds, 4 mm long and 3 mm wide.

Fmily : - Fabaceae
Vigna radiata var. radiata
Seeds 4 - 5 mm long, like an orange wedge, surface convex and slightly angular and the other surfaces flat shape, surface dull but smooth in texture, radish brown or oil color.

Family: Fabacea
Vigna unguiculata
Seed kidney shaped to oval, with seed coat being reddish brown and smooth. The hilum is distinctive and a lighter color than the rest of the seed coat. Seeds 4 to 8 mm long, 3 to 4 mm broad, variable in size and color (Barnard, 1969).

Family: - Linaceae
Linum usitatissimum
Seeds are spoon shaped and flat. The seed is glossy and reddish-brown in color, glossy brown or yellow seeds shaped like an apple pip. The seeds are 4 to 7 mm long.

Family : Liliaceaee
Allium cepa
Seeds 4-6 mm long,, kidney shape, surface glossy in texture, brown.

Family : Liliaceaee
Allium geyer
Seeds 4 - 5 mm long, like an orange wedge, surface convex and slightly angular and the other surfaces flat shape, surface dull but smooth in texture, dark brown to black.

Family: Liliaceaee
Allium porrum
Seeds 4.5 - 6 mm long, like an orange wedge, one surface convex and two surfaces flat, seed scar horseshoe shape surface densely covered with minute hairs in texture, dark brown to black..

Family : Liliaceaee
Allium schoenoprasum
Seeds 4-6 mm long,, kidney or oblong shaped, surface glossy in texture, brown.

Family : Liliaceaee
Allium textile
Seeds 4 - 5 mm long, like an orange wedge, surface convex and slightly angular and the other surfaces flat shape, surface dull but smooth in texture, dark brown to black.

Family: Liliaceaee
Allium tolmiei
Seeds 4.5 - 6 mm long, like an orange wedge, one surface convex and two surfaces flat, seed scar horseshoe shape surface densely covered with minute hairs in texture, dark brown to black..

Family : Liliaceaee
Allium vineale
This seed is generally found enclosed in cream colored, shiny bracts. The seed in the bract appears plump, and tapers to points at both ends, spoon shaped. Seeds are black and 3-4 mm long

Family: Scrophulariaceae
Verbascum blattaria
Seeds 4.5 - 6 mm long, oblong shape, surface of each seed is marked with wavy ridges in texture, brown.

Family : Poaceae
Alopecurus carolinianus
The spikelets are 4-7 mm long, single flowered, sub-sessile, with a disarticulation below the glumes. The glumes are united at the base, with three green nerves, narrowly winged and ciliate on keels. The lemmas equal the glumes in length, and are 4- to 5-nerved, with a 5-8 mm geniculate awn from near the base. Palea absent.

Family: - Poaceae
Alopecurus pratersis
Grain oblong, brown color, 5 mm long. Fertile lemma 4–6 mm long, keeled, 4–5 - nerved. Lemma apex entire, awned, 1-awned. Median (principal) awn dorsal, 6–10 mm long overall. Palea absent. Lodicules absent or vestigial.

Family: - Poaceae
Arrhenatherum elatius
Grain oblong, brown color, grain small to large, compressed dorsiventrally to terete, hairy on body, hilum long-linear, embryo small, 4 – 6 mm long.

Family: Poaceae
Bouteloua gracilis
Mature grains are about 4.5 mm. long, 1.5 mm. across, narrowly ellipsoid in shape, and light tan.

Family: Poaceae
Bromus racemosus
Fertile lemma 6.5–8.3 mm long, without keel, 7–9 -nerved. Lemma surface glabrous. Lemma apex dentate, awned, 1 -awned. Median (principal) awn subapical, 3.5–10 mm long overall. Lodicules present. Anthers 3.

Family: Poaceae
Cynosurus spp.
Fertile lemma 3–4.5 mm long, without keel, 5 -nerved. Lemma apex awned, 1 -awned. Median (principal) awn 0.5–1 mm long overall. Anthers 3. Grain 2 mm long.

Family: - Poaceae
Dactylis glomerata
Florets fertile lemma obovate, 4–7 mm long, herbaceous, much thinner on margins. Principal lemma awn 0.5–1.5 mm long overall, fruit hilum punctiform, grain oblong, brown color.

Family: Poaceae
Eriochloa aristata
Fertile floret(s), without rachilla extension, lanceolate, dorsally compressed, 4.5–15 mm long.

Family: Poaceae
Eriochloa punctata
Fertile floret(s), without rachilla extension, lanceolate, dorsally compressed, 4–15 mm long.

Family: Poaceae
Festuca brevipila
Fertile lemma 4.5–9.4 mm long, without keel or keeled, 5 -nerved. Lemma apex muticous or awned, 1 -awned. Median (principal) awn subapical, 0–4.3 mm long overall. Palea 2 -nerved.

Family: Poaceae
Hordeum hexastichon
Seeds are of two different shapes, dependant upon where the seed was in the floret. Outside row seeds are bent. and inner are plump. The husk is attached to the seed and similar to Hordeum distichon, the awn is brittle and often broken off

Family: Poaceae
Lolium multiflorum
Grains 4 -7 mm long, linear-elliptic, convex along its outer surface, where there are 3-5 longitudinal veins. Each lemma is 6-8 mm length, linear-elliptic, and convex along its outer surface, where there are several longitudinal veins.

Family: Poaceae
Lolium temulentum
The glume (8-12 mm. in length) is longer than the lemmas, but shorter than length of the spikelet; it is linear-elliptic, convex along its outer surface, where there are 3-5 longitudinal veins, grains 4 – 5 mm long.

Family: Poaceae
Phalaris canariensis

The seed 4 – 5 mm long, is shiny and pal brown colored, with maturity the seed becomes glossy. Fertile lemma elliptic laterally compressed, 5-6mm long, cartilaginous, shiny, keeled, 5-veind, lemma surface pubescent, ape acute, palea cartilaginous, 2-veined, without keels, palea surface pubescent, hairy on back.

Family: Poaceae
***Sorghum bicolor var. bicolor* (L.) Moench**
Seed heads – a large loose panicle up to 45 cm long and 23 cm wide. Seeds are 4 – 5 mm in diameter and are commonly red or white in color.

Family: Poaceae
Sorghum halapense

Seed heads – a large open panicle 10 to 45 cm long and 20 cm wide. Seeds are 4 – 5 mm in length and covered with fine hairs. orange/red to dark brown color.

Family: Poaceae
Sorghum x drummondii
Florets basal sterile florets 1, barren, without significant palea. Lemma of lower sterile floret hyaline, 2 -nerved. Fertile lemma 3.5–4.5 mm long, 1 -nerved. Lemma apex dentate, awned, 1 -awned. Median (principal) awn from a sinus, 10–16 mm long overall, with a twisted column. Palea absent. Lodicules present. Anthers 3. Grain 3.5–4.5 mm long.

Family: Poaceae
Vulpia myuros
Florets, fertile lemma 4.7–8.5 mm long, without keel, 5 -nerved. Lemma surface glabrous or indumented. Lemma apex awned, 1 -awned. Median (principal) awn 5–19.6 mm long overall. Palea 2 -nerved. Palea apex divided to base.

Family: Poaceae
Vulpia octoflora
Florets, fertile lemma 4.7–8.5 mm long, without keel, 5 -nerved. Lemma surface glabrous or indumented. Lemma apex awned, 1 -awned. Median (principal) awn 5–19.6 mm long overall. Palea 2 -nerved. Palea apex divided to base.

Family : - Apiaceae
***Chaerophyllum* spp.**
Seeds 5 - 6 mm long, elongated shape, in texture, brown to black.

Family : - Apiaceae
***Torilis* spp**
Seeds 5 - 6 mm long, , elongated shape, in texture, black.

Family : - Asteraceae
Ambrosia bidentata
Seeds 5 – 5.5 mm size, Apex with a central protuberance surrounded by several shorter projections shape, surface rough in texture, straw or gray brown .

Family : - Asteraceae
Ambrosia grayi
Seeds 5 – 6 mm Apex with a central protuberance surrounded by several shorter projections shape, Surface rough in texture, Straw or gray brown .

Family: - Asteraceae
Cirsium vulgare
Seed is elongated and is broadest above the middle region, sides of seeds are curved and a distinctive collar with a knob like projection is present at the tip, grey with brown and yellowing streaks running longitudinally along the coat. 5 mm long, with a downy pappus.

Family : Asteraceae
Carthamus lanatus
Seed 5 – 8 mm long, wedge shaped with four angled sides, bears pappus which are sharp and up to 1 centimetre long protruding from the crown, black or greyish-brown to dark brown color.

Family: Asteraceae
Carthamus tinctorius
Seeds are spoon shaped with longitudinal ribs running along the see. Seeds are whitish in colour with brown markings on some varieties, spoon shaped. achenes (fruits or seeds) white, 6-7 mm long, shining, the hull accounting for 1/3-1/2 total weight of seed. Fl. summer

Family : - Asteraceae
Gutierrezia sarothrae
Seeds 5 – 5.2 mm long, Oblong or egg shape, broad end at top in texture, light straw to brown.

Family: Asteraceae
Silybum marianum
Seeds – are dark brown to black, 5 – 8 mm long and 2.5 – 4 mm wide, topped by a dense tuft of silky bristles 12 – 20 mm long..

Family: Asteraceae
***Verbesina encelioides*(Cav.) A.Gray**
Seeds – are flattened, brown in colour, 5 – 7 mm long. The outer seeds in the head are wingless and the inner seeds winged, as in the WEEDpak photo.

Family : - Brassicaceae
Alliaria petiolata

Seeds 5 - 6 mm long, Oblong shape, in texture, brown to black.

Family: - Convolvulaceae
***Polymeria longifolia* Lindl.**

Seeds are 6 mm in diameter, dark brown, covered in short dense hairs.

Family : - Cucurbitaceae
Cucumis sativus
Seeds 5 - 6 mm long,, oval shape surface flatted and hairy in texture, seed dark brown and fruit light brown to gray.

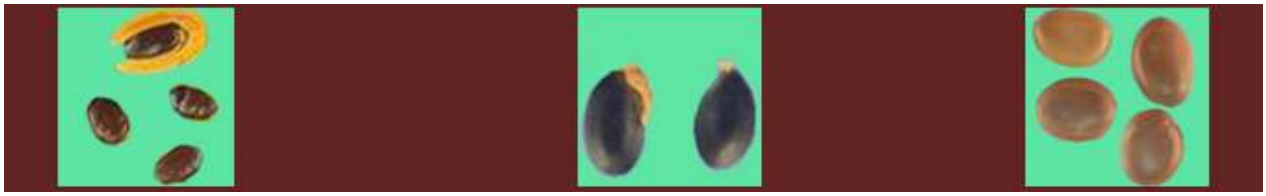
Family : Cucurbitaceae
Cucurbita maxima
Seeds 5 – 5.5 mm long, oblong shape, flattened and curved tipped with long white hairy plume in texture, Light straw.

Family : - Cucurbitaceae
Cucurbita moschata
Seeds 5 – 7 mm long, Oblong or egg shape, broad end at top in texture, light straw to brown.

Family : - Cucurbitaceae
Sicyos angulatus
Seeds 5 - 6 mm long, and 10 mm long of fruit seed oval shape and fruit broadly oval or broadly elliptic shape, seed flatted and hairy in texture and fruit surface smooth and dull, seed dark brown and fruit light brown to gray.

Family: Fabacea
***Acacia baileyana* F. Muell**
The hard Seeds, glassy, cylindrical to oblong shaped, 5 – 6 mm long and 3 mm wide., pal brown or black color (Entwisle *et al*. 1996; Kodela & Tindale 2001; Kodela & Harden 2002; Reid 2008 pers. comm.).

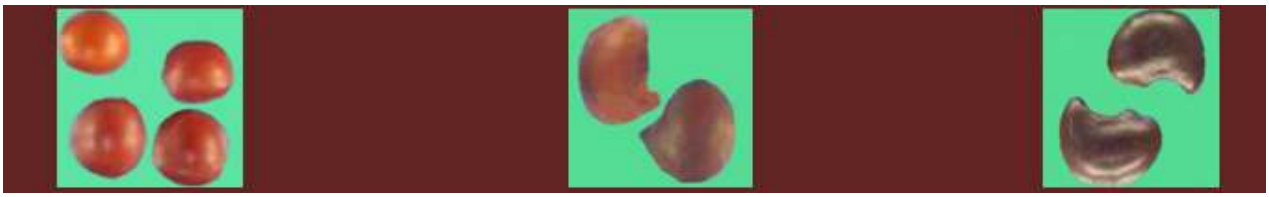
Family: Fabacea
***Acacia constricta* Benth.**
Seeds average about 3 mm wide, 5-6 mm long. Seeds are oblong shaped and flattened.



Family: Fabacea
***Acacia cyclops* A. Cunningham**
Seeds 5-7 mm long, glossy in appearance, smooth in texture, and dark brown to black in color.

Family: Fabacea
***Acacia dealbata* link.**
Seeds 5.5 - 7 mm long, glossy in appearance, smooth in texture, and black in color.

Family: Fabacea
***Acacia farnesiana* (L.) Willd**
Seeds compressed, 6-7 x 4-5 mm, coated with a characteristic whitish medulla.



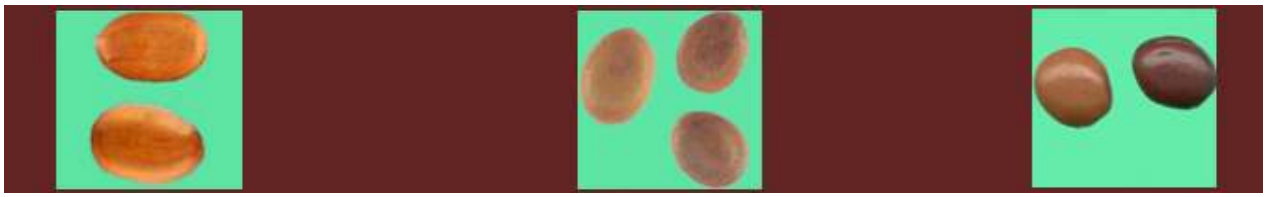
Family: Fabacea
***Adenanthera pavonina* L.**

The pods are curved and split into twisted halves when dry to expulse 8-12 bright red, hard, pill-shaped seeds.

Family: Fabacea
***Aeschnyomene rudis* Benth**

Seeds kidney shaped, 5 – 7 mm long, pal red to brown.

Family: Fabacea
***Aeschnyomene virginica* (L) B. S. P.**
Seeds kidney shaped, glassy, 5 – 7 mm long, dark brown, smoothin texture.



Family: Fabaceae
***Albizia julibrissin* Durazz**
Fruits are flat seed pods 12cm - 18cm (5 to 7 inches) in length containing light brown, oval-shaped seeds, 5 mm long.

Family: Fabaceae
***Albizia procera* (Roxb.) Benth**
Seeds smooth, greenish brown with a leathery testa, ellipsoid seeds, 7.5-8 mm x 4.5-6.5 mm and 1.5 mm thick

Family : - Fabaceae
Lathyrus aphaca
Seeds 5.8-6.2 mm size, oval or spherical shape, surface with short hairs and /or fine bumps in texture, dark brown to black.

Family: - Poaceae
Agropyron cristatum
Fertile lemma elliptic; 5–7 mm long; chartaceous; keeled; keeled above; 5 -veined. Lemma surface pilose. Lemma apex acuminate; awned; 1 -awned. Principal lemma awn 3–4 mm long overall; limb scabrous. Palea keels scabrous. Apical sterile florets resembling fertile though underdeveloped.

Family: Poaceae
Agropyron fragile subsp.
Fertile lemma elliptic; 6–8.5 mm long; chartaceous; keeled; 5 -veined. Lemma apex acute; muticous, or awned; 1 -awned. Principal lemma awn 0–1 mm long overall. Palea keels ciliate; with 12–40 enations per keel. Apical sterile florets resembling fertile though underdeveloped.

Family: Poaceae
Bouteloua curtipendula
Mature grains are about 4.5 mm. long, 1.5 mm. across, narrowly ellipsoid in shape, and light tan.

Family: Poaceae
Bouteloua eriopoda
Mature grains are about 4.5 mm. long, 1.5 mm. across, narrowly ellipsoid in shape, and light tan.

Family: Poaceae
Buchloae dactyloides
Staminate glumes unequal, 1-nerved, lemma 3.5 – 5 mm long, 3- nerved, palea subegual to lemma, 2-nerved, pistillate spikelets with first glume membranous or obsolete, second glume indurate and terminating in 3 awn-like points, lemma 3-nerved and with 3 short awns, fruits caryposis.

Family: Poaceae
Festuca arundinacea
Fertile lemma 6–9.4 mm long, without keel or keeled, 5 -nerved. Lemma apex muticous or awned, 1 -awned. Median (principal) awn subapical, 0–4.3 mm long overall. Palea 2 -nerved.

Family: - Poaceae
Festuca pratensis
Grain oblong, brown color, Fertile lemma 5–7(–8) mm long, without keel, 5 -nerved. Lemma apex muticous or awned. Median (principal) awn 0–2 mm long overall. Palea 2 -nerved.

Family: Poaceae
Festuca rubra subsp. rubra
Fertile lemma 4–6.4 mm long, without keel or keeled, 5 -nerved. Lemma apex awned, 1 -awned. Median (principal) awn 0.5–3.4 mm long overall. Palea 2 -nerved.

Family: Poaceae
Festuca rubra var. commutata
Fertile lemma 4–6.4 mm long, without keel or keeled, 5 -nerved. Lemma apex awned, 1 -awned. Median (principal) awn 0.5–3.4 mm long overall. Palea 2 -nerved.

Family: Poaceae
Hordeum vulgare subsp. vulgare
Grain oval, grooved, awned glumes firmly attached. Seeds Pale yellow, oval grain, 4-8 mm long by 2-5 mm wide, with a brittle awn that is often broken off jus above the grain. Husks are strongly attached to the grain.

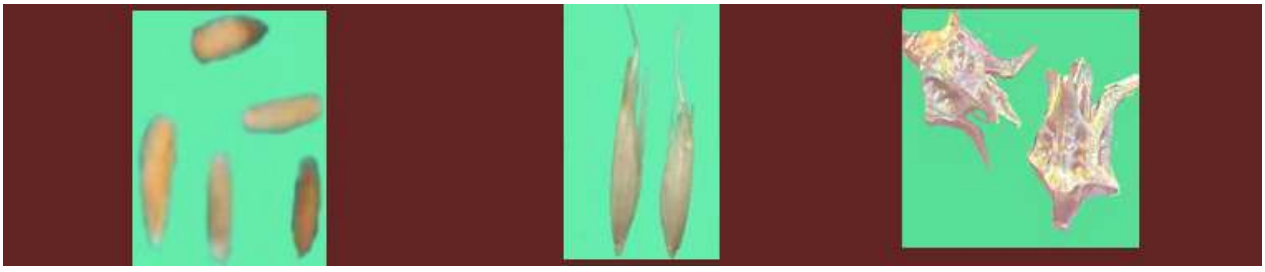
Family: Poaceae
Lolium perenne
lemma 5–7 mm long, without keel, 5 -nerved. Lemma apex muticous. Grain 3.8–4 mm long.

Family: - Poaceae
Nassella viridula
Fertile lemma elliptical, subterete, 5 – 6 mm long, coriaceous, without keel, hairy all along, margins convolute, covering most of palea, ape awned, 1-awned. Principal lemma awn bigeniculate, 2.5-3.5 mm. overall, with twisted column of lemma awn glabrous, palea 2 mm long, without keel.

Family: Poaceae
Psathyrostachys juncea
Lemmas 5.5-7.5 mm. long, lanceolate, glabrous or with 0.3-0.8 mm hairs, sharply acute or awned, awns 0.8-3.5 mm, paleas 5.8-7.6 mm, scabrous, acute, anthers 2.5-5.1 mm, lodicules 1.3-1.5 mm, caryopses 4.3-5 mm long.

Family: - Poaceae
Pseudoroegneria spicata
Glumes 6-13 mm long, 0.9-2.2 mm wide, spikelets glabrous, sometime scabrous over the veins, acute, lemmas 9-14 mm, unawned or with a terminal, strongly divergent awn, awns to 25 mm long.

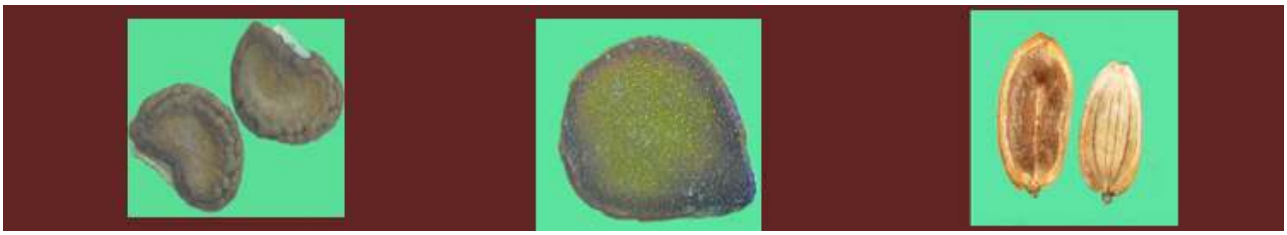
Family: - Poaceae
Sorghastrum nutans
Fertile lemma oblong, 3 – 5.5 mm. long, hyaline, without keel, 3-veined, margins ciliolate, apex lobed, 2-fid, awned, 1-awned. Principal lemma awn from a sinus, geniculate, 10-22 mm long overall, with twisted column of lemma awn hispiulous, palea absent or minut.



Family: - Poaceae
Secale cereale
Seeds are wrinkled and light to dark brown, wedge shaped with a flattened base, 5-7 mm long.

Family: - Poaceae
ventenata dubia
Spikelet 1 – 1.5 cm long and has riblike longitudinal veins, upper flower has a wavy awn up to 1.5 cm long. Fertile lemma elliptical, 5 – 13 mm. long.

Family: - Polygonaceae
***Emex spinosus* (L.) Compd.**
Seeds 5 - 7 mm long, has 3 spines and small pores shape, woody -spiny in texture, reddish green.



Family : - Solanaceae
***Datura innoxia* L.**
3x4 mm, kidney-shaped or approximately circular, surface rough with a network of veins, light brown color.

Family : - Zygophyllaceae
Fagonia indica
Seeds 6- 6.5 mm long, Round flat or oval shape, oil green and the ridge black color, the end tip in on side.

Family : - Apiaceae
Pastinaca sativa
Seeds 6- 6.2 mm long, Round, flat, and winged shape, Straw.

Family : - Asclepiadaceae
Ampelamus albidus
Seeds 6 - 6.5 mm long, horse-shaped oval -flatted, seed have tuft of silky-white hair attached to one end in texture, brown.

Family : - Asclepiadaceae
Asclepias incaranata
Seeds 6.5 - 7 mm long, Flat, oval have winged margins and long shape, Silky tufts of white hair at the tip in texture, brown.

Family: Convolvulaceae
Ipomoea diamantinensis
Seeds are brown and 6 – 8 mm in length.

Family: - Cucurbitaceae
Citrullus colocynthis
Seed is straw coloured with a smooth surface, rounded at one end and tapered to a point at the other, spoon shaped, grey and 6 mm long and 3 mm wide

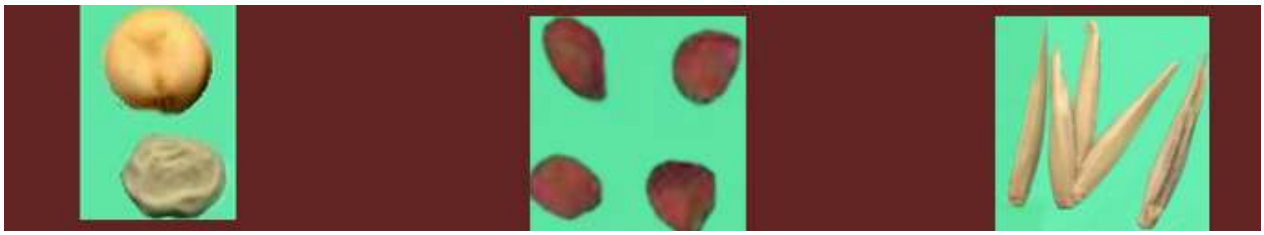
Family: Cucurbitaceae
Cucumis myriocarpus
Seed is oval shaped, with a round base and a slight tapering towards the tip. The seed surface is smooth and cream in color, spoon shaped. 6-7 mm long.

Family: Fabaceae
***Abrus precatorius* Nutt. ex Hook.**
The pod curls back when opened to reveal pendulous seeds and contains from 3 to 5 oval-shaped seeds, about 6 mm long.

Family : Fabaceae
Phaseolus coccineus
Seeds 4-6 mm long,, kidney shape, surface glossy in texture, dark brown to black, a smooth surface which is mottled with ride speckles.

Family : - Fabaceae
Phaseolus lunatus
Seeds 6 mm long, like an orange wedge, surface convex, surfaces flat shape, surface dull but smooth in texture, white color.

Family : Fabaceae
Phaseolus vulgaris
Seeds 6 – 6.5 mm long, kidney shape, one surface convex and two surfaces flat, seed scar horseshoe shape surface which is mottled with ride speckles, dark brown to black color.



Family: - Fabacea
Pisum sativum
Seeds vary in colour from brown, green to white, generally with a smooth surface, occasionally with indents. Seed coat is brittle and the yellow or green centre is often shown. The hilum of the seed may sometimes be black but is generally light brown, round shape.

Family: Iridaceae
Romulea rosea
Seeds are reddish brown and round with a smooth surface. Often found in a paper casing which holds a number of seeds in quadrants. Fruit a wrinkled broadly oblong capsule, 6 – 10 mm long.

Family: - Poaceae
Agropyron desertorum
Fertile lemma elliptic, 6 – 7 mm long, chartaceous, keeled; keeled above, 5 -veined. Lemma surface pilose. Lemma apex acuminate; awned, 1 -awned. Principal lemma awn 3–4 mm long overall; limb scabrous. Palea keels scabrous. 7 mm long Grain oblong, brown color,

Family: Poaceae
Andropogon geradii
Florets, basal sterile florets 1, barren, without significant palea. Lemma of lower sterile floret hyaline. Fertile lemma without keel. Lemma apex lobed, awned, 1 -awned. Median (principal) awn from a sinus, 6 – 26 mm long overall. Palea absent

Family : Poaceae
Avena barbata
Seeds are brown to cream, hairy curled and bent awns extending from the base.

Family: - Poaceae
Bromus commutatus
Grain oblong, brown color, fertile lemma 7–20 mm long, keeled, 9–13 -nerved. Lemma apex lobed, awned, 1-awned. Median (principal) awn subapical, 1–9 mm long overall, lodicules present.

Family: Poaceae
Bromus hordeaceus
Ellipsoid. 1mm wide, 3mm long. Yellow to brown. 1-10 mm Awn. Fertile lemma 11–14 mm long, keeled, 7–9 -nerved. Lemma apex awned, median (principal) awn subapical, (2–)3–10 mm long overall.

Family: - Poaceae
Bromus inermis subsp. inermis
7 – 9 mm long Grain oblong, brown color, fertile lemma 8–13.5 mm long, without keel or keeled, 5–7 -nerved. Lemma surface glabrous or indumented. Lemma apex dentate, muticous or awned, 1 -awned. Median (principal) awn subapical or from a sinus, 2.5–10 mm long overall. Lodicules present.

Family: Poaceae
Bromus secalinus
Fertile lemma 6–10 mm long, without keel, 7–9 -nerved. Lemma surface glabrous. Lemma apex muticous or awned, 1 -awned. Median (principal) awn subapical, 0–8 mm long overall. Lodicules present.

Family: Poaceae
Elymus lanceolatua subsp. lanceolatus
Fertile lemma lanceolate to oblong, 7-10 mm. long, coriaceous, 5-7-veined, apex acute, awned, 1-awned, palea 1 length of lemma, palea keel scabrous, apical sterile florets resembling fertile though underdeveloped.

Family: - Poaceae
Elymus virginicus

Fertile lemma lanceolate oblong, 7-10 mm long, coriaceous, 5 – 7-veind, surface glabrous or pilose, ape acute, awned, 1-awned. Principal lemma awn 5-25 mm. long overall, palea 1 length of lemma, palea scabrous, apical sterile florets resembling fertile though underdeveloped.

Family: Poaceae
Elytrigia intermedia subsp. intermedia
Fertile lemma 7–13 mm long, without keel or keeled, 5 -nerved. Lemma apex muticous or awned, 1 -awned. Median (principal) awn 0–10 mm long overall. Palea 2 -nerved. Lodicules present.. Grain 5 mm long.

Family: - Poaceae
Glyceria fluitans
Grain ablong, brown color, subfossil specimen; obovate, 0.5-1.5 mm; prominent indent at base of seed characterstic of Glyceria; 2 persistent, recurved stigmas; reddish-brown

Family: Poaceae
Lolium persicum
Fertile lemma lanceolate oblong, 8.2-11.7 mm long, coriaceous, 3 – 5-veind, lemma lateral veins obscure, apex erose, acute to attenuate, awned, 1-awned. Principal lemma awn 5-15 mm. long overall, palea 1.1 length of lemma, palea keel scabrous, apical sterile florets resembling fertile though underdeveloped.

Family: Poaceae
Pascopyrum simithi
The florets 8 – 10 mm long, pale color with the dark grain ollen visible, pale is covered in fin hairs, callus has 2 lines of hairs, a deep groove between the callus and the lemma looks like a fingemail mark.

Family : Aizoaceae
Tetragonia tetragonoides
Seed is in hard woody fruit, which appears dry and grey. The cone shaped fruit has up to 5 horns protruding, angular shape. Fruit sub globose, 10–12 mm diam., woody, winged; wings mostly 4–6, usually 2 larger than the rest; seeds numerous, pyriform, light brown.

Family : - Apiaceae
Petroslinum crispum
Seeds 8 mm long,, oval shape, surface much flattened, low ribbed in texture, straw or brown, fruits opens a long the middle of the locule.

Family : - Asclepiadaceae
Asclepias syriaca
Seeds 7 - 8 mm long, Oval shape, Flat with silky ,white parachutes of hair attached to the tip in texture, Light brown.

Family : - Asteraceae
Artemisia vulgaris
Seeds 11 mm long, rigeged, oblong with a narrow base shape, Seed tipped with tiny bristles in texture, brown.

Family : - Asteraceae
***Bidens bipinnata* (L.)**
Seeds 8 - 18 mm long, linear shape, angled, smooth or sparsely hairy in texture, dark brown to black.

Family : - Asteraceae
***Bidens pilosa* (L.) v. radiata**
Seeds 7 - 8 mm long, Linear shape, Rigeged, oblong with a narrow base in texture, black color.

Family : - Asteraceae
Liatris punctata
Seeds 7 - 8 mm long, wedge shape, hairy with a pappus of fin, elongated hairs in texture, dark gray.

Family : - Asteraceae
Tragopogon dubius
Seeds 7 - 8 mm long, ridged and more than half of their length is a slender beak shape, circle of feathery bristles attached to the tip in texture, brown.

Family: - Asteraceae
***Xanthium italicum* Moretti**
Burrs hard woody, spiny burrs, oval shaped, brown, 25 – 30 mm long, covered in hooked spines, 4 - 5 mm long, with longer terminal spines, 6 - 8 mm long. These terminal spines spread apart (are divergent) and are curved inward at the tip.

Family: - Asteraceae
***Xanthium orientale* L.**
Burrs hard woody, spiny burrs, oval shaped, brown, 18 – 24 mm long, covered in hooked spines, 2 - 4 mm long, with longer terminal spines, 4 - 6 mm long. These terminal spines spread apart (are divergent) and are hooked at the tip.

Family: - Asteraceae
***Xanthium spinosum* L.**
Burrs oval, brown, woody burrs, 8 – 15 mm long and 4 – 5 mm wide, covered in numerous hooked spines, to 3 mm long, with two longer, straight, unequal spines at the tip of the burr. Two seeds are enclosed within each burr. One of the seeds is slightly larger than the other.

Family: Asteraceae
Xanthium strumarium
This seed has a brown coloured surface which is covered with hooked spines, and two horns at the apex. single-seeded bur 8 – 20 mm long. It is covered with stiff, hooked spines, which sticks to fur and clothing and can be quite difficult to extract.

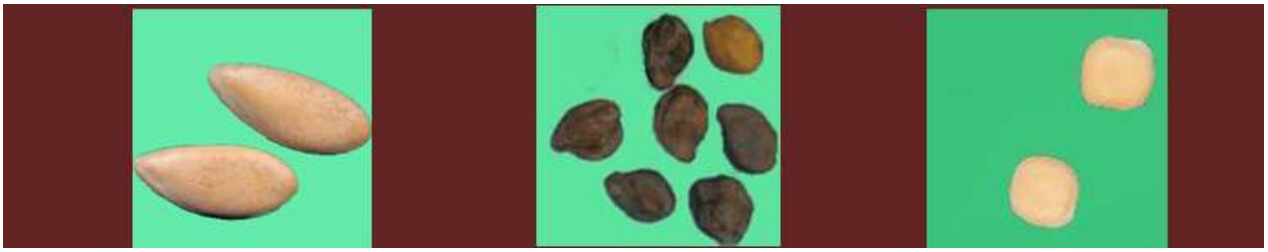
Family : - Bignoniaceae
***Campsis radicans* (L.)**

Seeds 7-12 mm mm long, broadly winged shape, strongly flattened in texture, dark or light brown .

Family : Cucurbitaceae
Citrullus lanatus var. lanatus

Seeds7 – 9.5 mm long, oblong shape, flattened and curved tipped with long white hairy plume in texture, Light straw.

Family: Cucurbitaceae
***Citrullus lanatus* (Thunb.) Matsum. & Nakai var. lanatus**
Seeds – are initially white but become brown with black stripes when mature. Seeds are ovalshaped and flat, 9 – 10 mm long and 6 mm wide.



Family : - Cucurbitaceae
Cucurbita pepo
Seeds 8 – 10 mm long, oblong or egg shape, broad end at top in texture, light straw to brown.

Family: - Fabaceae
***Cicer arietinum* L.**
Seeds are an unusual, angular shape, brown and 8 – 10 mm long, depending on variety.long Grain oblong, brown color,

Family: - Fabaceae
Lupinus albus
Seeds White, dull, almost square with rounded edges, with a dimple on one or both sides. 8-14 mm diameter. Smooth with a hollow in the centre, square and flattened.

Family : Liliaceae
Allium canadense
Seeds 9 - 10 mm long, oblong shape, wing- like ridge round it in texture, glassy , black.

Family : - Liliaceae
Yucca glauca
Seeds 9 mm long, oblong shape, Surface flat in texture, black.

Family: **-. Malvaceae**
***Abies fraseri* (Pursh) Poir**.
Abaxial (bottom) surface pictured on top, adaxial (top) surface below. Base of needle on righthand side of photograph. Note blunt tip w/small notch. Flat in cross section, twisted at base. May be 12-25 mm long.

Family: **-. Malvaceae**
Abies spp
Abaxial (bottom) surface pictured on top, adaxial (top) surface below. Base of needle on righthand side of photograph. Note blunt tip w/small notch. Flat in cross section, twisted at base. May be 12-25 mm long.

Family: Martyniaceae
***Ibicella lutea* (Lindl.) Van Eselt.**
Seeds are black, rough, angular 1 cm in length

Family: Poaceae
Aegilops cylindrica
Fertile lemma oblong, 9-11 mm long, coriaceous, without keel, 5-veind, lemma, apex truncate, awned only on distal spikelet, 1-awned. Principal lemma awn 30-80 mm. long overall, palea 1.1 length of lemma, palea keel scabrous, apical sterile resembling fertile though underdeveloped.

Family: Poaceae
Avena fatua
Seeds are elongated and dark brown with longitudinal markings along the coat, often paler at the tips. Seed is tapered at the tips.

Family: Poaceae
Avena sativa
Seeds are golden color, which may be lighter at the tops. The seed is hairless and free of awns as they are easily removed. The seed is elongated in shape.

Family: - Poaceae
Bromus catharticus
11 – 12 mm long Grain oblong, brown color, Fertile lemma 12–20 mm long, keeled, 9–13 -nerved. Lemma apex lobed, awned, 1-awned. Median (principal) awn subapical, 1–9 mm long overall. Lodicules present.

Family: Poaceae
Bromus marginatus
12 – 14 mm long, fertile lemma 12–19 mm long, without keel, 7 -nerved. Lemma apex dentate, awned, 1 -awned. Median (principal) awn subapical or dorsal, 10–22 mm long overall. Lodicules present.

Family: - Poaceae
Bromus rigidus
13 -. 15 mm long Grain oblong, brown color, 1-2 mm wide, 20-30 mm long with a 20-50 mm rough bristle, Fertile lemma 10–17 mm long, without keel or keeled, 5–7 -nerved. Lemma surface glabrous or indumented. Lemma apex dentate, awned, 1 -awned. Median (principal) awn subapical or dorsal, 7–23 mm long overall. Lodicules present.

Family: - Poaceae
Bromus tectorum
10 – 12 mm long Grain oblong, brown color, fertile lemma 9–16 mm long, without keel or keeled, 3–7 -nerved. Lemma surface glabrous or indumented. Lemma apex dentate, awned, 1 -awned. Median (principal) awn subapical or dorsal, 10–25 mm long overall. Lodicules present.

Family: - Poaceae
Bromus unioloides

Fertile lemma 9–16 mm long, without keel or keeled, 3–7 -nerved. Lemma surface glabrous or indumented. Lemma apex dentate, awned, 1 -awned. Median (principal) awn subapical or dorsal, 10–25 mm long overall. Lodicules present.

Family: Poaceae
Elymus canadensis

Spikelets comprising 3-5 fertile florets, with diminished florets at the apex, elliptic to oblong, laterally compressed, 12-15 mm. long, breaking up at maturity, disarticulating below each fertile floret, spikelet callus glabrous, bas truncate.

Family: Poaceae
Elymus trachycaulus subsp. trachycaulus
Fertile lemma lanceolate oblong, 8-13 mm long, coriaceous, 5 – 7-veind, lemma lateral veins obscure, apex acute, muticous or awned, 1-awned. Principal lemma awn 1-3 mm. long overall, palea 1 length of lemma, palea keel scabrous, apical sterile florets resembling fertile though underdeveloped.

Family: Poaceae
Elytrigia elongata
Fertile lemma lanceolate oblong, 8-10 mm long, coriaceous, 5 – 7-veind, surface glabrous or pilose, ape acute, awned, 1-awned. Principal lemma awn 5-25 mm. long overall, palea 1 length of lemma, palea scabrous, apical sterile florets resembling fertile though underdeveloped.

Family: - Poaceae
Elytrigia repens
Fertile lemma lanceolate oblong, 8-13 mm long, coriaceous, keeled, keeled above, 5-veind, lemma midvein scabrous, apex acute, muticous or awned, 1-awned. Principal lemma awn 0-10 mm. long overall, palea 1 length of lemma, palea keel ciliolate, palea apex tuncate apical sterile florets resembling fertile though underdeveloped.

Family: - Poaceae
Phragmites australi
Spikelet pedice8, 10 mm long, lemma equaling the glumes, hairiness awnless, surface scabrous, apex acuminate, awned, 1-awned. Principal lemma awn straight or curved, 70-120 mm. long overall, palea 1.1 length of lemma, palea keel scabrous, apical sterile 1 in number, barren, linear.

Family: - Poaceae
Taeniatherum caput-medusae subsp. caput
Fertile lemma lanceolate, 8-12 mm long, without keel, 5-veind, lemma surface scabrous, apex acuminate, awned, 1-awned. Principal lemma awn straight or curved, 70-120 mm. long overall, palea 1.1 length of lemma, palea keel scabrous, apical sterile 1 in number, barren, linear.

Family: - Poaceae
Triticum durum

Seed is golden and appears vitreous, is oblong and may have fine bristles at the end. A crease is evident on the underside of the seed, 7 – 9 mm long.

Family: - Poaceae
Triticum spelta

Seeds are wrinkled and a dull pale brown color, 9 – 10 mm long, elongated and always free of husks as seed is easily removed, plump and oblong in shape with a crease on the underside..

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