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Identification of weed seeds of some species belong to Asteraceae in Setifian high plateau.

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ABSTRACT

The identification of weed seeds interest selecteds and officials bodies charged with the control of the specific purity of seeds lots .For botanists the observation of seeds is an element of the confirmation of the identification. Present observation has been carried out on the study of the morphological characteristics of the widespread weeds seeds in the north east of Algeria (the Setifian high plateau). Eight characteristics were used to identify twenty species of seeds which belong to Asteraceae family. The morphological characteristics in which the study was based on are: shape, color, size (length, breadth), solidity, brightness, surface, Appendages, weight per 100seeds. Considerable differences were noticed between the various species of weeds seeds. The study of morphological characteristics of seeds allows identifying the different seeds mixed with cultivated plant, it also allows knowing the various species of weeds in fields. So such studies help to develop different strategies to control weeds.

KEYWORDS: Weed, Seed, Identification, Asteraceae, Morphological characters.

INTRODUCTION

Plant species are considered weeds when they interfere with man's activities or his welfare. Such plants grow where they are not wanted, they reduce yield and quality of crop [13]. The predominance of a weed species is the result of high capacity for reproduction and efficient mechanism for dispersal, survival, adaptation and competition[19]. Accurate weed identification is the first step in a successful weed management program. Weed species respond differently to different management strategies. Whether you choose chemical, cultural or mechanical control measures, you need to know what weed species are present[5]. Failure to identify the weed problem accurately may lead to wasted time and money or excess pesticide applied to the environment. Because most weeds are most effectively controlled at a very young stage, it is important to identify them as early as possible. Unfortunately, many weeds look very similar at a young stage [17], [22].

Compositae (Astesaceae) is one of the largest plant families consisting of herbaceous plants with only few exceptions. It is cosmopolitan in distribution, occurring in all continents. The family is most abundant in mountain sub-tropical latitude. It is highly evolved family among angiosperms and is generally regarded as occupying the highest position in plant kingdom due to its great preponderance and cosmopolitan range . The family comprises ± 1535 genera and over c.2300 species distributed in 3 subfamilies and 17 tribes[1]. It is also the largest plant family in Algeria, represented by over 408 species and 109 genera [8].

Weed seeds are difficult to manage because they are small, abundant, and produce a lot of seed. Weeds are one of the most significant limiting factors in agricultural production. Weeds compete strongly with crops for light, water and nutrients. This brings about severe interference with normal crop growth, causing high crop

losses and reducing the quality of produce. Most annual weeds produce a prolific number of seeds each year. Production of abundant small seeds is a common adaptation that ensures a high probability of dispersal and re-infestation [20].

Seed is a vital genetic source and dispersal unit between successive generation of plants, and it possesses very reliable and constant characters in various groups of seed plants. Seed morphological studies have great value and these characters can be individually used as a beneficial tool for the identification of plant species at various levels[7], [23]. Identification of weed seeds from overseas countries can be problematic, particularly when diagnostic tools are lacking or incomplete. A well trained seed analyst will usually be able to identify seed to generic level but not always to the species level [17]. Seed Identification can be both a science and an art. Some seed scientists use "seed keys" to identify seeds, others visualization, and most use both depending upon what experience they have in the field and what they are trying to identify. Unfortunately, only the most common agricultural and weed seeds have been described, drawn, or photographed. This makes identifying less common seeds harder[21].

MATERIALS AND METHODS

Plant material:

In this study Seeds of 20 different species of asteraceae were collected from various crop fields located in the region of Setifian high plateau which situated in the north east of Algeria between the two longitude 5°and 6°and between the two laltitudes35°. 40 and 36°.35. After maturation of the seed we collect as many as possible, we put the seed in paper bags to keep it dry and to avoid humidity and climatic factors which lead to germinating these seeds, they were kept in normal condition of laboratory.

Morphological characteristics:

Seeds morphological discrimination is related to external description of all the characteristics of seed. The study requires taking 05 seeds randomly of each species [3]. Apparent substantial information helps researchers to identify or describe seeds. the work on the identification starts by collecting seeds from fields then study it thoroughly in the laboratory where researchers often observe it by naked eyes, in addition to the reliance on references and researches concerning describing seeds to make the study effective and successful it must be conducted carefully with continual vigilance because of the smallness of some seeds so we use magnifying glass, the optical microscope and pocket lamp to see the different external parts of seeds [16] .The morphological characteristics in which the study was based on were used by different researchers for example the characteristics like size, weight ,color and shape were used as suggested by various workers [4], [9], [10]. As well as other some researchers who bear on other characteristics such as solidity ,brightness, surface [2], Appendages [18]. Generally the characteristics were used in this study are the result of the most important characteristics which were used in the different researches of seeds identification.

RESULTS AND DISCUSSION

The study of morphological characteristics of seeds allows identifying the different seeds mixed with cultivated plant, it also allows knowing the various species of weeds in fields. So such studies help to develop different strategies to control weeds.

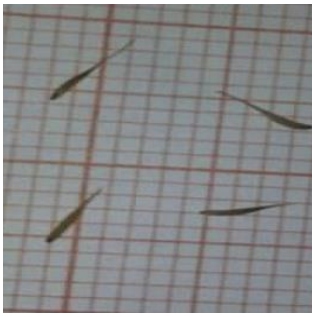

Photo1:Seeds of *Senecio vulgarus* L.

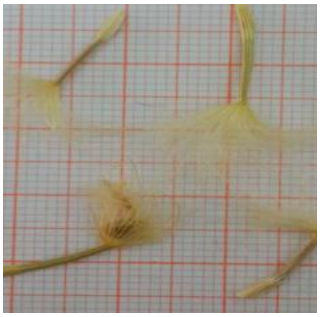

Photo2:Seeds of *Scorzonera liciniata* L.

Photo3:Seeds of *Carlina acaulis* L.

Photo4:Seeds of *Taraxacum bithynicum* L.


Photo5:Seeds of *Sonchus oleraceus* L.

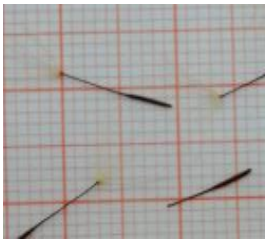
Photo6:Seeds of *Urospermum picroides* L.


Photo7:Seeds of *Crepis vesicaria* L.


Photo8:Seeds of *Sonchus asper* L.


Photo9:Seeds of *Scolymus grandiflorus* L.
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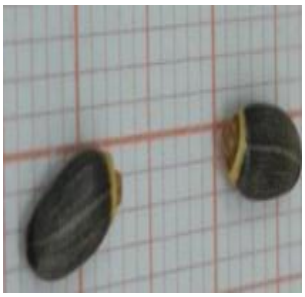
Photo10:Seeds of *Silybum marianum* L.


Photo11:Seeds of *Carduus tenuiflorus* L.


Photo12:Seeds of *Carduus psycnocephalus* L.


Photo13:Seeds of *Carthamus lanatus* L.


Photo14:Seeds of *Calendula arvensis* L.

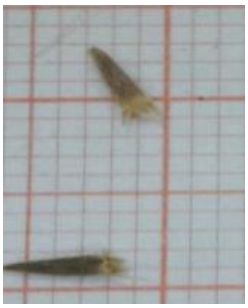
Photo15:Seeds of *Centauria aspera* L.


Photo16:Seeds of *Centaurea sobstilialis* L.


Photo17:Seeds of *Atractylis cancellata* L.


Photo18:Seeds of *Cichorium intybus* L.


Photo19:Seeds of *Onopordum acanthium* L.

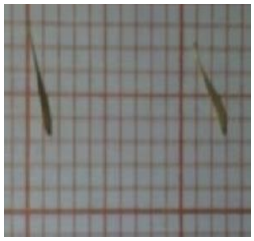
Photo20:Seeds of *Picris echoides* L.

Table 1: Morphological characteristics of species seeds (Shape, Color, Size, Surface).

Species	Morphological characteristics			
	Shape	Color	Size (mm)	Surface
Scorzonera liciniata L.	Linear.	Grayish to brown.	16.3±0.66;2.27±2.27	Reticular.
Urospermum picroides L.	Linear.	Brown to black.	5.17±0.09;0.30±0.0	Rough.
Picris echoides L.	Linear.	Yellow dark to brown.	3.17±0.17;0.25±0.05	Rough.
Senecio vulgarus L.	Linear.	Brown dark to black.	4.3±0.09;1.20±0.11	Rough.
Taraxacum bithynicum L.	Linear .	Yellow dark to brown.	17.17±1.04;1.95±0.05	Reticular.
Carduus tenuiflorus L.	Linear to obovate	Grayish pale to brown	4.1±0.18;1.62±0.15	Smooth.
Carduus psycnocephalus L.	Linear.	Yellow to grayish.	5.10±0.18;2.07±0.20	Smooth.
Centauria aspera L.	Linear to obovate	Grayish pale to brown	3.10±0.14;1.15±0.05	Smooth.
Cichorium intybus L.	Obovate to oblong.	Brown to black.	3.82±0.25;1.82±0.23	Smooth
Centaurea sobstilialis L.	Oblong to obovate.	Grayish pale to yellow.	4.05±0.12;1.2±0.08	Smooth.
Sonchus oleraceus L.	Flat to obovate	Orange to brown.	2.95±0.12;1.35±0.17	Rough.
Crepis vesicaria L.	Oval to oblong	Grayish to brown.	2.32±0.09;1.05±0.09	Rough.
Sonchus asper L.	Obovate to elliptic	Yellow dark to brown.	2.9±0.08;0.95±0.12	Rough.
Silybum marianum L.	Oval to oblong	Brown dark to black.	6.00±0.08;2.97±0.1	Smooth.
Onopordum acanthium L.	Oval to oblong	Grayish pale to yellow.	4.77±0.25;1.5±0.14	Reticular.
Scolymus grandiflorus L.	Elliptic to avate	Grayish pale to brown.	5.05±0.05;3.07±0.0	Winged.
Atractylis cancellata L.	Oval to obovate	White pale to yellow	4.97±0.20;4.54±0.17	Rough.
Carthamus lanatus L.	Elliptic.	Grayish to brown.	5.15±0.17;4.25±019	Reticular.
Calendula arvensis L.	Heteromorphic	Yellow to brown	6.82±0.12;5.15±0.17	Spiny.
Carlina acaulis L.	Obovate	Yellow to grayish.	6.40±0.18;4.52±0.09	Rough.

Table 2: Morphological characteristics of species seeds (Solidity, Brightness, Appendages, Weight per 100 seeds).

Species	Morphological characteristics			
	Solidity	Brightness	Appendages	Weight per 100 seeds (mg)
Scorzonera liciniata L.	Fragile.	Pale.	Pappus.	0.30±0.05
Urospermum picroides L.	Fragile.	Pale.	Pappus.	0.90±0.01
Picris echoides L.	Fragile.	Pale.	Pappus.	0.06±0.01
Senecio vulgarus L.	Fragile.	Pale.	Pappus.	0.02±0.05
Taraxacum bithynicum L.	Fragile.	Pale.	Pappus.	0.06±0.11
Carduus tenuiflorus L.	Ridged.	Pale.	Pappus.	0.16±0. 14
Carduus psycnocephalus L.	Ridged.	Pale.	Pappus.	0.59±0.03
Centauria aspera L.	Ridged.	Pale.	Pappus.	0.30±0.05
Cichorium intybus L.	Ridged.	Bright.	Pappus.	0.25±0.04
Centaurea solstilialis L.	Ridged.	Pale.	Pappus.	0.15±0.01
Sonchus oleraceus L.	Fragile.	Pale.	Pappus.	0.03±0.13
Crepis vesicaria L.	Fragile.	Pale.	Pappus.	0.08±0.15
Sonchus asper L.	Fragile.	Pale.	Pappus.	0.03±0.05
Silybum marianum L.	Ridged.	Bright.	Pappus.	2.11±0.25
Onopordum acanthium L.	Ridged.	Pale.	Pappus.	0.43±0.04
Scolymus grandiflorus L.	Fragile.	Pale.	Pappus.	0.06±0.01
Atractylis cancellata L.	Fragile.	Pale.	Pappus.	0.09±0.14
Carthamus lanatus L.	Ridged.	Bright.	Pappus.	1.89±0.27
Calendula arvensis L.	Fragile.	Pale.	Spines	1.54±0.16
Carlina acaulis L.	Ridged.	Pale.	Pappus	2.93±0.25

We found that, as expected, size, color and shape characteristics have larger discriminating power than solidity, brightness and weight per 100 seeds, that was confirmed by [11] and [6]. The identifying characters described and used in this publication are found only on the external surface of the seeds. Their usefulness for identification varies. Characters of major importance are color, size and shape of the seed [3], [12]. Other characters used in conjunction with these features have limited use.

We found that the single character is not enough to distinguish the species because the seeds of more than one species posses same mean value however their standard deviations vary . But the consideration of these characteristics collectively was found unique in this study. So these characteristics may serve as a convenient method for identification and classification of weeds on the basis of their seed bank available in the soil[4] . However, according to[15] the Variation in seed size is an important character for evolutionary plant ecologists. Variation occurs at several biological levels, from differences between species to within-individual variation. Seed heteromorphic is a special case of within-individual variation in seed size. involves the

production by single individual plants of seeds of different morphology. In several species, differentiation in morphology is accompanied by a difference in seed size [14].

Conclusion:

The analysis and classification of seeds are essential activities contributing to the final added value in crop production. In other situations, contaminant weed seeds may be difficult to find and identify. When seeds contaminate soil, their small size and color can make them difficult to find. These activities are performed at different stages of the global process, including seed production, cereal grading for industrialization or commercialization purposes, during scientific research for improvement of species, etc. For all these purposes, specialized technicians are employed.

In most cases, these methods are slow, have low reproducibility, and possess a degree of subjectivity hard to quantify, both in their commercial as well as in their technological implications. It is then of major technical and economical importance to implement new methods for reliable and fast identification and classification of seeds. Like ocular identification work, automatic classification should be based on knowledge of seed size, shape and color.

Seed descriptions are based on sound seed and what is generally considered normal. With any seed there can be variations from the norm due to: maturity, environmental factors such as weathering, disease and other factors which may change the visual features of the seeds. These factors can impact on the size, shape, color and overall appearance of a given seed.

The following research deals with the identification of the most morphological characteristics which help to describe seeds in order to know them, so the identification of the species which strength compete with the cultivated plant, the main purpose is attempting to find the effective methods in control to increase production and to try to attain sufficiency.

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