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STUDIES ON SHAPE, SIZE AND WEIGHT OF CERTAIN WEED SEEDSBURIED IN THE SOIL SEED BANK

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ABSTRACT

In agriculture the identification and classification of weed seeds are technically and economically important. In this work, seeds of 15 different weeds species were collected from different crop fields located in the periphery of Dera Ghazi Khan City, Pakistan. The size and weight of the collected seeds were recorded. These parameters may serve as a convenient method for identification and classification of weeds on the basis of their availability in the soil seed bank available in the soil.

Key words: Seed identification, Machine vision, seed bank

INTRODUCTION

In agriculture, the identification and classification of weeds is technically and economically important because these would be helpful to identify the seed bank in soil of expected competitor weeds. The standard ocular identification is mostly based on the knowledge of seed size, shape, colour and texture. Machine vision seems a suitable technique to automate this task (Granitto *et al*. 2000). In addition these characteristics are important to know the quality of seeds (Jansen, 1995; Ahmad *et al.* 1999).

In most of the studies, identification on bases of these morphological characters and machine vision technique was concentrated on cultivated varieties (Chen *et al*. 1989; Draper et*al.1984;* Neuman *et al.*1987; 1989; Symons *et al.* 1988). However, few studies are available in case of weeds (Chtioui *et al.* 1996; Petersen *et al.* 1992 and Granitto *et al.* 2003).[1]

In this paper we are firstly reporting the size, weight, color and shape of weed seeds in Pakistan. This study will be beneficial in future for weed identification, classification and in their management.

MATERIALS AND METHODS

During February to May 2005, five hundred normal and healthy partially buried seeds of each species of following 15 annual weeds i.e. *Anagallis arvensis* Linn*., Avena fatua* Linn*., Brassica campestris* Linn*., Chenopodium album* Linn*., Euphorbia helioscopia* Linn*., Fumaria indica*Hassk*., Galium aparine* Linn*., Ipomoea eriocarpa* R.Br., *Lathyrus aphaca* Linn., *Lolium temulentum* Linn., *Melilotus albus* Desr., *Medicago denticulata* Willd., *Phalaris minor* Retz*., Rumex obustifolious* Linn and *, Vicia sativa* Linn., were collected from the surrounding soil of respective weeds , growing in different crop fields located in the periphery of Dera Ghazi Khan City.

The 500 seeds of each weed species were randomly divided into five replicates. Each replicate was weighed with the help of Sartorious Electric Balance (Germany). Similarly out of 500 seeds; ten seeds of each species of weed were randomly selected for measuring the size. The seed size (diameter) was measured with the help of size measuring apparatus. For seed images or shapes, Software Computing Software Package was used.

Statistically, mean values with standard deviations of each weed was computed by using the SPSS Software package, 2003 Version-13.0.

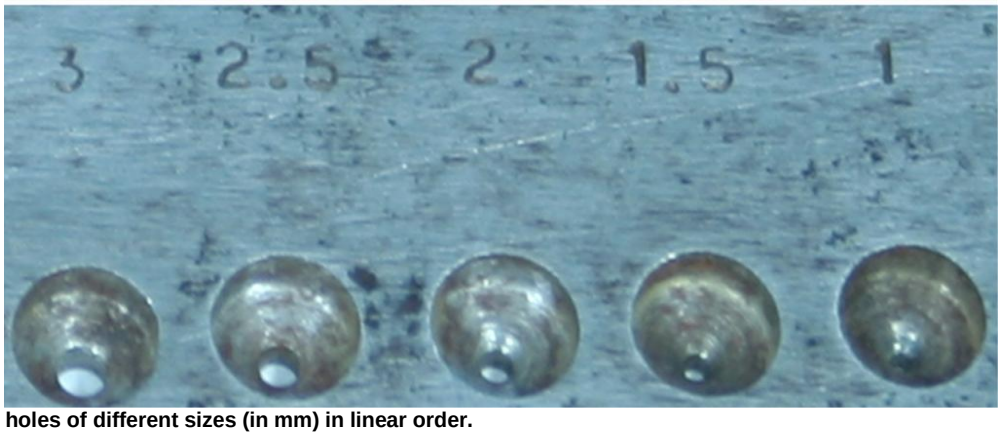

Figure 1. Steel Sieve with holes of different sizes (in mm) in linear order.

RESULTS AND DISCUSSION

In this study, the characteristics like size, weight and shape for identification were used as suggested by various workers in case of cultivated varieties (Chen *et al*. 1989; Draper et *al.1984*; Neuman *et al.* 1987, 1989 and Symons *et al.* 1988) The average size per seed and weight per 100 seeds with standard deviations of 15 weeds are presented in Table.1. The photographs to show details of seeds of each weed species are also presented in Figure 2.

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 three 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.

Table-1.Average Size per Seed and Weight per 100 Seeds of 15 Weed Species.

Species	Size	Weight	Species	Size	Weight
Anagallis arvensis	1.6±0.223	0.0384 ±0.004	*Lathyrus aphaca*	3.5±0.353	1.035±0.054
Avena fatua	2.4±0.707	1.295 ±0.025	*Lolium temulentum*	2.5±0.223	0.835±0.022
Brassica campestris	2.5±0.418	0.170 ±0.001	*Medicago denticulata*	2.5±0.418	0.336±0.006
Chenopodium album	1.5	0.0523 ±0.003	*Melilotus albus*	1.5	0.160±0.008
Euphorbia helioscopia	2.2±0.274	0.194±0.003	*Phalaris minor*	1.00	0.178±0.005
Fumaria indica	1.5	0.279±0.015	*Rumex obustifolous*	1.7±0.274	0.113±0.001
Galium aparine	2.1±0.223	0.716±0.036	*Vicia faba*	4.1±0.223	2.349±0.111
Ipomoea eriocarpa	3.2±0.273	1.301±0.019			

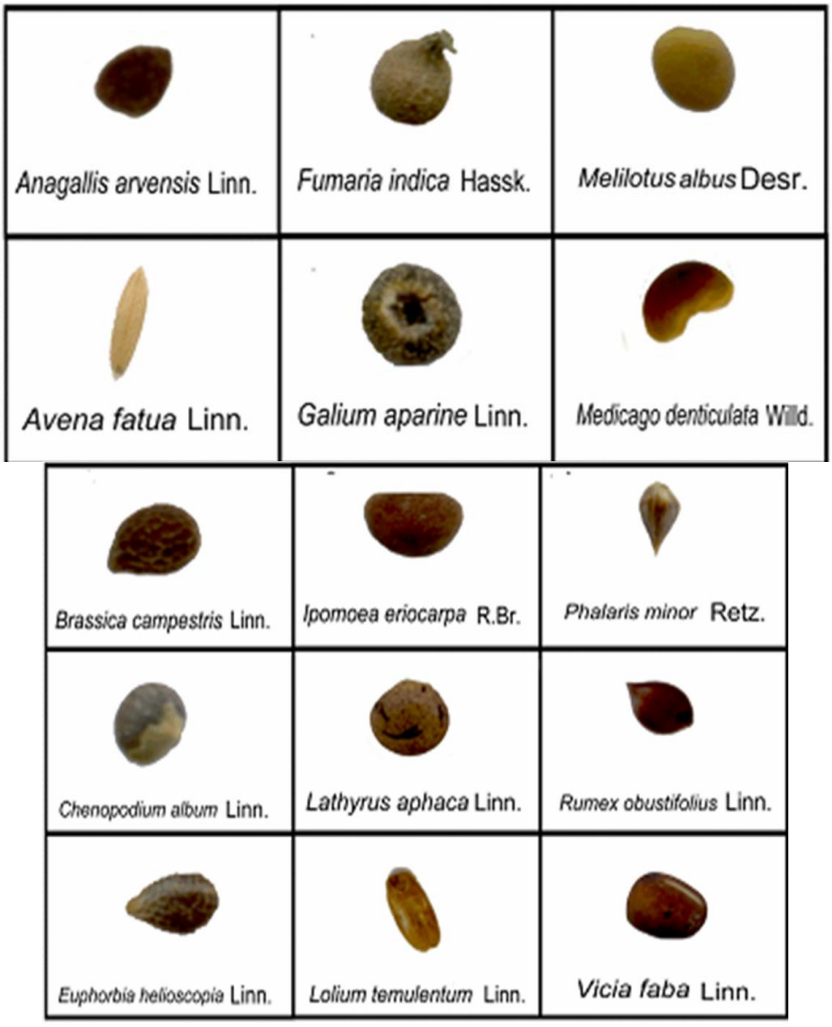

Figure 2. Photographs of Seeds belonging to 15 different annual weeds

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