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Survey for Bird Seed Mixtures Entered Iraqi Kurdistan Region Markets

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ABSTRACT

Samples of 1 kg weight of bird seed mixture were drawn randomly from local grocers of Iraqi Kurdistan governorates (Erbil, Duhok, Sulaimani and Kirkuk) from different packaging materials during 23/2/2013. Each sample was divided into four batches of 250 g to represent four replications; the samples were kept at the laboratory of Field Crops Department, University of Salahaddin to study. One hundred gram was drawn as testing sample was analyzed for their components as percentage, packaging material and the country of entry source, mixture samples frequency, seed species frequency and families. The collected data was analyzed statistically using Statistical Analysis System (SAS). The results revealed that birdseed mixtures entered to Iraqi Kurdistan Region illegally without declaration certificate, mainly from Turkey, Spain, Poland and Iran but to a lower extend from other countries, Russia, Belgium and Germany and it was entered in different extent into the governorates. Nineteen seed species were identified and twelve were non-identified species in addition to inert materials. The identified seeds were (flax, *Linum usitatissimum* L., Linnaceae), (safflower, *Carthamus tinctorius* L., Asteraceae), (brassica, *Brassica rapa* L., Brassicaceae), (groundnut, *Arachis hypogaea* L., Fabaceae), (mungbean, *Vigna radita* (L.) R. Wilczek, Fabaceae), (corn, *Zea mays* L., Poaceae), (squash, *Cucurbita pepo* L., Cucurbitaceae), (millet, *Panicum miliaceum* L., Poaceae), (wheat, *Triticum aestivum* L., Poaceae), (barley, *Hordeum vulgare* L., Poaceae), (rice, *Oryza sativa* L., Poaceae), (lentil, *Lens culinaris* Medikus, Fabaceae), (oat, *Avena* sp. L., Poaceae), (vicia, *Vicia villosa* Roth *subsp. varia*, Fabaceae), (pine, *Pinus edulis* Engelm., Pinaceae), (sesame, *Sesamum indicum* L., Pedaliaceae), (soybean, *Glycine max* (L.) Merrill, Fabaceae), (sunflower, *Helianthus annuus* L., Asteraceae) and (sorghum, *Sorghum bicolor* (L.) Moench, Poaceae) and five species were considered as alien or exotic (niger, *Guizotia abyssinica* L., Asteraceae), (hemp, *Cannabis sativa* L., Canabaceae), (buckwheat, *Fagopyrum esculentum* Moench, Polygonaceae), (bromus, *Bromus ciliatus* L., Poaceae) and (canary, *Phalaris canariensis* L., Poaceae). The components analyzed in term of percentage, frequency, indicated that these mixtures were not blended properly within the standard rules, as there was great variation even within the seed of the same species.

Key words: Birdseed, mixtures, packages, Kurdistan

INTRODUCTION

Feeding of various types of birds, including the domesticated birds such as (hens, pigeon, doves, turkeys, duck, domesticated geese and pheasants), wild (Quail, Sand grouse, Ostrich) and cage

birds (finches, parrots, canary, lovebirds) depends mainly on bird seed mixtures. In a survey done by APPMA (2001) it has been reported that 6.9 million households in the United States have birds as pets. This fascination with birds has led to a birdseed industry that dispenses over 500,000 tons of birdseed per year. Bird food statistics are difficult to find because bird food is grouped under the general heading of pet foods. However, some published data give an indication of the global scale of the market (EPPO-OEPP, 2007). According to Ohio Revised Code (2010) seed bird mixtures means seed consisting of more than one kind, each of which is present in excess of five per cent of the whole. These mixes can be useful but birders may see large quantities of waste as birds seek out favorite seeds in the mix. To prevent as much waste, augment a commercial mix with more desirable seed such as sunflower chips or niger seeds (Mayntz, 2012).

In most locations, however, the best all around attractant is black-oil sunflower seed. This seed has a high meat-to-shell ratio; it is high in fat; small size and thin shell make it easy for small birds to handle and crack. (Striped sunflower seeds are larger and have thicker seed coats).

Some important criteria have been considered by Lin (2005) while formulating bird seed mixtures to minimizing waste and also some standard for birdseed mixtures has been fixed by Queensland Agricultural Merchants (QAM, 2012).

Bird seeds have been identified as a pathway for the introduction of invasive alien plants as contaminants. Some researchers and regulators are concerned that noxious weeds may be disseminated through bird seeds (Kurokawa, 2001). So the identity of seeds in bird seed mixes must be determined, exactly and checked for viability and germination.

Hovda (1978) published a list of plants cultivated or dispersed from bird seed in Oslo. Watts and Watts (1979) made a painstaking analysis of the composition of commercial bird seed mixtures and related it to the occurrence of weeds on a Norwich rubbish tip.

Hanson and Mason (1985) reported that about 30 species of alien plants imported to Britain by bird seed mixtures. Clement and Foster (1994) and Ryves *et al.* (1996) reported that 34 species of alien plants may be from bird seed, in Japan about 187 species of alien plants imported (Auld *et al.*, 2003).

In a survey conducted by Casper (2007), reported that more than 50 weed species were identified in 10 wild bird feed brands purchased in Oregon State. All of the brands contain invasive plants, ten weed at least recognized as a noxious weed, these included: Buffalobur, bull thistle, Canada thistle, common ragweed, cuscuta species, field bindweed, jointed goatgrass, kochia, puncturevine and velvetleaf. Bohren (2007) reported that the seed of *Ambrosia artemisiifolia* L. was found in bird seed mixtures, he claimed that it was entered through the borders of France and Italy by agricultural machines and excavated material from building sites. These seeds endanger public health, so it must take care in their invasion.

The mixtures also may contain narcotic seed and the misuse of these seeds leads to big social problems.

Several materials are available for packaging of birdseed mixtures, for transportation, the material should be lightweight but sturdy. The packaging materials depend on the importer and the type of installation available.

As there is no information or statically issues on bird seed mixtures entered to Iraqi Kurdistan Region, so it was suggested to carry on this survey on local grocers of the governorates of Iraqi Kurdistan Region-Erbil, Sulaimani, Duhok and Kirkuk; to determine the countries that bird seeds are entered from, the type of seeds packages used and the composition of the bird seed mixtures to give a clear information and data for this surveying.

MATERIALS AND METHODS

Bird seed mixtures samples were collected in (23/2/2013) from the local grocers market of Iraqi Kurdistan Region Governorates-Erbil, Sulaimani, Duhok and Kirkuk, on base of one kilogram sample for each package type, which drawn randomly by hand to represent truly the seeds in the container. The collected samples were kept at the laboratory of Field Crops Department, University of Salahhdin for study. Each sample was divided into four batches of 250 g to represents four replications. Sample of one hundred gram was drawn randomly from each replication and analyzed for the following information; source of bird seed mixtures (country which entered from), type of seed packages, type of seeds in the mixtures as percentages and their families, seed weight in percentage, (all types of seeds and impurities that the sample contained as percentages).

The collected data were subjected to statistical analysis utilizing SAS (2003), to determined the country frequency and percentages and package types frequency and percentages, seed species frequency and percentages within the governorate, seed components analysis in terms of seed weight as percentages.

The percentage of each separation part was determined by dividing the weight of individual fraction by the total sample weight (100 g) obtained for analysis. International Seed Testing Association (ISTA) with minor modification, as in ISTA rules the testing sample is differed for each type of seed.

$$\text{Wight of individual fraction (\%)} = \frac{\text{Weight of each fraction}}{\text{Total weight of sample obtained assumed (100 g)}} \times 100$$

RESULTS AND DISCUSSION

Twenty two collected samples from Iraqi Kurdistan governorates grocers were sorted utilizing SAS (2003) program, the display results in Table 1 revealed that the bird seed mixtures were entered differently to Kurdistan governorates. At Erbil they were entered from three countries (Turkey, Spain and Poland) in four packaging types (polyethylene, woven polypropylene, cardboard box and plastic buckets). Two additional countries (Iran and Russia) were the countries

Table 1: Bird seed mixture (collected samples)

Samples	Governorate	Country	Packages
1-4	Erbil	Turkey	Polyethylene and woven polypropylene
		Spain	Cardboard box
		Poland	Plastic buckets
5-11	Duhok	Turkey	Cardboard box and woven polypropylene
		Spain	Polyethylene
		Iran	Polyethylene and woven polypropylene
		Poland	Polyethylene
		Russia	Woven polypropylene
12-17	Sulaimani	Turkey	Polyethylene and woven polypropylene
		Iran	Woven polypropylene
		Belgium	Polyethylene and paper bag
		Germany	Polyethylene
18-22	Kirkuk	Turkey	Polyethylene and cardboard box
		Spain	Woven polypropylene and cardboard box
		Poland	Woven polypropylene

sources of bird seed mixtures entered to Duhok governorate. They were similarly packaged in polyethylene, woven polypropylene and cardboard boxes but without plastic buckets.

The sources of birdseed mixtures that entered Sulaimani governorate were Turkey, Iran, Belgium and Germany, in polyethylene, woven polypropylene and paper bags.

At Kirkuk governorate, bird seed mixtures countries sources and packages were entirely similar to that of Erbil governorate (Turkey, Spain and Poland) but without plastic bucket.

Bird seed mixtures samples frequency displayed in Table 2 indicated that the rank was as follow (7, 6, 5 and 4) samples for Duhok, Sulaimani, Kirkuk and Erbil; comprising the percentage of 31.82, 27.27, 22.73 and 18.18, respectively.

The number of bird seed mixtures samples frequency and percentage per countries sources displayed in Table 3 referred to the countries sources were Turkey, Spain, Iran, Poland, Belgium and the lowest was from Germany and Russia). The samples percentage for the above countries were 36.36, 18.18, 13.64, 13.64, 9.09, 4.55 and 4.55%, respectively.

Five different packaging materials of birdseed mixtures entered Iraqi Kurdistan Governorates, polyethylene, woven polypropylene, cardboard box, plastic buckets and paper bags (Table 4).

The frequency and percentage of samples per package is displayed in Table 4, indicated that the majority of samples were entered in polyethylene and woven polypropylene bags, followed by cardboard box while the lowest percentage was in plastic buckets and paper bags; their percentage were 36.36, 36.36, 18.18, 4.55 and 4.55%, respectively.

Table 2: Number of bird seed mixture samples per governorate

Governorate	Frequency	Percentage	Cumulative frequency	Cumulative percentage
Erbil	4	18.18	4	18.18
Duhok	7	31.82	11	50.00
Sulaimani	6	27.27	17	77.27
Kirkuk	5	22.73	22	100.00
Total sample	22	100.00		

Table 3: Number of bird seed mixture samples per country

Country	Frequency	Percentage	Cumulative frequency	Cumulative percentage
Turkey	8	36.36	8	36.36
Spain	4	18.18	12	54.55
Iran	3	13.64	15	68.18
Poland	3	13.64	18	81.82
Belgium	2	9.09	20	90.91
Germany	1	4.55	21	95.45
Russia	1	4.55	22	100.00
Total sample	22	100.00		

Table 4: Number of bird seed mixture samples per package

Package	Frequency	Percentage	Cumulative frequency	Cumulative percentage
Polyethylene	8	36.36	8	36.36
Woven polypropylene	8	36.36	16	72.73
Cardboard box	4	18.18	20	90.91
Plastic buckets	1	4.55	21	95.45
Paper bags	1	4.55	22	100.00
Total sample	22	100.00		

Table 5 shows thirteen types of identified seeds were existing in the collected samples from Erbil governorate in addition to inert materials, twenty identified species in addition to non-identified and inert materials from Duhok, twenty three identified species in addition to non-identified and inert materials from Sulaimani and ten identified species in addition to inert materials from Kirkuk; as they represented 19.44, 30.56, 34.72 and 15.28%, respectively. Twenty four identified seed species were displayed in Table 6, in addition to non-identified species and inert materials which can't be ignored. Seed species frequency per Governorate ranged from four for canary seeds, oat (dehulled), hemp, flax, safflower, brassica, niger, sunflower and sorghum; followed by three for mungbean, squash, corn (cracked), millet; two for ground nut, buckwheat, wheat, barley, rice, lentil, bean and non-identified species and lastly one for pine (*Pinus edulis* Engelm.), sesame, bromus (*Bromus cilliatus* L.) soybean. It can be considering that five species among these species

Table 5: Seed types frequency per governorate

Governorate	Frequency	Percentage	Cumulative frequency	Cumulative percentage
Erbil	14	19.44	14	19.44
Duhok	22	30.56	36	50.00
Sulaimani	25	34.72	61	84.72
Kirkuk	11	15.28	72	100.00
Total	72	100.00		

Table 6: Seed types frequency and percentage per governorates

Seed type	Frequency	Percentage	Cumulative frequency	Cumulative percentage
Barley	2	2.78	24	33.33
Bromus	1	1.39	37	51.39
Buck wheat	2	2.78	17	23.61
Canary seed	4	5.56	4	5.56
Corn	3	4.17	12	16.67
Flax	4	5.56	52	72.22
Groundnut	2	2.78	6	8.33
Hemp	4	5.56	48	66.67
Inert matter	4	5.56	44	61.11
Lentil	2	2.78	28	38.89
Millet	3	4.17	20	27.78
Mungbean	3	4.17	9	12.50
Niger	4	5.56	64	88.89
Non-identified	2	2.78	40	55.56
Oat	4	5.56	32	44.44
Pine	1	1.39	35	48.61
Rapeseed	4	5.56	60	83.33
Rice	2	2.78	26	36.11
Safflower	4	5.56	56	77.78
Sesame	1	1.39	36	50.00
Sorghum	4	5.56	72	100.00
Soybean	1	1.39	38	52.78
Squash	3	4.17	15	20.83
Sunflower	4	5.56	68	94.44
Vicia	2	2.78	34	47.22
Wheat	2	2.78	22	30.56

as alien or exotic species: Niger (*Guizotia abyssinica* L.), hemp (*Cannabis sativa* L.), bromus (*Bromus ciliatus* L.), buckwheat (*Fagopyrum esculentum* Moench) and canary (*Phalaris canariensis* L.).

The existences seeds belong to ten families; nine species in Poaceae, five in Fabaceae, three in Asteraceae and one species for each of Cucurbitaceae, Canabaceae, Linnaceae, Brassicaceae, Polygonaceae, Pinaceae, Pedaliaceae; in addition to those that has not been identified yet (Table 7). This result was in harmony with that mentioned by EPPO-OEPP (2007) for existence of eight families comprising, Poaceae-Canary (*Phalaris canariensis* L.), Proso millet (*Panicum miliaceum* L.), Sorghum (*Sorghum bicolor* L.), Oat (*Avena* sp. L.), Corn (*Zea mays* L.), Wheat (*Triticum aestivum* L.), Barley (*Hordeum vulgare* L.), Rice (*Oryza sativa* L.), Asteraceae-Sunflower (*Helianthus annuus* L.), Niger seed (*Guizotia abyssinica* L.), Safflower (*Carthamus tinctorius* L.), Fabaceae-Groundnuts (*Arachis hypogaea* L.), Soybean (*Glycine max* (L.) Merrill), Linaceae-Flax (*Linum usitatissimum* L.). Polygonaceae-Buck wheat (*Fagopyrum esculentum* Moench), Pinaceae-Pine (*Pinus edulis* Engelm), Brassicaceae-Rapeseed (*Brassica rapa* L.) and Cannabinaceae-Hemp (*Cannabis sativa* L.).

Hanson and Mason (1985) found about 30 species of alien plants imported to Britain by bird seed mixtures. They have stated that the pet food industry is responsible for entering large quantities of foreign seeds into Britain as food for cage birds. These results accountable in the appearance of many species of plants growing in Britain as casuals on rubbish tips or waste ground and in gardens. These plants originate widely from many countries around the world. Cultivation

Table 7: Bird seed families frequency and percentage

Seed types	Scientific name	Family	Frequency	Percentage
Barley	*Hordeum vulgare* L.	Poaceae	4	18.18
Bromus	*Bromus ciliatus* L.	Poaceae	1	4.55
Buckwheat	*Fagopyrum esculentum* Moench	Polygonaceae	6	27.27
Canary	*Phalaris canariensis* L.	Poaceae	18	81.82
Corn	*Zea mays* L.	Poaceae	6	27.27
Flax	*Linum usitatissimum* L.	Linaceae	16	72.73
Groundnut	*Arachis hypogaea* L.	Fabaceae	2	9.09
Hemp	*Cannabis sativa* L.	Cannabinaceae	17	77.27
Lentil	*Lens culinaris* Medikus	Fabaceae	2	9.09
Millet	*Panicum miliaceum* L.	Poaceae	9	40.91
Mungbean	*Vigna radita* (L.) R. Wilczek	Fabaceae	5	22.73
Niger	*Guizotia abyssinica* L.	Asteraceae	5	22.73
Non-identified			12	54.54
Oat	*Avena* sp. L.	Poaceae	18	81.82
Pine	*Pinus edulis* Engelm.	Pinaceae	1	4.55
Rapeseed	*Brassica rapa* L.	Brassicaceae	15	68.18
Rice	*Oryza sativa* L.	Poaceae	4	18.18
Safflower	*Carthamus tinctorius* L.	Asteraceae	20	90.91
Sesame	*Sesamum indicum* L.	Pedaliaceae	1	4.55
Sorghum	*Sorghum bicolor* L.	Poaceae	8	36.36
Soybean	*Glycine max* (L.) Merrill	Fabaceae	1	4.55
Squash	*Cucurbita pepo* L.	Cucurbitacea	3	13.64
Sunflower	*Helianthus anuus* L.	Asteraceae	8	36.36
Vicia	*Vicia villosa* Roth subsp. *varia*	Fabaceae	2	9.09
Wheat	*Triticum aestivum* L.	Poaceae	6	27.27

of bird seed samples from many sources and the records of plants occurring as bird seed aliens have produced a 1ist of 438 species of plants believed to be introduced by this agency.

Clement and Foster (1994) and Ryves *et al.* (1996) reported that 34 species of alien plants may be from bird seed, some of these are much more likely than others thus making a grand total of just over 500 taxa. Continued cultivation experiments will certainly enlarge the proportion of definite bird seed aliens to more than the 70% of this grand total which will it also certainly marginally increase.

Kurokawa (2001) reported that imported seeds used as a concentrated feed stock was investigated to determine whether foreign weed seeds were present. All seeds imported during one year at the port of Kashima were thoroughly tested for weed seeds. The results showed that many kinds of weed seeds were mixed within the imported seeds. Some of these species were noxious weeds.

Table 8 shows the components analysis in percentage of Erbil collected samples; it was obvious that the mixtures were entered from three countries (Turkey, Spain and Poland) in four different packaging materials (polyethylene bags, woven polypropylene bags, cardboard box and plastic buckets), whereas seed types varied within each package. The highest portion was manifested in canary seeds in three packages (polyethylene-woven polypropylene and cardboard box), 45.3, 43.47 and 30.33, respectively. While sunflower was exists in the fourth package plastic buckets (38.04) and the lowest was for corn in plastic buckets (1.25).

The components in percentage for bird seed mixtures at Duhok governorate is displayed in Table 9, shows that the seeds were entered from five countries (Turkey, Spain, Iran, Russia and Poland) in three different packages (polyethylene, woven polypropylene and cardboard box). The maximum component among the seventh samples was canary seeds which exist in four samples (49.34, 50.20, 31.53 and 68.89); then millet and sorghum for the remainder three samples; whereas the minimum percentages were for buckwheat, niger, hemp and barley seeds (0.05, 0.05, 0.03 and 0.1, respectively.

The components percentage from Sulaimani collected samples, displayed in Table 10, revealed that bird seed mixtures entered from four countries (Turkey, Iran, Germany and Belgium) in three different packages (polyethylene, woven polypropylene and paper bags). The maximum portion percentage was for lentil (20.09), canary (61.59), sorghum (21.08) and sunflower (25.62). The lowest component percentages were recorded for non-identified seeds (0.11), buck wheat (0.27) and sesame seeds (0.53).

Table 8: Means of components percentage of bird seed mixture samples collected from Erbil

		Components (%)						
Country	Package	Canary	Oat	Hemp	Flax	Safflower	Rapeseed	Inert matter
Turkey	Polyethylene	45.31	11.03	3.79	9.50	7.81	14.82	6.79
Turkey	Woven polypropylene	43.47	4.10	10.51	5.66	10.46	9.87	3.75
Spain	Cardboard box	30.33	27.13	1.49	5.90	2.23	25.31	6.57
Poland	Plastic buckets			1.68		1.83		19.73

		Components (%)						
Country	Package	Niger	Sunflower	Sorghum	Groundnut	Mungbean	Corn	Squash
Turkey	Polyethylene							
Turkey	Woven polypropylene	12.03						
Spain	Cardboard box							
Poland	Plastic buckets		38.04	17.33	3.84	12.62	1.25	2.36

Table 9: Means of components percentage of bird seed mixture samples collected from Duhok

		Components (%)										
Country	Package	Canary	Oat	Hemp	Flax	Safflower	Rapeseed	Inert matter	Buck wheat	Millet	Niger	Non-identified
Turkey	Cardboard box	49.34	9.87	3.97	7.98	7.19	13.30	7.27	0.06			
Turkey	Woven polypropylene	50.20	6.38	2.68	11.06	7.63	10.39	9.23	0.05	0.18	0.05	1.00
Spain	Polyethylene	31.53	1.39	1.41	6.30	5.23	25.01	3.69				
Iran	Polyethylene	14.17	2.08	1.14	1.30	1.25	1.77	8.59		38.58	2.2	27.90
Iran	Woven polypropylene	68.89				18.31		5.46				
Russia	Woven polypropylene	0.6	0.9	0.03	0.11	0.08	0.26	3.45		13.74		1.68
Poland	Polyethylene			6.1		6.98		12.60				5.25

Country	Package	Wheat	Barley	Rice	Sunflower	Sorghum	Mungbean	Lentil	Vicia	Squash	Groundnut	Corn
Turkey	Cardboard box											
Turkey	Woven polypropylene											
Spain	Polyethylene	24.25	0.28									
Iran	Polyethylene			0.85								
Iran	Woven polypropylene				7.22							
Russia	Woven polypropylene				3.69	50.24	10.38	6.44	6.81			
Poland	Polyethylene		0.1		13.58	24.92	21.00			1.65	3.82	3.15

Table 10: Means of components percentage of bird seed mixture samples collected from Sulaimani

		Components (%)												
Country	Package	Wheat	Sorghum	Corn	Millet	Mungbean	Lentil	Inert matter	Vicia	Non-identified	Barley	Canary	Oat	Hemp
Turkey	Woven polypropylene	12.85	15.72	3.95	11.2	15.42	20.09	4.99	14.48	0.11	0.16			
Turkey	Polyethylene	0.38						5.13				47.11	14.08	3.99
Iran	Woven polypropylene	1.44			0.43			5.99				61.59	1.80	12.77
Germany	Polyethylene	9.3	21.08	12.85	4.94	6.89		19.28			3.77		2.27	
Belgium	Polyethylene	3.37	6.99	4.14				13.03		0.77		2.1	6.63	6.43
Belgium	Paper bag	9.43	10.50	9.22	6.99			7.78		0.78	2.51	7.1	2.37	3.94

Country	Package	Flax	Safflower	Rapeseed	Buck wheat	Rice	Squash	Pine	Niger	Sunflower	Sesame	Bromus	Soybean
Turkey	Woven polypropylene												
Turkey	Polyethylene	6.64	7.79	13.3	0.27								
Iran	Woven polypropylene	1.30	9.91	3.83									
Germany	Polyethylene		4.74		3.59	4.78				4.60			
Belgium	Polyethylene		13.08		9.44	2.91	2.31	1.40		25.62			
Belgium	Paper bag	4.44	4.73	7.95	3.61	2.88		1.52	2.74	2.31	0.53	4.13	2.74

Table 11: Means of components percentage of bird seed mixture samples collected from Kirkuk

		Components (%)										
Country	Package	Canary	Oat	Hemp	Flax	Safflower	Rapeseed	Inert matter	Millet	Sunflower	Niger	Sorghum
Turkey	Polyethylene	47.42	9.99	4.95	8.97	6.21	15.16	5.78				
Turkey	Cardboard box	4.60			0.60		1.73	1.06	76.65	14.60		
Spain	Cardboard box	30.70	33.55	1.26	5.72	2.44	24.95	1.12				
Spain	Woven polypropylene	49.34	10.62	3.57	8.89	5.88	15.68	5.07				
Poland	Woven polypropylene	9.26	1.34		1.61	0.99		5.82	69.40	5.55	2.21	2.81

As regards Kirkuk governorate, the components analysis displayed in Table 11, showed that bird seed mixtures entered from three countries (Turkey, Spain and Poland) in three different packages (polyethylene, woven polypropylene and cardboard box); with the highest percentage for canary (49.34) and millet (76.65) but the lowest percentage was recorded for hemp (1.26) and flax seeds (0.60).

REFERENCES

APPMA, 2001. Birdseed. How Product are Made? Volume 7, American Pet Product Manufactures Association, USA.

Auld, B., H. Morita, T. Nishida, M. Ito and P. Michael, 2003. Shared exotica: Plant invasions of Japan and south eastern Australia. Cunninghamia, 8: 147-152.

Bohren, C., 2007. *Ambrosia artemisiifolia* L. in Switzerland: Concerted action to prevent further spreading. Revision 2007, Agroscope Changins-Wadenswil (ACW), Nyon, Switzerland.

Casper, B., 2007. Bird seed can contribute to spread of invasive weeds. http://archive.statesmanjournal.com/article/20071216/INVASIVE04/712160308/Bird-seed-can-contribute-spread-invasive-weeds

Clement, E.J. and M.C. Foster, 1994. Alien plants of the British Isles: A Provisional Catalogue of Vascular Plants. Botanical Society of the British Isles, London, UK., ISBN-13: 978-0901158239, Pages: 590.

EPPO-OEPP, 2007. Service d'information-plantes envahissantes. European and Mediterranean Plant Protection Organization, No. 6, Paris, June 2007, pp: 1-21.

Hanson, C.G. and J.L. Mason, 1985. Bird seed aliens in Britain. Watsonia, 15: 237-252.

Hovda, J.T., 1978. Adventitious plants dispersed as bird seeds. Blyttia, 36: 17-18.

Kurokawa, S., 2001. Invasion of exotic weed seeds into Japan mixed in imported feed grains. Extension Bulletin-Food and Fertilizer Technology Center No. 497, Japan, pp: 1-14.

Lin, E., 2005. Production and processing of small seeds for birds. Agricultural and Food Engineering Technical Report No. 1, FAO, Rome, Italy, Pages: 1-47.

Mayntz, M., 2012. Commercial birdseed mix. http://birding.about.com/od/birdfeeders/ig/Types-of-Birdseed/Commercial-Birdseed-Mix.htm

Ohio Revised Code, 2010. Agriculture-animal-fences. http://codes.ohio.gov/orc/9.

QAM, 2012. Bird seeds: Purchasing and export market standards. Queensland Agricultural Merchants Inc., Toowoomba, Queensland, Australia.

Ryves, T.B., E.J. Clement and M.C. Foster, 1996. Alien Grasses of the British Isles. Botanical Society of the British Isles, London, UK., ISBN-13: 9780901158277, Pages: 181.

SAS, 2003. SAS/STAT User's Guide, Version 9.1. SAS Institute Inc., Cary, NC, USA.

Watts, N.S. and G.D. Watts, 1979. Norwich bird seed mixtures and the casual plants of Harford tip. Trans. Norfolk Norwich Nat. Soc., 25: 300-309.