Effect of Pesticides Application on Migratory Soaring Birds in Four Agricultural areas in Sudan

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Abstract:
This study was conducted in four parts of Sudan namely Northern Sudan, Eastern Sudan, Gazzira scheme and Sugar schemes, during the period from September to October 2014, with the aim to determine the effect of primary and secondary effect of pesticides application on migratory soaring bird in these agricultural areas in Sudan. Questionnaires were used to study and search inventory and collect the necessary data then analyzed by (Microsoft excel), the results reveal that the migratory soaring birds are existing in the study area, 100% of respondents strongly agreed there are agricultural pests and pesticides used to control them, the majority of respondents did not consider pesticides have adverse effect on migratory soaring birds.

Index words: migratory soaring birds, pesticides application, agricultural pests,

I. Introduction:

There is increasing concern that poisoning associated with the agricultural sector is a significant and avoidable cause of mortality for migratory soaring birds and particularly vulnerable to primary and secondary poisoning because they are long-lived slow reproducing species whose of their position at the top of the food chain and as long-lived, slow reproducing species through primary and secondary poisoning. [1]

Primary poisoning occurs as a result of direct ingestion of poison [1]; whereas, secondary poisoning occurs when predators are exposed to physiologically damaging concentrations of poisons by ingesting contaminated prey [2]. The use of chemicals toxic to birds in the agriculture environment is often related to the protection of crops (food crops and non-food crops).

Pesticide problems have decreased in some Middle Eastern countries since the 1980s, but there are still cases of raptor mortality due to pesticides, including the death of 30 Eurasian Griffons (Gyps fulvus) in a single day in 1998 [3 and 4].

No previous studies have been conducted to determine the effect of pesticides application on migratory soaring birds in Sudan.

The aim of this study was to determine the primary and secondary effect of pesticides application on migratory soaring bird in Northern Sudan, Eastern Sudan, Gazzira scheme and Sugar schemes in Sudan.

II. MATERIALS AND METHODS

Study areas:
This study was conducted during the period from September to October 2014 in four parts of Sudan namely Northern Sudan (Kaboushia, Ganado, Elbgrawia, Elghidah and Elshaheed schemes) Eastern Sudan (Gadaref, Kassala, New Halfa and Rahad), Gazzira scheme and Sugar schemes (Sugar production is one of the major pillars of the Sudanese economy, it contributes to the national revenue a reasonable amount of hard currency). The production process entails cultivation of vast lands that amounts to thousands of feddans allocated to sugar manufacturing companies including: White Nile, Kenena, El Geneid, Asalaya, Sennar, Halfa and El Gedeida. Following cultivation pesticides are
used to control pests when plantation reaches a certain level).

**Methodology:**
Questionnaires were used to study inventory and collect the necessary data analyzed by (micro soft excel); the questionnaires were split into two parts as follow:

Part one: The personal information of the study sample contains five components.

i. Gender.
ii. Age.
iii. Type of agricultural scheme.
iv. Occupation.
v. Years of experience.

Part 2: Consist of seven hypotheses.

i. Migratory Soaring birds exist in the region.
ii. Agricultural pests exist in the region.
iii. Pesticides use to control pests.
iv. Pesticides are lethal to migratory soaring birds.
v. Migratory soaring bird’s death as a result of direct ingestion of pesticides.
vi. Migratory soaring birds’ death in directly as a result of ingestion of contaminated pests.
vii. Identification of soaring migratory birds’ species observed in the study area.

III. RESULTS and DISCUSSIONS

The results reveal that in more than 80% of the study samples, 80% were males engage in governmental offices and 20% were farmers, their ages more than 40 years old and had experience more than 10 years, strongly agreed that there is migratory soaring birds in the Eastern Sudan and Gazzira scheme, while 70% strongly agreed in Northern Sudan and only 56% strongly agreed in sugar schemes.

Ranked according to their respective frequency of occurrence; Abdim's stork (Ciconia abdimi), Lesser Spotted Eagle (Clanga pomarina) and Marabou stork (Leptoptilos crumeniferus) showed highest frequency of occurrence in Eastern Sudan compared with other study areas. White stork (Ciconia ciconia), White pelican (Pelecanus onocrotalus), Western March Harrier (Circus aeruginosus), Short-toed Snake-eagle (Circaetus gallicus), Pallid Harrier (Circus macrourus), Northern Bald Ibis (Geronticus eremite), European Honey-Buzzard (Pernis apivorus), Eurasian Griffon (Gyps fulvus), Black stork (Ciconia nigra) and Black kite (Milvus migrans) were highly observed in sugar schemes. Short-toed Snake-eagle (Circaetus gallicus) was not observed in Northern Sudan. Gazzira schemes harbor less number of soaring migratory birds in comparison with other study areas. Some species were less common such as Common Kestrel (Falco tinnunculus), Osprey (Pandion haliaetus) and Northern harrier (Circus cyaneus). (Figure 1 and 2.)

In Northern Sudan many species such as booty Falcon (Falco biarmicus) and Black kite (Milvus migrans) were not observed.

Concerning the Lethality of pesticides used, more than 50% of the respondents in Northern Sudan and Gazzira scheme highly agreed that pesticides application affect migratory soaring birds negatively by poisoning, while 30% in Northern Sudan disagreed and 20% disagreed in Gazzira scheme. In Eastern Sudan 55% strongly agreed, 25% agreed; 15% neutral and 30% disagreed. In sugar schemes 14% strongly agreed while more than 70% disagreed. This suggests that the majority of people interviewed did not consider pesticides have adverse effect on birds (Figure 5.)
To determine whether deaths of migratory soaring birds is caused directly by ingestion of pesticides, those who responded positively to this assumption were 90% in Northern Sudan while in Gazzira and sugar schemes more than 40% disagreed, 15% neutral in sugar scheme and 40% agreed in Gazzira scheme. In Eastern Sudan 35% strongly agreed, 25% agreed and 20% disagreed and 10% were neutral. (Figure 6). To decide upon death of birds resulting indirectly as a result of ingestion of sprayed (contaminated) pests, the majority of respondents admitted that there was no death cases encountered after ingestion of pests in more than 50% of the respondents in northern Sudan, sugar scheme and Gazzira scheme, while those who have no clue of evidence were less than 20%, those who believe that mortality of migratory soaring birds caused by the ingestion of sprayed pests and 25% were neutral (Figure 7). Based on these findings it should be noted that in general there was decisive evidence of bird mortality due to pesticides use. This is justified by the fact that in sugar cane schemes, weeds represent the main pest to be controlled, unlike cereal farms where quelea and other birds and locust are the targeted pests.
Abdim’s stork  Black kite  Black stork  Common Buzzard  Common Kestrel  Crested Honey - Vulture  Egyptian Vulture  Eurasian Crane  Eurasian Hobbly  Eurasian Honey - Eagle  Eurasian Honey - Buzzard  Egyptian Vulture  European Honey - Buzzard  Lanner Falcon  Levant Sparrow - Hawk  Lesser Spotted Eagle  Montagu’s Harrier  Montagu’s Harrier  Northern Harrier  Northern Harrier  Osprey  Pallid Harrier  Peregrine Falcon  Red kite  Saker Falcon  Short - toed Snake - Eagle  Short - toed Snake - Eagle  Sooty Falcon  Western Marsh Harrier  White pelican  White stork  White tailed eagle

Figure 2. Migratory soaring birds species observed in study areas

Figure 3. Agricultural pests exist in the study areas
Figure 4. Pesticides use to control pests in agricultural schemes in study area.

Figure 5. Pesticides harmful (lethal) to migratory soaring birds
Figure 6. Migratory soaring birds death as a result of direct ingestion of pesticides

Figure 7. Migratory soaring birds death indirectly as a result of ingestion of contaminated (sprayed) pest with pesticides
IV. CONCLUSION AND RECOMMENDATIONS

Many migratory soaring birds observed in study areas, some of them were common such as black stork (Ciconia nigra), white stork (Ciconia ciconia) and marabou stork (Leptoptilos crumeniferus), some of them were less common such as steppe eagle (Aquila nipalensis), imperial eagle (Aquila heliaca) pallid harrier (Circus macrourus) and crested honey buzzard (Pernis ptilorhyncus) and some of them were not observed in Northern and Eastern Sudan such as Eurasian hobby (Falco subbuteo) and Eurasian Sparrow-Hawk (Accipiter nisus).

Pesticides are applied to control pest in agricultural schemes. Pesticides are harmful to Migratory Soaring birds; as a result some species are killed directly as a result of ingestion of pesticides or indirectly as a result of ingestion of contaminated pests in spite of the fact that majority of people admitted that there were no death cases encountered following ingestion of pests, or ingestion of sprayed agricultural pests.

No studies on environmental impact assessment were carried out. Therefore, the fate of organisms including migratory soaring birds is so far unknown in these sites.

Recommendations
1. Annual census is needed to determine the conservation status of migratory soaring birds in Sudan.
2. Laboratory studies are needed to determine the effect of pesticides application on migratory soaring bird species.
3. Carrying out environmental impact assessment (EIA) is needed.
4. Gaps in scientific data on pesticides use in terms of temporal and spatial intensity should be bridged and made available.
5. There is a growing need to public awareness concerning making people acquainted with the migratory soaring bird species.

V. REFERENCES


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