

LOSSES CAUSED IN SUNFLOWERS BY BIRDS IN HUNGARY.

J. REKASI¹, and E. HORVATH²

1 Grammar School Bacsalmás.

2 Agricultural Complex Baja, Hungary.

ABSTRACT

With the increased intensity of sunflower cultivation large flocks of birds have changed their feeding habits and have become pests in this crop. The losses caused vary with geographical locality and season. During the seedling stage the most important pest species are: *Phasianus colchicus*, *Columba livia*, *Streptopelia decaocto* and *S. turtur*, while the two *Streptopelia* species and *Passer montanus* and *P. domesticus* are the most important pests in maturing sunflowers.

Results of damage surveys and ecological studies conducted during a five year period are summarized. Although no single method was found to effectively reduce bird damage, losses can be minimized by using several simple and partly effective methods. These methods are generally inexpensive and rarely upset the ecological balance.

INTRODUCTION

The Carpathian basin is one of the most important regions in Europe. The greater part of the basin belongs to Hungary. Its climate — continental but rather temperate — and soils are good for cereals, maize and many other crops. Among these latter crops sunflower is the most important. The hectareage devoted to sunflower has been roughly doubled in recent years. Last year nearly 5% of the total arable lands was sown to sunflower.

Observations were made on the plains in southern Hungary called Bacska (latitude: 40°10'N, longitude: 19°20'E, altitude: 100 m). The farm land, scattered with tiny ponds and marshes is divided by shelter belts and small groups of trees. Farms carrying livestock are rather abundant in the region.

In order to estimate the losses caused by birds and to find the most effective and least expensive means of crop protection, damage surveys were conducted in association with investigation of habit and diet of the pest birds.

MATERIALS AND METHODS

Results were obtained from two main sources: (a) by checking the damage in sunflower fields and, (b) investigating habits of pest birds. Observations were made daily in the seedling stage (in April and May) and during ripening (from August to October) in the morning (0500-0900 h) and in the evening (1700-1900 h). Damage caused by mammals was also estimated occasionally in the period from emergence to flowering.

(a) Damage Surveys. Four to five sunflower fields (both seed production crops and commercial crops) of about 100 — 200 hectares were examined each year from 1976 to 1980. 10 diagonal traverses were made in each field with 500 seedlings or mature heads examined in each traverse. The scale used to determine damage in the seedling stage was: 0 = undamaged seedlings; 1 = seedlings with two but damaged cotyledons; 2 = seedlings with 1 cotyledon only and; 3 = seedlings without cotyledons (only hypocotyls). The scale used to determine damage on maturing plants was: 0 = undamaged head; 1 = 1 — 10% of seed removed; 2 = 11 — 20% of seed removed etc.

(b) Ecological studies consisted of 3 parts: (1) observing bird populations feeding on sunflower fields and surrounding areas, identifying the species estimating flock size; (2) observing the habits of every species and; (3) investigating the diets of the most important species by examining the content of the crop (ingluvies) and muscular stomach (ventriculus). Crops and stomachs were removed from birds

shot from flocks of medium size and the contents left to dry. The dry matter was divided into 3 portions — animal origin (mostly insects rarely snails), vegetable origin (mostly seed divided into crop seed and weed seed) and indigestible matter (gastroliths and sand). Seed numbers were counted and recorded.

RESULTS AND DISCUSSION

Sunflower is the most favoured food of many bird species, and granivorous birds invade sunflower fields in large, sometimes huge flocks. According to our field observations during five years the most important species are as follows: *Passer montanus*, *Streptopelia decaocto*, *S. turtur*, *Passer domesticus*, *Columba livia*, *Phasianus colchicus*, *Columba palumbus*, *Chloris chloris*, *Carduelis cannabina*, *Carduelis carduelis*, *Perdix perdix*. *Corvidae*, indicated as important pests (Camprag, 1974) in the Carpathian basin in previous years, rarely visited the sunflower fields. *Sturnus vulgaris*, also During spring *Columba livia*, *Phasianus colchicus*, *Streptopelia decaocto*, *Passer domesticus* and a mammal pest, the brown hare were the most important species, while during ripening *Passer montanus*, *Streptopelia decaocto*, *S. turtur*, *Passer montanus*, *Columba livia* and *C. palumbus*. Are the most important pests.

The species listed above have some specialities in their feeding habits, but many features are common. The fields and parts of fields adjacent to shelter belts, groups of trees or fields of well-developed cereals are the ones usually attacked. Loss surveys indicated that parts of fields adjacent to shelter belts suffered 3 times as much head damage as other parts of the same field. An exception to this occurred with *S. turtur* flocks which generally feed in the middle parts of the same fields. The doves stand and peck the seeds on the upper edge of heads, sparrows and *Chloris* perch on upper leaves as well. Some species, have a special routine (Kiss and Rekasi, 1981). *S. decaocto* have one long feeding period in early morning and another shorter and much more intensive feeding before sunset. The maximum number of sunflower seeds found in a crop was 168 following morning feeding and 384 following the evening feeding. Even though the doves could get enough food in the villages and around the granaries, one of the examined *S. decaocto* (ringed in village) flew 6 km to feed on sunflower.

According to bromatological investigations most of the pest species live on varied diets, but most usually on sunflower seeds when crops are maturing. Sparrows eat the least quantities of sunflower seed, *Passer montanus*: 1.6 seeds/bird and *P. domesticus*: 3.7 seeds/bird on the data obtained from examining 17 and 49 birds respectively. These small quantities become considerable if the size of sparrow flocks are taken into consideration. The loss caused by sparrows is greater because they scatter seed as well (mostly in over-matured stands). The loss caused by *Phasianus* can be more or less controlled. If the birds get enough feed and the sunflower fields are patrolled during the fortnight of emergence, then losses are minimal. In maturing crops the pheasants feed on scattered seeds making use of unharvestable seed and they decrease the number of volunteers in succeeding crops. According to results sunflower is the main diet of the two *Columbas* and *C. palumbus* which consumes the largest amounts of sunflower seed, 115 seeds/bird and *C. livia* which eats less seed, but this species occurs in greater number, 47 seed/bird. Both species hardly consume any weed seeds. The two *Streptopelia* species are also great sunflower seed consumers. Flocks of 500 — 5,000 turtle doves arrive generally in mid-September and feed mostly on sunflower

stands. The crops of 75 birds were examined and the average number of sunflower seed consumed was 38.5/bird. The amount of weed seeds was small. The diet of collared doves was more varied (Barthos, 1957; Keve, 1943; Rekasi, 1980). Beside the sunflower seeds a lot of weed species seed was found in crops and stomachs. The most frequently found species are listed in Table 1. Beside the listed plant species other harmful weeds such as *Echinochloa crus-galli*, *Hibiscus trionum*, *Panicum* sp., *Setaria viridis*, *Sinapis arvensis* and *Sorghum halepense* were found in crops. *S. decaocto* which produced 4 — 5 broods per year caused considerable damage to agricultural farms not only by feeding on crops, but by spreading some animal diseases as well. Because of much more organised harvests, better storage of crops and heavy hunting of birds, collared dove populations were controlled a few years ago.

Table 1. The most frequent seeds found in the crops and stomachs of 372 birds (*Streptopelia decaocto*).

Species	Total Number of times found	Total Number of Seeds
<i>Helianthus annuus</i>	372	13605
<i>Polygonum convolvulus</i>	114	1496
<i>Zea mays</i>	99	618
<i>Setaria lutescens</i>	83	1711
<i>Amaranthus retroflexus</i>	69	919
<i>Cannabis sativa</i>	66	5655
<i>Triticum aestivum</i>	43	2453
<i>Vitis vinifera</i>	33	206
<i>Chenopodium album</i>	32	565
<i>Sambucus nigra</i>	32	552

Loss surveys indicate a gradual decrease in percentage of damaged plants. Losses during the seedling stage do not exceed the 10% level. Losses are caused by *Phasianus*, *Columba livia* and hares. The losses in commercial productions aren't important, but in seed production fields losses are considerable. In our surveys conducted during the ripening stage losses weren't as great as those reported by several other authors (Besser, 1978; Camprag, 1974; and Henne, 1978), but they were considerable. Losses in seed production fields were larger than in commercial fields. After checking many thousands of heads the percentage of attacked heads was about 10%, but the most (76.5%) of the attacked heads belonged to category 1. Damaged heads in categories 2 and 3 were 15.5% and 5% respectively. Heads belonging to categories 4 — 8 were rare. In our region the losses caused by birds rarely exceeded 5%.

Use of repellent chemicals (Mesurol, Morkit), carbide exploders and devices inducing ultrasounds (Csernavolgyi, 1974) proved to be ineffective. The only effective chemical is the desiccant Reglone. Firstly it accelerates maturity and secondly it acts as a repellent for sparrows and turtle doves. According to the observations *Columbas* feed more intensively on desiccated stands. Emerging stands can be saved by spreading bait (worthless broken and small crop seeds)

around sunflower fields. Plastic foil belts attached on rods and put on the edges of fields can be also useful against birds, but ineffective against hares, so farms badly need chemical repellents against mammal pests. In some regions hares and roe deers cause considerable losses. The very precious stands of parent stock productions and performance trials must be protected with light nets, or webs of poly-acryl-nitril must be laid on plants.

Planting large sunflower fields, concentrating the production and avoiding planting sunflower close to larger shelter belts and marshes could also be of use in reducing damage. Reducing the periods emergence and maturity by better seed bed preparation, by choosing proper planting dates, by using vigorous, uniform and early maturing hybrids and by spraying desiccants always decreases losses due to birds. Well organised and quick harvest is of great importance as well. Delaying the burning or ploughing in of cereal stubble may delay bird attack on sunflower fields. In general by making it more difficult for birds to feed on sunflower crops (by growing uniform quick maturing hybrids with desirable head inclination and employing procedures already discussed) losses can be minimized and the birds will revert to their original diets and their populations will decrease to the usual levels.

ACKNOWLEDGEMENTS

We are very grateful to Mr Mihaly Perczel for his useful advice and help.

LITERATURE CITED

- BARTHOS, Gy. 1957. Quantitative data about the food of the Indian ring dove. *Aquila*, LXIII-LXIV. 344.
- BESSER, J.F. 1978. Birds and Sunflower. In *Sunflower Science and Technology*. 263 — 278.
- CAMPRAG, D. 1974. Harmfulness of birds (Aves) on maturing sunflower plants in north-east regions of Yugoslavia. *Proceedings of the 6th International Sunflower Conference*. 701 — 705.
- CSERNAVOLGYI, L. 1974. Agricultural losses caused by birds and some possibilities for their reduction. *Aquila*, LXXX-LXXXI. 239 — 247.
- GLUTZ, U. and BAUER, K. 1980. *Handbuch der Vogel Mitteleuropas*. 9:1148.
- HENNE, D.R. 1978. Ground application of Avitrol to control blackbirds in sunflowers. *Proceedings of the 8th International Sunflower Conference*. 172 — 177.
- KEVE, A. 1943. Die Ausbreitung der orientalischen Lachtaube in Ungarn im letzten Dezennium. *Aquila*, L. 264 — 298.
- KISS, J.B. and REKASI, J. 1981. Zur Ernährung der Turckentaube in der Nord-Dobrudscha/Rumaenien. *Der Ornith. Beobachter*, 78:13 — 16.
- REKASI, J. 1974. Nahrung der von Sonnenblumenfeldern gesammelten Turckentauben. *Aquila*, LXXX-LXXXI. 305.
- REKASI, J. 1980. Adatok a balkani gerle taplalkozas-biologiajához. *Allattani Kozlemenyek*, LXVII. 1-4:99 — 108.

PEST STATUS OF PARROT SPECIES ON SUNFLOWERS IN NORTHERN NEW SOUTH WALES.

D.N. JONES

Department of Ecosystem Management, University of New England, Armidale, N.S.W. 2351. Australia.

ABSTRACT

A number of parrot species were found to be pests in sunflowers in mid-northern New South Wales, although the distribution and importance of these species varied

greatly. The galah *Eolophus roseicapillus* and sulphur-crested cockatoo *Cacatua galerita* were the main pests throughout the area, with the cockatoo being important