

# A short overview of bird control in sweet and sour cherry orchards – Possibilities of protection of bird damage and its effectiveness

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## Introduction

Throughout the world birds are one of the most important pests of fruit orchards. Usually the early ripening fruit species (like cherries) are damaged the most seriously, but birds like some other species like grapes, blueberries, gooseberries and apples too. *Wright and Brough (1966)* showed that damage could also be caused to green cherry fruit, soon after stoning has occurred.

Bird damage varies accordingly species of birds and from farm to farm and from one area to another. Generally the following bird species are causing damage in cherry orchards: bullfinches (*Pyrrhula pyrrhulla* L.), blackbirds (*Turdus merula* L.), robins (*Turdus migratorius* L.) jays (*Garullus glandarius* L.), common grackles (*Quiscalus quiscula* L.) and wood pigeon (*Columba palumbus* L. – dangerous for unripped green cherries) (*Upshal, 1943; Wright & Brough, 1966; Way, 1968; Guarino, 1972; Tahon, 1980; Bonnemayer & Dane, 1987*). Bird damages are usually seriously than we thought, and only after using effective protection system we can realize it. Various estimates of losses to birds in cherry crops have been made, ranging from 0,5–10% in the case of full ripened cherry fruits (*Upshal, 1943*). Others (*Way, 1968*) showed more serious data up to 90%. In one survey, blueberry growers in the Northeastern United States estimated that nearly 30 percent of their crop is lost to bird depredation each year. Across the USA, 10 percent of the blueberry crop is probably lost – at a cost of \$10 million (*Delamano, 2006*).

Birds damage fruit usually in three different ways:

1. By eating fruits;
2. Not eating but damaging fruits. Damaged fruits can be infected by different *Monilinia* and *Botrytis* species. Problem is that birds are damaging more fruits than eating. Damaged or/and moldy fruits can not be sold for fresh market and processing industry too. Recently, fresh food handlers have been concerned about the possibility of birds introducing *Salmonella* and other pathogens into the food supply (*Pritts, 2001*).

3. Causing fruit to be harvested early before full size, sugar and maturity are reached resulting in an inferior product to be marketed (*Feare, 1980 & Delamano, 2006*).

For a long time there are several repellent ways of birds to protect the crop of fruit orchards.

Nowadays there are three applicable way of bird control:

- scaring by visual way (scarecrows; balloons imitating hunter birds eyes; lighting or shining metal or mirror piece and plastic ribbons);
- scaring by auditory way (shooting or propane-powered scaring guns, distress calls of birds);
- using nets to keep birds of from fruit trees

Effectiveness of applied repellent techniques is varied by regions, bird and fruit species too. Every grower has find the right bird control way accordingly orchard and biotic parameters (*Simon, 2003*).

## Protection ways of cherries from bird damage

**Chemical control:** Testing of chemicals with bird repellent activity started in the end of 1960' and the beginnings of 1970's. all over the world. Many compounds were tested by their repellent activity and thiram (tetrathiomethylurea disulfide) was found as the most effective bird repellent material. For a long period thiram became the comparative standard of chemical bird repellent researches.

Later in the beginnings of 1970's a non-systemic insecticide the methiocarb (4-(methylthio)3,5-xilyl-N-methylcarbonate) became the most preferred bird repellent (*Guarino, 1972; Westlake, 1981; Hoyoux et al., 1984*). It was used in Michigan in sweet and sour cherry orchards too. In the first trials the bird damage was five times less (less than 20%) on methiocarb-treated trees than on untreated trees (more than 50%). In subsequent trials the dose and spraying technique were modified and more than 60% bird damage reduction was achieved. Methiocarb became well known as Mesuro<sup>®</sup> registered trade mark. The general applied technology was with three sprayings at 2-weeks intervals and the last was 7 days before the planned time of harvest time.



In the practice many cherry grower used Mesuro<sup>®</sup> in high volume (4.5 kg/hectare) (Guarino et al., 1974). By appropriate application technique residues of methiocarb were low in fruits at harvest. Since the loss of Mesuro<sup>®</sup> more than a decade ago, there is no effective chemical repellent has been available to keep birds off fruit in the field.

At the end of 1990's research started at Cornell University to develop an effective and environmental friendly chemical bird repellent technique. In this project Paul Curtis (wildlife management specialist in Cornell's Department of Natural Resources), and Ian Merwin (Department of Horticulture) were working in a cooperation (Pritts, 2001). Scientists have known for a long time certain chemicals which are distasteful to birds. Unfortunately, most chemicals used in the past had toxicological effects (like Mesuro<sup>®</sup> was an insecticide), so the search began for a nontoxic chemical that was distasteful to birds, but not detectable to humans at harvest. Researchers found that methyl anthranilate, which is a major flavor component of 'Concord' grapes, was distasteful to birds. It is the reason why birds tend to avoid 'Concord' but feast on other varieties. Methyl anthranilate is manufactured in large quantities by food industry and used as addition to chewing gum, candy, juice, and soft drinks.

A marketable product was developed and registered for use in fruit plantings as 'Bird-Shield' and 'Rejex-It'. This product was tested at Cornell University and it was experienced some problems related application of it (Pritts, 2001). It was found good repellency for about 3 days, but the sprayed material loses its effectiveness later. Secondly, to repel birds, a large amount must be consumed in one bite. It is less effective when applied uniformly as it would be with an air blast sprayer. Thirdly, it must be reapplied after rainfall. Although methyl anthranilate works well in some situations (e.g. as a goose repellent in turf), it was not found it to be a reliable deterrent in fruit crops, particularly in rainy climates and in blueberries that ripen over long periods of time.

If adequate alternative food is available to achieve for birds chemical bird control is more effective (Rogers, 1980).

## Physical control methods

**Trapping or shooting birds:** First of all it is noted that in the most of countries these ways are illegal by environmental protection laws. To preserve of wild life and diversity of wild animal species is global interest of humankind. Tahon (1980) reported a seriously drastic method to control birds. 200–300 kg dynamite was used to blow up the evening roost site of starlings to test as a possible bird control method. Detonation between 23.00 and 02.00 and the mean number of killed bird was about 34.000 per explosions. The explosions killed 10 to 78% juvenile proportion of the bird population. By Tahon's opinion although roosts were destroyed by this method and were not reoccupied at least for the next 2 years, but the effectiveness of this drastic method is limited to the second half of the harvest season and to only a part of the bird population.

**Scaring birds:** Based on Slater's (1980) and Inglis's (1980) opinions visual and sound scare methods can be effective in fruit orchards.

**Sound scaring:** Among the sound scare methods using propane powered guns is the easiest way. This way is generally used in cherry orchards in UK and USA too. In Hungary in the research orchard of Fruit Research Institute – Érd to scared birds and decreasing the bird damage a typical propane-powered gun was applied in the harvest season of 2007 (propane-powered gun is showed in *Picture 1*. Based on my personal experiences this scaring method was really effective, during picking fruit samples any eating and flying birds in orchard were no seen. By my opinion this method is useable in orchards fare from inhabited territories because it is too noisy and disturbing people too.



*Picture 1* A typical propane –powered gun.  
(In cherry orchard of Fruit Research Institute Érd – 2006.)

Other way to use distress calls of birds. There are several reports (Wright, 1966; Keil, 1968 & Zajac, 1983) from different countries on the good effectivity of this method. By the reports by using distress calls (approximately 1 speaker for 1 hectare) gave 80–88% protection. Based on my personal experiences in sweet and sour cherry research orchards of New York State Agricultural Experimental Station in Geneva using of distress calls was ineffective. Machine was called as "Bird alarm" (an electric device) with different setting possibilities (frequent of alarm, loudness, automatically switch on and off etc.). Bird alarm was installed in the centre of the research orchard at the beginning of fruit colouring. For 8–10 days birds were not seen in the orchard, and after this time more and more birds (starlings, blackbirds, robins etc.) came back to the orchard for feeding. In full mature status about 85–90% of the crop was picked or eaten by birds, even in 1m distance of the speaker of bird alarm. So it is seems this way applied itself is giving not satisfactory protection, it is necessary to be combined with other sound and visual scaring effects. Some other authors Taylor (1985) & Dzhabbarov (1988) reported similar results.



*Scaring by visual effects:* Maybe this way was applied first time as a scaring method. The scarecrows are well known from grape orchards. Some cherry growers apply inflammable balloons imitating hunter bird's eyes and other equipments are also installed in orchards like lighting or shining metal or mirror piece and plastic ribbons. In some orchards painted plastic models of hunting birds (like hawk or owl, *Picture 2*) are placed on a tall pole in a good visible place (*Pritts, 2001*). The problem with visual methods that birds can easily acclimate to these equipments and the fruit orchard is reoccupied rapidly. That is the reason if we want to have satisfactory visual scaring effect these visual scaring equipments necessary to be frequently replaced to different part of the orchard.

*Pritts* has surrounded a blueberry planting with strobe lights, but found they were not effective for repelling birds. The combination of sound and visual scare device works much better than either by itself (*Pritts, 2001*).

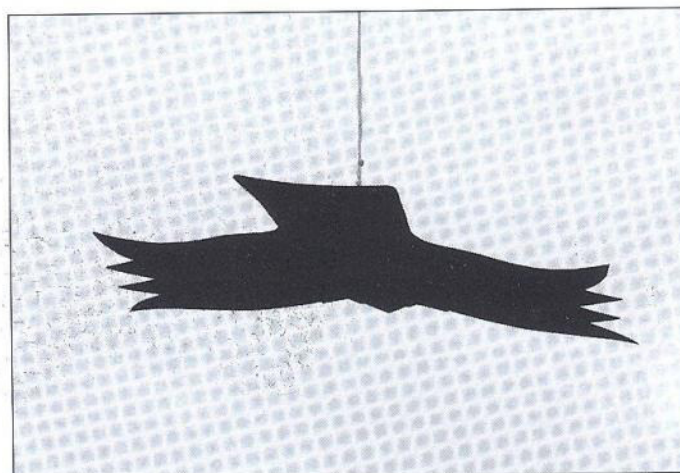
Based on *Inglis (1984)* report *Pennel and Webster (1996)* described following guidelines of the effective use of auditory and visual scaring devices:

- Use as infrequently as possible;
- Change the position of scaring devices as frequently as possible;
- Varying the height of scarers in the orchard can be helpful and effective;
- Immediately remove any scarers when it has lost its effectiveness;
- Control times of use and interval to take account when feeding pressure is greatest;
- By aware of alternative foods in the same area can reduce the feeding pressure.

**Protector netting system:** That is the generally accepted opinion that protector nets are controlling fully the bird damage (*Way, 1968*). There are some other recent opinions: netting is expensive and difficult to install, so most growers would like to avoid using it if possible (*Pritts, 2001*). The material of protective nets was cotton (*Lovelidge, 1976*) and



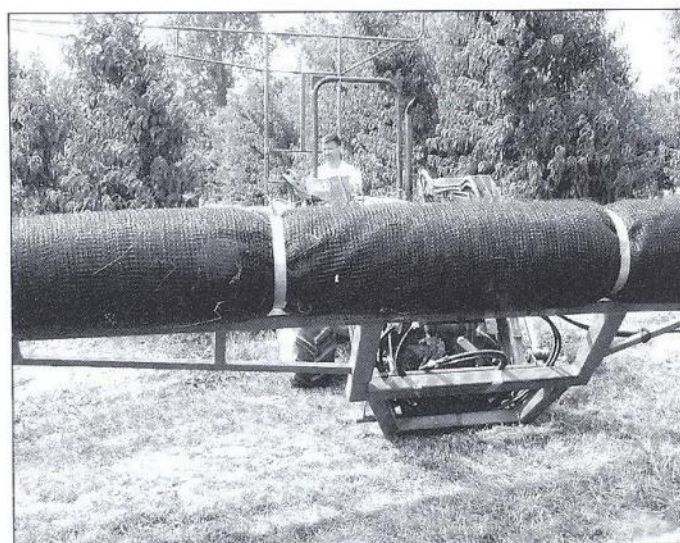
*Picture 3* The spools of bird protective nets



*Picture 2* Hanged hawk model in cherry orchard (*Érd, 2006*)

later synthetic fibers draped form to web (*Wright and Brough, 1966*) and recently made of UV light-stabilized polyethylene with a mesh diameter of 20–30 mm (*Pennel, 1981*). First time the protector net was laid over and into the fruit tree without any support system (*Bugdan et al., 1981*). Nets used in this way can inhibit the tree growth and it can be difficult to remove before harvest without damaging of leaves or fruits. Other thing, that birds tend to perch on exterior on the net eat or pick all the fruits within their reach. In 2002 I took part in laying overhead a protector net on sour cherry trees in Geneva at New York State Agricultural Experimental station. It was used a modified tractor with a front lifter to help laying the net over the tree canopy (*Picture 4, 5 and 6*).

The spools of nets (*Picture 3*) were bought and transported to the orchard. In the orchard 2 or 3 workers had to rewind the net to a wide spool (spindle) fixed in the front lifting part of the tractor (*Picture 4 and 5*). In laying process the spool with the bird protective net is lifted overhead the canopy by the tractor. 2 workers are going behind the tractor and pulling down the net from the spool (*Picture 7*). Finally the laid net is fixed by hooks to the ground.



*Picture 4* Rewind net to a wide spool





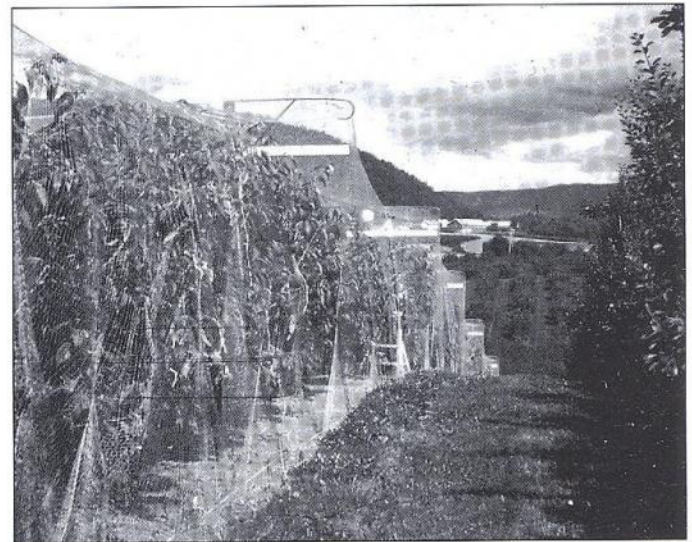
Picture 5 Front lifting part of the tractor with the spool of bird protector net.



Picture 6 Back side of the "net laying" tractor



Picture 7 Bird protector net laid directly on the canopy of sour cherry trees in Geneva, NY-USA



Picture 8 Single row netting system in a sweet cherry orchard in south part of Norway (Picture by Hrotkó, 1997)

By introduction of semi-dwarfing and dwarfing cherry rootstocks combined with modern spindle training methods the tree size was reduced extremely. In the case of trees with 2–3m height application of bird protective net is more economical and viable way then earlier. In the intensive cherry orchards the protective net is not laid over directly on canopy but net is fixed to support poles. In the last decade it was developed different netting systems: for single row (Picture 8), for double rows and for multi rows too. In some new trials supports systems of bird protective netting and rain cover sheets are combined, by this way relative costs are reduced beside the increased fruit quality.

To summarize the information related bird damages and protection are the followings. Different protection ways can be applied. The traditional scaring methods by auditory or visual repellent ways are partly effective. Propane-powered guns are relatively effective, but their application is limited because their big noise can disturb humans and domestic animals too. The new methods like strobe lights and distress

call devices are ineffective or with short time repellent effect. Chemical bird control is only partly effective. Netting systems give full protection of bird but it is costly and difficult to install and remove before the harvest.

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