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12

Israel's Water Crisis



18

Climate Change Plan



21

Environmental Enforcement



BARN OWLS AND KESTRELS: BIOLOGICAL PEST CONTROL AGENTS

An idea to use raptors to control rodent populations is transformed into a national project 25 years later

In 1983, fourteen barn owl nesting boxes and hunting perches were erected in Kibbutz Sde Eliyahu in Israel's Beit Shean Valley, 30 km south of the Sea of Galilee. Today, a quarter of a century later, what was once a local biological pest control initiative has been transformed into a national project, with the cooperation of the Ministry of Environmental Protection, Ministry of Agriculture, Society for the Protection of Nature in Israel, and Tel Aviv University. And with the assistance of international foundations, the project has even been extended beyond Israel's borders to Jordan and the Palestinian Authority.

First Steps

Often, it takes a crisis to initiate change. The idea of using raptors to control rodent populations was first devised in Israel in 1982, following the accidental secondary poisoning of hundreds of raptors after eating voles which were poisoned in the alfalfa fields of the Hula Valley. After an initial failed attempt in Kibbutz Neot Mordechai in 1982, Kibbutz Sde Eliyahu,

one of the first communal farms in Israel to adhere to bio-organic and environmentally-friendly farming practices, took up the challenge.

The problem confronting both farmers and conservationists was clear-cut: rodents are responsible for extensive damage to agricultural crops, reaching up to 35% of certain crops such as wheat, but rodenticides are problematic, expensive and environmentally harmful, especially in Israel which is world renowned as a major bird migration route where some 500 million birds are estimated to pass twice a year. The advocated solution: the addition of large numbers of nest boxes in farmland, a decrease in pesticide use, and the creation of a friendly environment for raptors.

Although the original project, initiated by Dr. Yossi Leshem of the Society for

the Protection of Nature in Israel, the late Prof. Heinrich Mendelssohn of Tel Aviv University and the late Prof. Eitan Chernov of The Hebrew University of Jerusalem, was based on nesting boxes for barn owls (*Tyto alba*), common kestrels (*Falco tinnunculus*) were added subsequently as diurnal partners to the nocturnal owls, thus creating 24 hours of predatory pressure on rodents. "The two species provide round-the-clock predation of mice, rats and voles and have been used throughout history as natural pest controllers", says Dr. Yossi Leshem, director of the International Center for the Study of Migratory Birds.

The results, according to Shauli Aviel and Hanoch Pleser, who pioneered the project in Kibbutz Sde Eliyahu, were most encouraging: removal of some 80,000 rodents from the kibbutz fields every year, bringing about a reduction in the damage pesticides cause to people, soil, water, wildlife and migrating birds.

Regional Expansion

The success of the project in Sde Eliyahu, coupled with another mass secondary poisoning event in 1998, led to a decision to expand it to the entire Beit Shean Valley, and between 1998 and 2006, some 220 nesting boxes were placed in the Valley, in addition to the 59 in Kibbutz Sde Eliyahu. Today, there are 30 pairs of barn owls in boxes in Sde Eliyahu and another 80-120 pairs in the fields outside the kibbutz. Since a pair of barn owls eats between 2,000-5,000 rodents a year, this translates into between 200,000 to 500,000 less





rodents a year in the agricultural fields of the Beit Shean Valley.

Mr. Motti Charter, scientific coordinator of the project, points out the uniqueness of the Israeli project, in comparison to similar projects in the Western world: "Unlike conservation projects for barn owls in the US and Europe which place nest boxes in low densities, in Israel nest boxes are placed in high density. For example, we can have 100-250 breeding pairs within the 90 square kilometer Beit Shean area, in comparison to only 3 to 15 pairs in a comparable area in the UK." Charter goes on to explain that "typically, pest control projects are covers for barn owl conservation projects and have little to do with real pest control. In Israel, this is just the opposite: first pest control, later conservation. Where scientists or birders are responsible for placing barn owl nest boxes in other parts of the world, the majority of nest boxes in Israel were placed by farmers for pest control."

Indeed, in light of the achievements in Beit Shean, Israeli farmers were quick to introduce barn owl nesting boxes in other parts of Israel. However, the quick and

uncontrolled expansion of the nesting box project was not always successful. All too often farmers did not make optimal use of the nesting boxes, situating them in the wrong places at the wrong times, with disappointing results. It soon became clear that in order to provide the necessary expertise, the pilot project for the control of voles by barn owls and kestrels would have to be transformed into a national project.

From Local to National

On its part, the Ministry of Environmental Protection examined the project and recognized its potential to reduce pesticide use in Israel. In conjunction with the Society for the Protection of Nature, the Ministry of Agriculture and Tel Aviv University, a comprehensive program for biological control, based on splitting the country into multiple regions, each under the supervision of regional coordinators, was drawn in 2007. It included several components:

- Distribution of thousands of nesting boxes for barn owls and kestrels in agricultural fields throughout the country.

- Instruction, support and advice to farmers by the Ministry of Agriculture on the necessary conditions for the breeding and reproduction of raptors.
- Monitoring and data collection by the Society for the Protection of Nature in Israel (SPNI) and Tel Aviv University on both raptor and rodent populations, including standardized nest box monitoring, ringing of nestlings and adults and pellet dissection.
- Development of educational programs, largely targeted at schoolchildren in the project areas.

In the past, the project was carried out by the farmers themselves, with little scientific basis, little analysis of breeding data and little scientific publication. Today, this is no longer the case. Beginning in the 2007 breeding season, a pilot of the national project was initiated by the Society for the Protection of Nature and Tel Aviv University, and an exhaustive report on the results of the first year of the program was recently published. In parallel, in 2008, the Agro-Ecology Department of the Ministry of Environmental Protection funded five independent projects in five regional councils throughout Israel. While these projects are not part of the national project, funding requirements called for strict adherence to the provisions of the larger project, in terms of placement of the nest boxes, monitoring and professional input.

In January 2009, a contract was signed between the Ministry of Environmental Protection, Ministry of Agriculture and the Society for the Protection of Nature in Israel to promote the use of barn owls and kestrels as biological control agents in agriculture. For the Ministry of Environmental Protection, partnership in the national project was welcomed as a means of significantly reducing the adverse impacts of pesticides on wildlife, groundwater and soil and, of course, on people.

According to Dr. Shlomo Capua, coordinator of the project on behalf of the Ministry of Environmental Protection, in just a year and a half, "we have advanced all four elements of the national program – infrastructure, instruction, monitoring and education – and have succeeded in raising awareness of the need to reduce pesticide use, on the one hand, and protect nature, on the other."

"Today, we have reached a point of saturation in terms of infrastructure," continues Capua. "What is needed now is further study on the dynamics of the population and increased monitoring."

And Beyond Israel

Recognition that raptors move regularly between Israel, Jordan and the Palestinian Authority, and that they are at risk of secondary poisoning and hunting has helped to expand the nesting box project beyond Israel's borders. The regional dimension of the biological control project is especially exciting and challenging and includes such partners as the Amman Center for Peace and Development in Jordan, headed by Mansur Abu-Rashad, the Palestinian Wildlife Society, directed by Imad Atrash and the Society for the Protection of Nature in Israel and the International Center for the Study of Bird Migration in Tel Aviv University in Israel.

To date, three regional cooperation projects have been initiated, funded by the Jewish Community of Cleveland, the USAID Middle-East Regional Cooperation Program (MERC) and, most recently, the European Commission for the Hanns Seidel Foundation in Germany.

Project Uniqueness

Reactions to the project are enthusiastic, to say the least. According to Dr. Yossi Leshem, the initiation of Israel's national

program on the use of barn owls and kestrels for biological control represents "the first time in which the subject of biological control is given national importance by government, public and

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academic institutions." Dr. Shlomo Capua, director of the Agro-Ecology Department in the Ministry of Environmental Protection, believes that "the project is unique in that it is based on a scientific infrastructure and has an ecological result in the form of reduced pesticides." Mr. Motti Charter points out the rigorous academic level scientific research that accompanies the project and notes that "in Israel we probably have one of the highest densities of breeding barn owls in the world." And Dan Alon, Director of the Israel Ornithological Center, hopes that the project, which has already expanded to Jordan and the Palestinian Authority, will spread even "further afield to African countries, thus developing a cross-continental environmental concept that will drastically diminish the harm to local and migrating birds."

One of the main accomplishments of the project, alongside reduced pesticide use and increased raptor conservation, lies in education and awareness. Today, posters and leaflets, in both Arabic and Hebrew, are available to teach farmers, decision makers and the general public about the project, and an educational kit, targeted at youngsters in the farming communities, has been especially prepared. Moreover, an online infra-red camera now allows surfers worldwide to view and to hear a family of barn owls atop a water tower in Kibbutz Tirat Tzvi in the Beit Shean Valley, live 24 hours a day. Of nine eggs laid by the female owl, five fledglings survived. In the first three weeks since the activation of the site in mid-April 2009, some 85,000 people accessed the link.

What's more, even Israel's military industry has joined the project by contributing some 500 ammunition boxes that will be transformed into nesting boxes, thus giving a modern interpretation to the age-old prophecy of Isaiah "and they shall beat their swords into plowshares, and their spears into pruninghooks."



Barn owl and nesting in nest box converted from ammunition box/Photo: Amir Ezer

