

GRASS SPECIES AS A KEY ELEMENT IN BIRD CONTROL STRATEGY AROUND THE AIRFIELD**Hagai Kupstein, M.A.¹ and Nicholas B. Carter, Ph.D.²**

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Bird harassment, habitat management, and air traffic are the three major components of a bird control strategy to reduce bird strikes around the runways. Habitat management is essential to maintain sustainable minimum bird species diversity and to significantly increase harassment efficiency.

Birds are just one element of the ecosystem and understanding the dynamic biotic and non-biotic components of the habitat helps reduce bird presence around the runways. Learning to control these components can greatly contribute to effective bird control.

Maintaining uniform low landscape on the airfield generally reduces bird species diversity and improves harassment on the airfield (the ability to locate bird hazards quickly and chase them away in real-time). A specific species of grass, *Coast Cross-One*, is being tested at Ramat-David AFB to address the ecological requirements of northern Israel. The species has no seeds (vegetative reproduction), is highly aggressive competitively, can survive long summers with no water, can survive localized flooding and has tremendous economic potential as fodder for cattle.

Grass management policy has been implemented on the airbase to maintain an average grass height of 20 cm. – too high for bird species that need open fields in order to see approaching predators but too low for species that need the shelter of high vegetation. This management policy (along with the elimination of habitat nuisances that attract birds like agriculture, trees, unnecessary signs and poles on the airfield, water ponds in the fields and on the runways) is part of a concerted effort to bring the airfield landscape into strict uniformity and control. Thus far, *Coast Cross-One* appears to be an effective factor in the overall Israeli Air Force bird control strategy.

Keywords: Grass management, Bird harassment, Habitat management, Air Traffic Coordination, Species Diversity, Grass Policy, Airfield management

1. Introduction

In the effort to reduce strikes between aircrafts and birds around the runway, air- bases must apply air traffic control and bird control at the same time. Air traffic control is accomplished by coordinating takeoffs and landings according to bird hazards in time and space. Bird control is often achieved by making the runway environment unattractive for birds, and applying routine efficient bird harassment in order to expel those birds that have passed the environmental line of defense. Bird harassment efficiency is a factor of the harassment method and the environmental landscape. Controlling the close surroundings of the runways is a key factor to bird control as it

serves not only as a deterrent for birds but also improves locating birds and harassing them efficiently in real time. This factor is especially important in Israeli Air Force bases, where fighter jets are being launched regularly in order to defend Israel's skies from potential threats. This does not always give sufficient work time to eliminate the birds.

Different air-fields have different spatial heterogeneity around the runways, as it is a combination of various environmental factors such as local topography, radiation, winds, temperatures, air humidity, different soil substrates, water availability, human interference, and on a second tier, biotic factors (plants and animals). A third level is the activity of the animals, like digging or selective feeding that changes the spatial heterogeneity.

In general, the more heterogeneous an area (tress, bushes, different weeds, different species at different seasons, human interference, water ponds, runway shoulders, tarmac cracks, signs, ditches, runway lights etc.) – the higher the biotic diversity.

The mechanism that increases the species diversity is competition. Decreasing the resources, increasing the width of niches, decreasing the overlapping and decreasing exploitation of resources – increases the competition, and thus allows a smaller variety of species to co-exist.

A specific grass species, *Bermuda Coast Cross-1* (“*Cross-1*”), is being tested these days in Ramat-David Air-Force Base (Ramat-David), a highly operational base in northern Israel, to achieve these objectives, as part of an overall strategy of bird control. This is another step forward for the base after the elimination of a civilian farmer that grew wheat around the runways for many years.

An overall Birdstrike Control Program is being applied successfully in Ramat David, and thus far (2002-2004) with no damaging birdstikes around the airfield. The program includes a civil biologists equipped with a trained Border Collie dog, the one thing birds cannot habituate to. The implementation of the grass around the runways should be the next big step for the base to take toward a higher flight-safety status.

2. Materials and methods

Cross-1 was brought to Israel from Georgia, U.S.A. in 1978, and has passed since then introduction tests and agricultural experiments. It was originally nurtured as cattle fodder, but very soon its soil stabilising qualities were discovered.

Cross-1 characteristics:

1. Height – up to 60 cm. with proper watering.
2. Growth – upper ground-level stolons. No underground rhizomes. Recovers rapidly from leaf removal.
3. Root system – massive and deep (up to 1 meter).
4. Drought resistance – can survive long periods without water through summer hibernation.
5. Water – low water requirements.
6. Reproduction – vegetative (no seeds).
7. Commercial potential – highly nutritional for cattle and sheep.

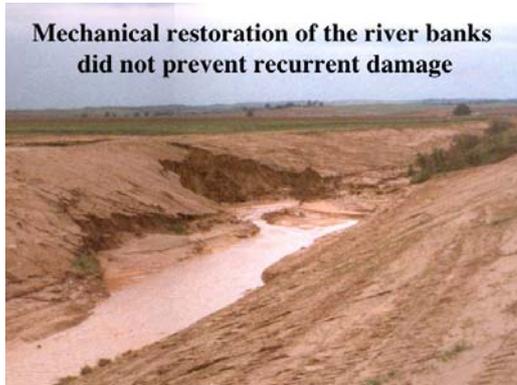
This species was chosen out of other potential grass species, as its characteristics best fit the runways environmental requirements:

1. Uniformed landscape – *Cross-1* is highly aggressive to competitors and grows rapidly.
2. Resistance to soil erosion – massive root system holds the soil year round.
3. Low risk – *Cross-1* doesn't have underground rhizomes and thus will not crack the runways.
4. Unattractive to birds – beside the uniformity factor, this species has no seeds and thus will not attract seed eating birds, or birds that feed on other seed eating animals.
5. Low maintenance – not only for cost-effectiveness but also for safety reasons (runways environment should be free of man and machines) – this species does not require much

watering or minerals, and fighting weeds will become easier over time due to its high aggressiveness and massive root system.

Coast Cross-1 was planted in different locations in Israel for different purposes:

1. River banks



2. Highways banks



3. Dairy farms Ditches



In Ramat-David two small plots (1 hectare each) were planted in different locations around the runways as a pilot project. Since water is not an abundant resource in Israel, the main objective

was to test if the grass could survive without the addition of water (8 months with no precipitation, and high temperatures during the summer). This was to compare to a control plot that was watered for a single 12 hour period during the summer.



Upper ground-level stolons

An average of 20 cm. grass height seemed to be the optimal height in order to repel the local birds. It was too high for small species of birds to watch for approaching predators and to hunt small invertebrates in the soil, and too low for bird species that look for the vegetation shelter in order to search food, nest or roosting habitats. Although this is the prescribed height for airbase purposes, commercial needs may differ, and so a flexible commercial cropping seems to be a compromise that serves both interests with minimal cost.

3. Results

Cross-1 survived the long Israeli summer with no water at all. Large cracks that were observed in the plot during the summer (as a result of deep soil movements in the Israel valley, and the hot drought season) only caused the grass to deepen its roots more than expected, which allowed it to reach subterranean water and survive. The control plot (watered once) remained green and reached larger heights.

Re-growth of green leaves were seen after the first rains and the grass grew tremendously during the spring, when the temperatures were higher.

Professional agronomists, as well as Israeli AF are pleased with the results, and are ready to move forward to plant entire fields around the runways, once an economical program will be established.

4. Discussion

It appears that commercial cropping of *Cross-1* for Israeli airfields is an appropriate solution for the IAF's runway environment. It seems to combine both interests: bird deterrence and low maintenance cost.

The theory and the practical (in Ramat-David, as well as other projects throughout Israel) support a productive strategy to address IAF's birdstrikes around runways. *Cross-1*'s lack of seeds, its high aggressive nature and rapid growth, its minimal water and minerals requirement and particularly its commercial potential are what make this species a practical solution for IAF airfields.

One of the most important expected aspects of the implementation of the grass around the runways is that it increases the dog's impact on the birds. The mobility of the dog is much higher on the grass and thus affecting the bird's behaviour as to leave the area almost immediately. Another aspect of the uniformity of the grass is the fear effect – birds feel they have no place to hide from the dog and so prefer to stay elsewhere. The combination of the grass with the dog effect is what should keep birds at bay in Ramat David, and that is in a base located in the middle of the Israel valley – a well bird populated agricultural valley and visited by many flocks of migrating birds.