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BARN OWL NEST BOXES OFFER NO SOLUTION TO POCKET GOPHER DAMAGE

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ABSTRACT: The belief that native predators such as barn owls (*Tyto alba*) keep native rodents such as pocket gophers (*Thomomys* spp.) in check has a long history, in spite of a lack of evidence that such predators play any role in lowering pest rodent populations to the extent that their pest status is measurably influenced. Attempts to artificially increase native predators such as barn owls in the hope of increasing predation on native pest rodents is not new and has been explored many times in the past, but as yet evidence of success is absent. Since predation is a slow ongoing process, two biological principles work to nullify any negative effect on populations of rodents with high reproductive propensities. The belief that predators somehow control their prey is challenged as a biological control approach, and proven gopher management methods offered in its place.

KEY WORDS: barn owls, *Tyto alba*, pocket gophers, *Thomomys* spp., gopher control, biological control, predator/prey relationships

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INTRODUCTION

It is a long standing misconception that native vertebrate predators, such as barn owls (*Tyto alba*), will assist in controlling pocket gophers (*Thomomys* spp.) and other native rodents to below damaging levels. In recent years, there has been a resurgence in the perpetuation of this myth as orchardists and vineyard managers are being misled into believing that if they install barn owl nest boxes on their property their pocket gopher problems will be resolved. The truth is that no scientific evidence exists to support this belief. Those promoting the establishment of barn owl nest boxes as a biological control technique overlook certain fundamentals in predator/prey relationships and the complex interactions and feeding strategies among all the other predators present. Also overlooked are the reproductive potential and the general population dynamics of the most prevalent small rodents of the region. To suggest that the installation of barn owl nest boxes and the hoped-for ensuing increase in barn owls will assist in gopher control, ignores the fact that rodent species have evolved in the presence of these native predators and, thus, have reproductive capabilities to more than compensate for those killed by predators; hence, rodents are very capable of maintaining thriving populations.

ABSENCE OF EVIDENCE

To support their contention, those who promote the barn owl nest box concept for gopher control often provide misleading and grossly biased evidence which, without close scrutiny, may sound very convincing. Some point to previous dietary studies, while others are involved in collecting the regurgitated pellets from within or beneath the nest boxes. These are then teased apart in order to identify and count the rodent skulls and determine the content of the owl's diet. From such studies, calculations and extrapolations are made as to how many rodents are consumed by a pair of barn owls over the course of a year. If conducted with a large enough sample over a period of several years, this will provide useful data about food habits but nothing more.

Such an analysis does not furnish evidence on the effects of owl predation on populations of pocket gophers and the other rodent species found in the owl's diet because information on the number of pocket gophers or voles (*Microtus* spp.) (the barn owl's primary food species) found within the foraging range is absent and has not been determined. Even if a pair of barn owls consumed 900 rodents annually, this has no significance if the number of breeding rodents available to these owls exceeds three million, and this three million is capable of producing nine to twelve million young annually.

EFFECTS OF PREDATION NULLIFIED

When promoters of this concept are challenged with these facts, they contend that because owls eat rodents they must provide some benefits to the grower. However, evidence suggests that predation probably helps the pocket gopher populations. Since predators tend to capture and kill a disproportionate number of the weakest and less agile, which often represents the diseased, deformed, or aging individuals, in addition to inexperienced and less alert young, this may, in fact, contribute to a more vigorous and thriving rodent population (i.e., the survival of the fittest). Natural predation, combined with mortality caused by diseases, parasites, social strife, and adverse environmental conditions, decreases competition among the surviving members. Not only will social stresses be diminished, but there will be less competition for the most nutritious food and, as a result, the reproductive potential for the remaining rodents of the population may be elevated (i.e., compensatory replacement).

NATURALLY OCCURRING PREDATION

Predation is an ongoing phenomenon with hawks, owls, fox, kit fox, coyotes, skunks, weasels, badgers, bobcats, raccoons, and snakes feeding upon pocket gophers in orchards and vineyards, as do domestic cats and dogs; hence, this fact is not in question. It is whether these predators can collectively kill sufficient numbers of pocket gophers to measurably reduce their

population in any given area. It doesn't matter how many gophers are killed if the reproductive rate of pocket gophers has the potential to more than replace those losses. Many researchers have studied pocket gophers and their biology over the years, but none has concluded that predation plays any significant role in limiting their numbers.

TRADITIONAL MANAGEMENT IS ESSENTIAL

In spite of being preyed upon, certain rodent populations naturally exist in densities where they cause serious agricultural damage. A few pocket gophers in a newly planted orchard or vineyard can kill hundreds of trees or vines in a single year. Attempting to rely on barn owls, foregoing traditional proven gopher control management techniques such as poison baits or trapping, is inviting potential gopher problems which, if unchecked, may prove disastrous to the grower. Orchardists neglecting gopher control, in some instances, lose through root girdling as much as a third of their trees in the first two or three years.

Suggestions for the Grower Who Wants to Avoid Pocket Gopher Damage

1. Eliminate all or nearly all the gophers from the land prior to planting a new vineyard or orchard. This can be accomplished by planting crops which do not support pocket gophers for a few years prior to orchard planting. Alternatively, gophers can be controlled with strychnine baits dispensed by a hand probe or, in large fields, with the use of the mechanical burrow builder. The burrow fumigant, aluminum phosphide (a restricted use pesticide), although more expensive, can also be very

effective, as can trapping. The latter two are more suited for the less dense populations and/or the smaller acreages.

2. Monitor newly planted orchards or vineyards monthly or bimonthly for evidence of fresh mounds, and carefully inspect trees or vines that are showing symptoms of stress. Initiate control as soon as gophers are discovered, for it is much more cost effective and environmentally sound to control gophers when they are at low levels.

3. Remember, gophers, when present, cause the most severe damage in years just following planting. Young trees and vines are most susceptible to injury because of their small diameter, permitting the gopher to easily completely girdle them within one night of feeding. As the trees or vines mature beyond four to seven years of age, gophers are less likely to completely girdle them, but a partial girdle or severe root pruning may slow growth or reduce crop production.

SUMMARY

Without supporting facts, it is time to abandon this erroneous belief that native predators, such as barn owls, can provide meaningful control of pest rodent species such as pocket gophers or voles. This does not imply that predators never have a regional impact on their prey, at least temporarily. A few predator/prey relationships such as the effects of mountain lions (*Puma concolor*) on bighorn sheep (*Ovis canadensis*) and wolves (*Canis lupus*) on caribou (*Rangifer tarandus*) are examples for which good evidence exists. Such examples, however, are specific and cannot be generalized to all predator/prey relationships.