ONE HUNDRED YEARS OF POCKET GOPHER TRAPS AND TRAPPING

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ABSTRACT: The pest status of pocket gophers (*Thomomys* spp. and *Geomys* spp.) to agricultural crops and home gardens is well established, as is the fact that trapping in the early history of this country and its western expansion was the predominant method of their control. The former payment of bounties for gopher scalps or tails is thought to have stimulated the development and production of dozens of different kinds and models of gopher traps. In the midwest, prior to the industrial revolution, small size leg-hold traps were used for taking gophers because they were the only traps available. By 1880, traps were being developed and manufactured specifically for gophers, with a dozen or so marketed prior to 1900. The zenith of gopher trap development was from 1900 through the 1930s. Following the end of World War II, the use of poison baits for gopher control significantly replaced the use of traps. Five of the most successful gopher traps, all with a long history of production, are enumerated and the specific history of the Macabee gopher trap is detailed.

KEYWORDS: pocket gophers, gopher control, traps, trapping, trap development, trap history

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GOPHERS AS PESTS

Pocket gophers, of one species or another, can be serious pests, causing damage to a wide range of agricultural crops, to home gardens, to many types of landscaping, and often to forest regeneration efforts (Figure 1). In addition to the crops or other vegetation they destroy, they are also capable of considerable physical damage by gnawing on buried plastic water pipes and underground electrical and communication lines. Their burrows cause substantial losses of irrigation water, especially in flood irrigated crops. Their burrowing activities weaken earthen dams, levees, and dikes, resulting in major and costly breaks.

Figure 1. Botta's pocket gopher (*Thomomys bottae*) causes the most significant damage to California agriculture.

When this country began to expand with the westward movement of settlers to the mid- and far-west, farming endeavors were impacted severely by pocket gophers, as well as other prolific rodents such as ground squirrels and prairie dogs. Especially effected were vegetable crops, orchards, and vineyards. Root crops such as potatoes, sweet potatoes, beets, parsnips, turnips, and carrots are favorite foods of gophers, as are field crops such as alfalfa and clover. Orchard trees such as apples, plums, almonds, peaches, and cherries are killed as a result of the crowns or major roots being completely girdled.

BOUNTIES

When the country was young, so great was the damage caused by pocket gophers that in many regions bounties were placed on the animal's scalp or tail. Benton County, Iowa had a pocket gopher bounty program as early as 1866, when 10¢ per scalp or tail was paid (Bailey 1895). By 1895, bounties were being paid in Iowa, North Dakota, South Dakota, and Minnesota. In these states, bounties often extended to include both pocket gophers and ground squirrels, which were also referred to as gophers. Since ground squirrels were more easily shot or trapped than pocket gophers, their number seemed to dominate in the submissions for payment.

A compulsory extermination law was passed in Kansas in 1905, however, the provisions of this law were seldom implemented. Several years later (1908), a bounty law was passed and, at the discretion of the counties, either 5¢ or 10¢ was paid for each scalp (Scheffer 1910).

These bounty programs were discovered to be very expensive and the counties soon found themselves unable to pay the claimants because of the large numbers of animals submitted for payment and a lack of funds. The number of fraudulent claims often compounded the exorbitant amounts paid out. Crouch (1933) indicated that it was not difficult for dishonest individuals to perpetrate fraud in claiming bounties on pocket gophers. He wrote, "Some public official to whom scalps or tails are presented for bounty may never have seen a pocket gopher, and it would be practically impossible for them to distinguish a dried and shriveled pocket-gopher scalp or tail from that of any other small animal." Frequently, several "scalps" or "tails" were fashioned from the skin of a single animal. A county clerk may unknowingly pay bounties on the scalps or tails of gophers collected outside the designated bounty area (Crouch 1933). Efforts toward paying bounties for pest animals often resulted in fraud and in some instances the corruption of officials.

The heavy drain on the public treasury usually resulted in the abandonment of such programs, resulting in the repeal of bounty laws. Because of the high cost, no county or state has ever been able to pay a generous bounty on rodents for any prolonged length of time. It was found that the expense of maintaining a bounty system was way out of proportion to the benefit resulting from a reduction in pest numbers. It is thought that the bounty systems, while they lasted, plus significant agricultural expansion, stimulated the development of gopher traps and gopher trap production. This contributed to the proliferation of gopher trap patents issued around the turn of the century and well into the early 1900s.

As the bounty systems were discontinued, they were often replaced with government sponsored poisoning programs in which farmers were provided with low cost or free poison bait and shown how to effectively use it. The poisoning programs were found much more cost effective and produced far greater results.

THE ART OF TRAPPING

The most effective method of setting a gopher trap is to place it in the main tunnel or runway, not in a lateral tunnel leading to the soil mound. The main tunnel is located by probing with a steel rod at a distance of about 14 to 18 inches from a freshly made mound on the side adjacent to the plugged hole. Fresh mounds are easily identified because the higher moisture content of newly dislodged soil makes the soil darker than older mounds. Fresh mounds are indicative of the most recent gopher activity and will maximize trapping success when traps are located near to where the gopher is currently digging. The main tunnel is generally about 7 to 10 inches below the surface; the reduced soil friction on the probe is the clue that indicates a tunnel has been entered. Alternatively, the main tunnel can be found by selecting two fresh gopher mounds and, with the assumption they are connected underground by a tunnel, proceeding to probe every 3 inches across the area of the suspected tunnel. Once the tunnel has been located, a shovel is used to open an approximately 12 inch diameter access hole to the tunnel. A hand trowel is used to clear any soil from the tunnel and to enlarge it slightly so a trap, such as the Macabee, can be inserted. To maximize results, two traps should be set in the main tunnel, each facing in the opposite direction (Figure 2). Traps need not be baited. Most trappers close up the trap hole, leaving only a small dime-size opening for light to enter. Gophers are caught when they come to investigate the disturbed area of the tunnel and plug the small opening.

The directions accompanying some traps show the trap set in lateral runs that lead to the surface mound and instruct the user to clean out the soil from the laterals with a large long-handled spoon and then place the set trap inside. While this method is simpler for the home gardener because it dispenses with the need to probe for the main tunnel, trapping success is considerably diminished. The lateral tunnels produce poorer results because they may be blocked with soil at some lower level. In fact, in many instances the gopher does not reuse the laterals, whereas the main tunnel is used on a regular basis. Professional gopher trappers rarely waste time setting traps in lateral runs.

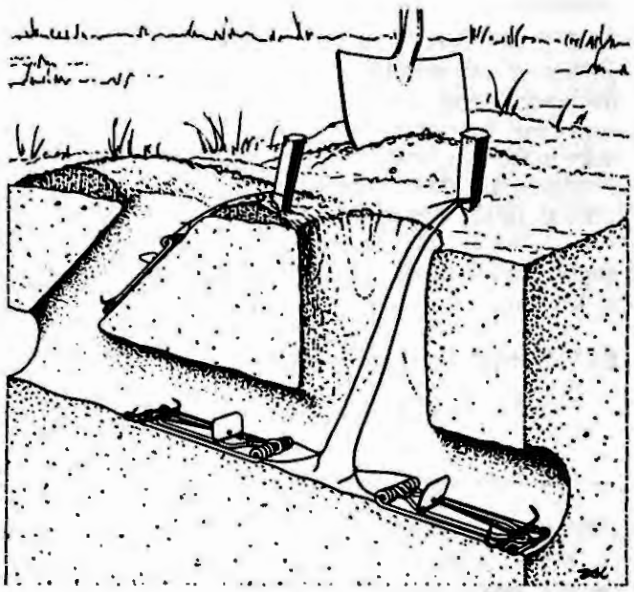

Figure 2. Two Macabee traps positioned in opposite directions in the gopher's main tunnel is the best of sets. The single trap positioned in the lateral tunnel (on the left) is a much less productive set.

EARLY USE OF LEG-HOLD TRAPS

Prior to the development of traps specifically designed for pocket gophers, small size leg-hold traps were found to be fairly effective for taking gophers. The "O" size was particularly useful, because it could be more easily inserted into the gopher burrow without much extra digging. Early records and writings indicate that such traps were in common use in the midwest by the 1860s. These traps would catch the gopher mid-body, killing it instantly.

Halsey Thrasher (1868), in his book entitled "The Hunter and Trapper," devoted a chapter, consisting of all of two pages, to the control of pocket gophers. He describes the animal and its activities. Thrasher wrote the following: "The best trap to use is the little one spring kind of the Newhouse make. Having pushed the trap in, go away, without further fixing, and perhaps in an hour, perhaps in three to four days, you will catch the lad."

Charles Olds, a salesman for the largest trap manufacturer in the country, reported back to his employer, the Oneida Community, the promising outlook for trap sales for the purpose of trapping gophers. According to Gerstell (1985), in 1867 Olds wrote of gopher problems in the Missouri and Mississippi valleys and added that bounties were being paid to destroy the pests. Olds further indicated that the new No. 0 traps were well suited to trapping gophers and that the majority of those purchased in Iowa were bought for that purpose (Gerstell 1985). The Newhouse pattern No. 0 trap was

sometimes referred to in advertisements during that period as a rat and gopher trap because it was used mostly for those pests, or vermin, as they were frequently called in those days.

These accounts provide information regarding gopher trapping prior to the industrial revolution. Even after traps specifically designed for pocket gophers were being made and marketed, the use of No. 0 leg-hold-type traps continued to be commonplace. They also continued to be suggested in trapping guides (Kreps 1909) and in gopher control bulletins written for farmers. As an example, in a USDA Circular, Lantz (1908) wrote the following: "For trapping gophers an ordinary No. 0 steel trap may be employed with success, but there are on the market several special gopher traps which are better adapted for general use." Field studies conducted by Scheffer (1910) compared the trapping success of the No. 0 steel trap with those of the 44 California and Newhouse gopher traps. The percent catch was 36 for the 44 California, 30 for the No. 0 steel traps, and 19 for the Newhouse. In this particular field study, the No. 0 steel trap compared favorably to the best of the gopher traps.

EARLY GOPHER TRAP DEVELOPMENT

One of the earliest patented gopher traps was a choker-type box trap. It was patented in 1864 by Augustus J. Eddy and John B. Wilber of Iowa (patent number 45,399). Another wire choker gopher trap was patented by John Curtis of St. Charles, Minnesota (patent number 69,777); however, neither of these traps are known to have been produced commercially.

The first patented and commercially produced gopher trap that the author has identified is the Wood's gopher trap patented in 1870 by Romanso E. Wood of Santa Cruz, California (patent number 109,789). Based on early wholesale hardware catalogs, the "California" half-ring and strike-arm-type gopher trap was being marketed about this same period. William L. B. Cushing and Americus D. Vest of San Jose, California patented the CV Gopher Trap in 1884. The Catch-Well and Excelsior traps were patented in 1886 and commercially produced. A couple of years later, Bertie Jolly of Soledad, California developed the clutch-type trap and was issued patent number 375,822 on January 3, 1888. Frank White and Frank Murphy of Pomona, California patented the Suicide and Dead-Lock traps in 1890. The Ward's trap was developed and patented by Oring Smith Ward of Los Gatos, California in 1892. In 1896 Andrew C. Carlsen of St. Paul, Minnesota patented his Carlsen's spear-type gopher trap, and Charles M. Williams of Los Angeles, California fashioned and patented the Star trap in 1899. It is interesting to note how many of these traps were invented by California residents.

Collectively, a dozen or so gopher traps are known to have been marketed prior to 1900. Based on the number of hardware distributor catalogs which included them as listings, the Wood's and the "California" gopher traps appear to have been the most popular of the very early traps. By 1883, the makers of the Wood's trap claimed to have sold over 30,000 traps; presumably most were purchased in California. The CV and Ward's traps were apparently also fairly popular, and all remained on the market into the early 1900s (Marsh 1997).

THE RISE AND FALL IN TRAP DEVELOPMENT

Nineteen hundred through the 1930s was the zenith of gopher trap development; more traps were patented and commercially produced than during any other comparable period of time. During the first decade of the century, traps like the Macabee, 44 California, Newhouse, Gates, Merritt, OK, Hamilton, Hooker, Daniels, E-Z, and the Cinch were representative of what appeared on the market. The next 10 years produced such traps as the Eldridge, Brown's, Teeter, Renken, Salof, Death-Klutch, Bittle, J.V.J., and the Ideal. The 1920s brought the Ullman, Lutz, Palmer, Phillips, and Wolf double spring choker-type box trap. Representatives of the 1930s include the Circlaw, Superior, Lewis Pincer, M.W.G. Pincer, Victor, Hain's Double Pincer, and Get-Mor (Marsh 1997). In Figure 3, a selection of widely different types of gopher traps is illustrated to demonstrate the developmental ingenuity of trap inventors.

A wide variety of gopher traps were patented at a relatively fast pace from 1900 up until the beginning of World War II. After the war, a few new gopher traps, like the Self-Set, were commercially produced; but, by the late 1940s, little was happening in the field of trap development. Since the late 1940s, only a dozen or so new gopher traps have appeared on the market. The EasySet, the Quick-Set, the DK-2, and the Guardian represent some of the most common of these. The Blackhole, marketed in the late 1980s, has been the most successful of the more recently developed gopher traps. The Quick-Set, patented in the 1988, has received some interest, especially in the midwest (Marsh 1997).

Breaking into the current market with a new trap is fraught with difficulties, even if the trap is highly efficacious. The major problems are getting the trap into the appropriate distribution channels and producing a trap that can favorably compete in price. There appears no reason to believe the outlook for gopher trap development will change; it is most likely to continue at about the rate which has occurred over the last four decades.

TRAPS WITH A LONG HISTORY

In 1900, Zephyr A. Macabee of Los Gatos, California developed the highly acclaimed Macabee gopher trap that has survived relatively unchanged and is still manufactured to this day by the heirs of the inventor.

A few years later, about 1904, the 44 California choker box trap had its beginning; however, no patent has been identified for this trap. The 44 California was produced up until 1980 when it was discontinued.

The Newhouse gopher trap was first produced in 1901 by the Oneida Community, and continued to be manufactured, but not by the same firm, until about 1986 when it too was discontinued.

The Cinch trap, patented on November 8, 1910 by Charles A. Wyman of Gaston, Oregon, is another trap with a long history. It remains on the market today, however, it is believed that its production was curtailed for a time, but for how long is unknown.

The Death-Klutch was patented in 1917 by Judson C. Pewther and continues to be manufactured and sold. The Death-Klutch has been a popular trap in the midwest while the Cinch trap is popular in the west, especially the northwest.

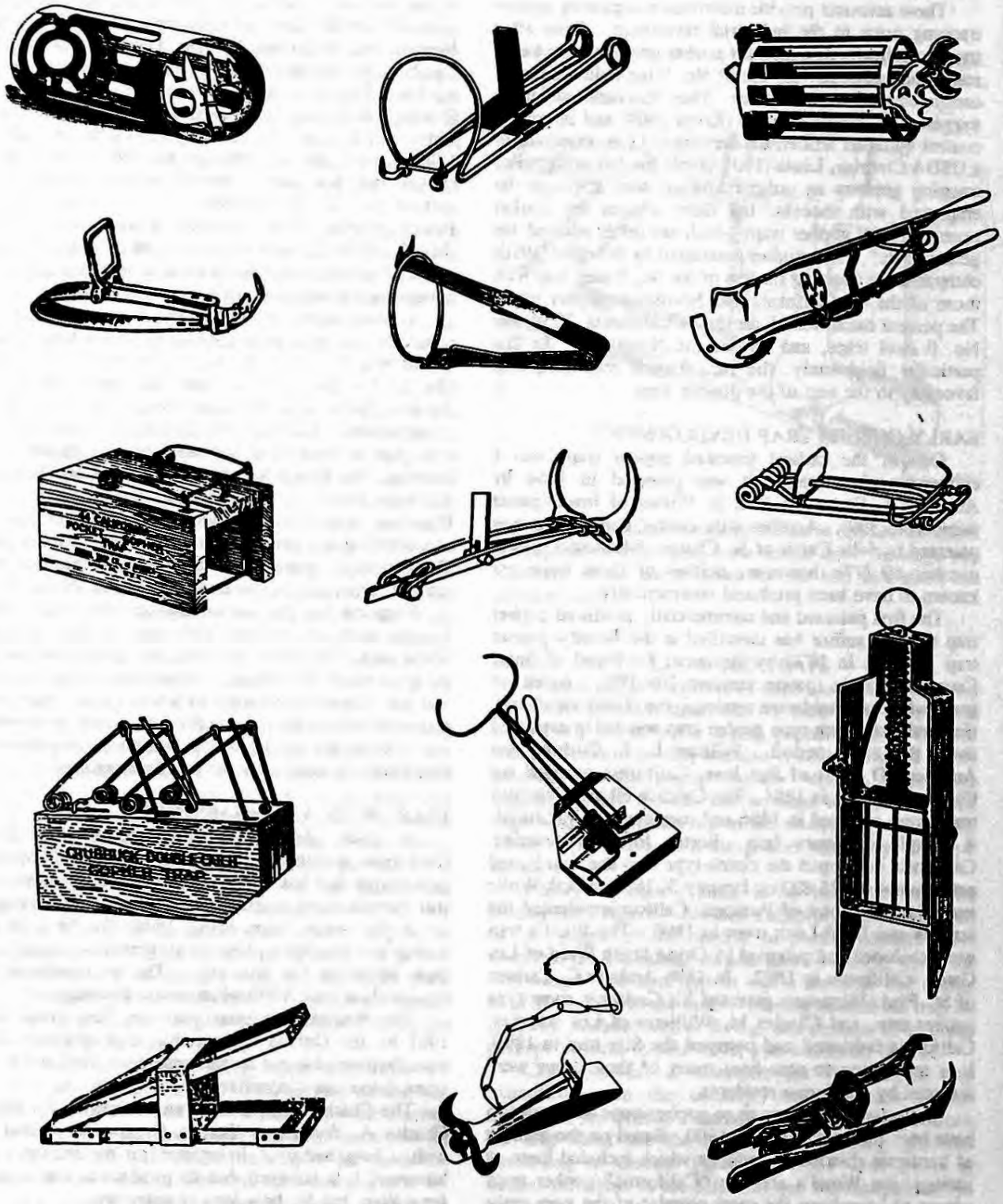

Figure 3. Illustrations of a variety of pocket gopher traps dating from about 1870. (Top row L to R) Wood's, Star, Ideal. (Second row L to R) Triumph, Newhouse, California*. (Third row L to R) 44 California, Ward's, Macabee. (Fourth row L to R) Double Catch, Zap*, "Dandy"*. (Bottom row L to R) Renken Sure Catch, Oneida Victor*, Self-Set*. Illustrations with an asterisk following the name of the trap were drawn by Ron Munro.

Thus, five pocket gopher traps have exceptionally long histories of production and use, ranging from about 80 to nearly 100 years. Of these, the Macabee, Cinch, and the Death-Klutch remain in production.

THE MACABEE GOPHER TRAP

In keeping with the title of this paper, it seems appropriate to highlight the gopher trap with the longest history of production. The tale of the Macabee gopher trap is, indeed, an example of a classic success story and one of which California is most proud. The small, family-owned manufacturing firm can claim nearly 100 years of production. Throughout this period, it has remained one of the best and most cost effective traps ever produced. Much of the following history of the Macabee trap has been drawn from a previous publication (Marsh 1997).

At the turn of the century, Zephyr A. Macabee of Los Gatos, California, a barber by trade, designed and patented the Macabee gopher trap. Patent number 659,932 was granted October 16, 1900. The commercial trap is almost identical to the patent drawings. Except for the use of a better grade of steel wire and some additional soldering, this trap has essentially remained the same over 98 years of production. Early in its history, the trap was made in two sizes; the regular size was 6 inches long and the large size was 6-5/8 inches long with a jaw spread of 2-3/4 inches when set. The current model is slightly shorter than the original regular size model.

A newspaper article about the Macabee trap and its makers, by staff writer, Joan Jackson, was printed on March 11, 1980 in the San Jose News. Information from that article revealed that the trap was still being produced in what was originally Zephyr Macabee's home, a Victorian house at 110 Loma Alta Avenue in Los Gatos. The home is now designated an historical landmark. When Z. A. Macabee first started the family business out of his home, the traps were made and assembled in the cellar. As the story goes, Z. A. Macabee traveled throughout the Santa Clara Valley in his horse-drawn wagon selling traps. This was at a time when the valley was becoming one of the leading fruit producing regions of the state. There were prune, apricot, cherry, pear, and walnut orchards covering much of the valley and pocket gophers were a major threat, especially to young orchards.

Z. A.'s children, Lucille Macabee Evans and Raymond Macabee, ran the family business after the death of their father. Raymond Macabee retired about 1979 and his children, Joyce Ridgely and Mary Barnes, took over the business with the assistance of Ron Fink, the production manager. At that time, the Z. A. Macabee Gopher Trap Company had a total of 10 workers.

The Macabee family moved to a new home in 1924, retaining the old residence on Loma Alta Avenue and continuing to utilize it as the firm's production plant. In 1980, piece work was conducted at home by some of the employees, but the actual assembly was still done in the cellar. The soldering was done in an old barn behind the house and the painting in another barn, which also served as storage. According to Ron Fink (pers. comm.), things have not changed much since 1980.

An advertisement for the Macabee trap found in the January 1904 issue of *California Cultivator* magazine mentions that, "If your dealer does not handle same, send 15¢ in stamps and mention your dealer's name and get sample at special rates." The Macabee gopher trap was a success almost from the beginning. It was highly touted by those experienced and knowledgeable in gopher control and was frequently mentioned in farmers' bulletins written specifically for the control of gophers or for the control of agricultural pest rodents in general, which always included gophers (Dixon and De Ong 1917; Dixon 1929; Storer 1938; Crouch 1942; Cummings 1962; Marsh 1992). Since its inception, the Macabee has been the leading gopher trap in the west and is especially popular with California growers. About 1960, it was said, based on distributor's reports, to have 75 to 80% of the gopher trap market. Macabee's main competitor at that time was the 44 California choker-type box gopher trap.

The Macabee and the 44 California dominated the California gopher trap market for well over 60 years. The 44 California gopher trap was discontinued by Woodstream Corporation in 1980, leaving the Macabee as the preeminent gopher trap on the market. While a few other gopher traps remain or have come on the scene, the Macabee continues to dominate and has no significant rival, at least among the growers in the west.

THE EVOLUTION OF GOPHER TRAPPING

The trapping of gophers on a substantial scale can be traced back to the 1860s when the "O" size Newhouse leg-hold traps were being sold for gopher control in the Missouri and Mississippi valleys. By 1880, motivated by the thought that there was sufficient need for a specialized trap designed for taking gophers, inventors developed and patented over 50 different traps prior to 1900. Of these, at least 10 were produced and marketed. The period from 1900 through the 1930s was the heyday of gopher trap development. This was thought to have been stimulated by the passage of bounty laws, as well as the great agricultural expansion into the west, where pocket gophers were a serious pest.

While formulations were available in the early 1900s for preparing poisonous baits for gophers, commercially prepared baits were not readily available. In the 1920s and 1930s, following the discontinuance of bounties, the federal government, state, or county agencies often came to the aid of the growers and prepared gopher baits at a central mixing facility. These baits were distributed locally at cost or as a free service. Because baiting was a more cost effective method of controlling gophers, this method gradually replaced much of the trapping, especially in production agriculture. This trend toward baiting gophers continued and became increasingly more important following World War II when labor costs were rising dramatically, making labor-intensive trapping too costly. While the emphasis on trapping has waned over the years in agricultural production, it has always held a prominent place in gopher control in home gardens and landscaped areas.

The status of gopher trapping in the 1990s can be summarized as follows: trapping remains extensively used by home gardeners to resolve their gopher problems.

Trapping continues to be used in agricultural situations where only a few gophers may exist over a relatively small area, and to clean out a few gophers that may have survived a poisoning program or have invaded from an adjoining property. In those instances where ineffective control is being achieved with currently available gopher baits, trapping and burrow fumigation are used as alternative control methods. Trapping has regained a somewhat greater importance with the high emphasis placed on integrated pest management (IPM). Where toxic pesticides are not considered an acceptable control option, such as with organic growers, then trapping becomes the logical alternative. Although trapping is not as widely used today as it once was, it continues to play an important role in gopher management. As the 21st century approaches, the author does not expect there will be a significant change in the status of gopher trapping.

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LITERATURE CITED

BAILEY, V. 1895. The pocket gophers of the United States. U.S. Department of Agriculture, Division of Ornithology and Mammalogy. Bulletin No. 5. 47 pp.

CROUCH, W. E. 1933. Pocket gopher control. U.S. Department of Agriculture, Bureau of Biological Survey. Farmers' Bulletin No. 1709. 20 pp.

CROUCH, W. E. 1942. Pocket gopher control. U.S. Department of the Interior, Fish and Wildlife Service, Conservation Bulletin 23. 20 pp.

CUMMINGS, M. W. 1962. Control of pocket gophers. Vert. Pest Control Conf. 1:113-125.

DIXON, J., and E. R. DE ONG. 1917. Control of the gopher in California. University of California, College of Agriculture, Agricultural Experiment Station. Bulletin No. 281. 16 pp.

DIXON, J. 1929. Control of pocket gophers and moles in California. University of California, College of Agriculture, Agricultural Extension Service Circular 29. 16 pp.

GERSTELL, R. 1985. The Steel Trap in North America. Stackpole Books, Harrisburg, PA. 352 pp.

JACKSON, J. 1980. The man who built a better gopher trap. San Jose News (March 11, 1980).

KREPS, E. 1909. Science of Trapping. A. R. Harding Publisher, St. Louis, MO. 245 pp.

LANTZ, D. E. 1908. Directions for destroying pocket gophers. U.S. Department of Agriculture, Bureau of Biological Survey. Circular No. 52. 4 pp.

MARSH, R. E. 1992. Reflections on current (1992) pocket gopher control in California. Proc. Vert. Pest Conference. 15:289-295.

MARSH, R. E. 1997. Pocket Gopher Traps—A Collector's Manual. Self published, Davis, California. 309 pp.

SCHEFFER, T. H. 1910. The pocket gopher. Pages 197-233 *in* Kansas State Agricultural College Experiment Station Bulletin 172.

STORER, T. I. 1938. Control of injurious rodents in California. University of California, College of Agriculture, Agricultural Extension Service Circular 79. 62 pp.

THRASHER, H. 1868. The Hunter and Trapper. Orange Judd and Company, New York. 91 pp.