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WHERE HAVE ALL THE COWBOYS GONE?

Charly McTee

Half of all Texans have never seen a screwworm; the other half will never forget having seen one.

It's hard to pick up a paper or magazine, or turn on the TV, without seeing something about the environment, the latest threat to it, or how much it's going to cost to "save" it. A curious thing is that these stories never, ever, mention the most effective—and cost-effective—ecological program ever undertaken within Texas. The program's a little over 30 years old now, and was started while most of today's environmental reporters were still taking their nourishment through a nipple. The program was, of course, the eradication of the screwworm. The success of the screwworm program has changed forever the Texas range, the way of life on it, and the wildlife which lives there.

For those who have not seen one, we'll risk biasing your judgment by saying that a screwworm infestation is the most horrible thing imaginable. The process is simple ehough: a fly lays its eggs on an open wound in an animal—a wire scratch, antler gouge, navel sore, or even a tick bite. The eggs hatch into larvae, which then sustain themselves by feeding on the flesh around the wound—in effect, consuming their host while it is still alive. Since the wound stays open, more flies can lay their eggs, and the process goes on. As the larvae mature, they pupate, fall to the ground, and hatch out into still more flies, and the process continues until eventually the animal dies and is consumed.

The adult screwworm fly lays her eggs on an open wound (USDA artwork)

Most commonly, the wounded animals chosen as egg-laying sites were pets, livestock or wildlife—especially deer. Any animal larger than a cottontail rabbit could support screwworms long enough for the larvae to mature. As additional evidence that flies don't discriminate, however, news reports a couple of years ago told of a soldier returning from Panama with screwworms in a head wound. Records from the Texas frontier tell of many human deaths from screwworms, when the fly would lay its eggs in the nostril of a sick person, or someone asleep in the shade. The resulting infestation was often rapidly and painfully fatal. The last recorded human death from screwworms in Texas was in 1972, of an invalid from south of San Antonio, infected under similar circumstances.

The possibility of screwworm infestations in livestock put special requirements on ranchers, who had to visually inspect every

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single head of stock on the ranch at least twice a week during fly season. Harvey Goff, the dean of guides at the YO Ranch, says, "When we had to check stock for screwworms all the time, there were a lot of real good horses in this country, and cowboys to ride them, too. We rode a lot, and many of us used trained dogs, especially in the sheep and goat country. I had a dog who could smell an infected goat from 100 yards away when the wind was right."

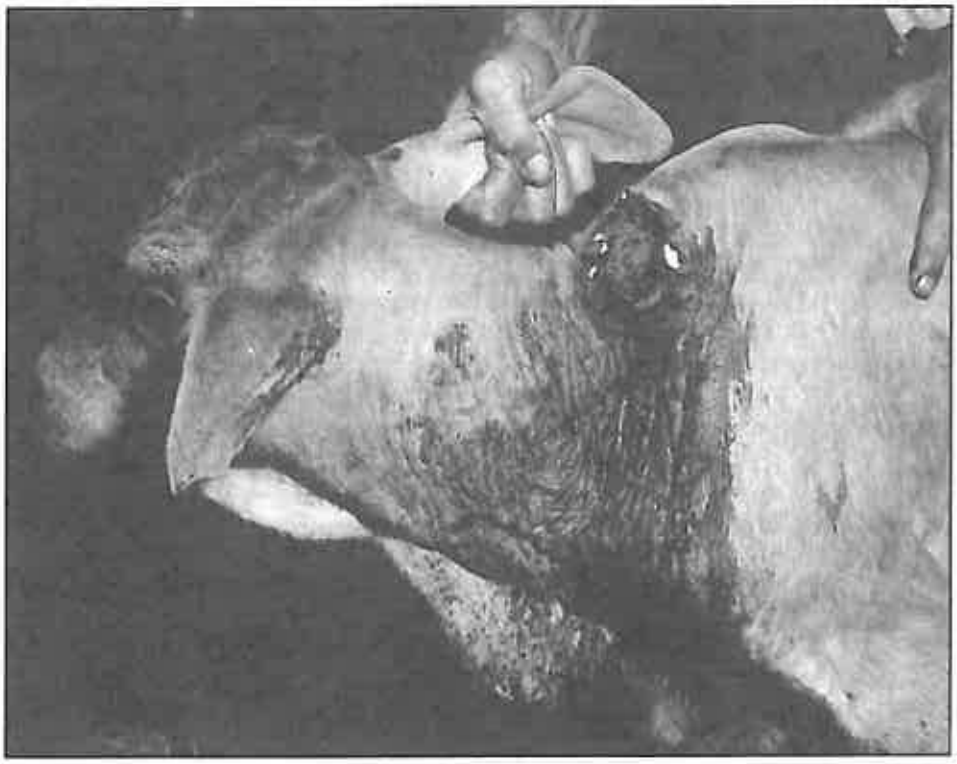
Uvalde rancher, banker, former Governor, and TWA Director Dolph Briscoe, Jr. was exposed to the problem early. As he says, "When I came back from the Army, and my dad turned our sheep and goat operation over to me, I was right in the middle of the screwworm problem. Sheep and goats were worse risks for flies than cattle anyhow, and we sure had a lot of them to rope and treat. We used to work a pasture every morning while it was cool, separate out the 'wormies', doctor them in the middle of the day, and repeat the process in another pasture that afternoon."

Briscoe went on, "In the hot months, the goats would eat a lot of prickly pear apples, and get sores on their chins from the thorns. The screwworm flies would then lay their eggs in the sores, and we had another goat to treat." He reflects, "You can't find wormy goats from a helicopter, either."

Rainy years were also great years for screwworm flies. According to Dr. O.H. Graham, during the summer of 1957 after the drouth of the 1950s broke, the Callaghan ranch near Encinal had 1900 head of worm-infested stock at one time in their "hospital trap." That year, the Callaghan was using one cowboy per pasture, riding 6 days a week, to check for screwworms in livestock.

Multiply these efforts by the hundreds of ranches in Texas, and the amount of daily work needed to keep the screwworms under control is much easier to understand. Farms likewise were not immune, because almost every farm had a few milk cows. An especially vivid experience of my own farm childhood was helping my dad treat a screwworm infestation on a milk cow. The wound, behind the cow's ear, was small, but the sheer number of worms writhing and twisting deep inside it was staggering. Again, it is a sight which can't be forgotten.

Screwworm infestations in wildlife helped to keep the fly population high and wildlife populations low. Deer were obviously impossible to check, catch, and treat as pets and livestock were, so that the wildlife population served as a constant source of flies for continuing the infection. Most screwworms which actually matured were believed to have done so in wildlife hosts, sustaining the outbreaks.



Screwworm infestation in a calf. Note the white egg masses at the edges of the wound. (USDA photo)

Does and fawns were especially susceptible, since fawns were dropped during fly season; but any fence cut or antler wound during fly time meant certain but slow death for the wounded animal. Deer populations were thus sharply limited by the screwworm fly. Estimates range between 25 and 100 percent loss of fawns to screwworms, depending on the area and how bad the flies were that year. Common points of screwworm fly attack were the fawn's navel, and under the tail of the doe.

Fly season annually began in the earliest part of spring as the weather warmed, and the flies began moving north from the Rio Grande, sometimes to surprising distances. An 1825 U.S. Army report from Fort Atkinson, Nebraska—near the present site of Omaha—describes a screwworm infestation of the Army's horse herd there. The rate of movement was surprisingly rapid; researcher Billy Hightower released marked sterile flies, and trapped one of them 11 days later 180 miles from the point of release.

The screwworm danger continued through the warm days of spring, summer, and fall, until winter frosts killed off the adult flies; but the next spring brought a reinfestation and the same long hours of checking and treatment once again. Pupae could live only 60 days; if it was then too cold to hatch, the pupa simply died. Dr. Graham estimates the northward line for overwintering survival of the screwworm fly pupae at about Highway 90, with about half the pupae surviving the winter below that line. Joe Finley, Jr., of the Callaghan ranch north of Laredo, told Dr. Graham that there were nearly always a few screwworms even in wintertime on the ranch. Further south, around Hebbronville in Jim Hogg County, cases of worms were more common year-round. Rains and wet years intensified the fly problem.

Since it was a major and formidable agricultural pest, naturally a great many research hours and dollars were spent on the investigation of the screwworm, in both the larvae and the adult fly stage. Much of the early work, in 1937-39, was done at the USDA laboratory in Menard, TX, where Dr. R.C. Bushland had developed a technique for artificially raising screwworm flies, for the initial purpose of testing medications. Dr. E.F. Knibling, also stationed at Menard, had noticed that there seemed to be relatively few screwworm flies in nature. Another curious observation was that the female screwworm fly, the egg-layer, seemed to breed only once. Winter, of course brought cold temperatures that killed off the wild flies.

The twin peculiarities of not being able to

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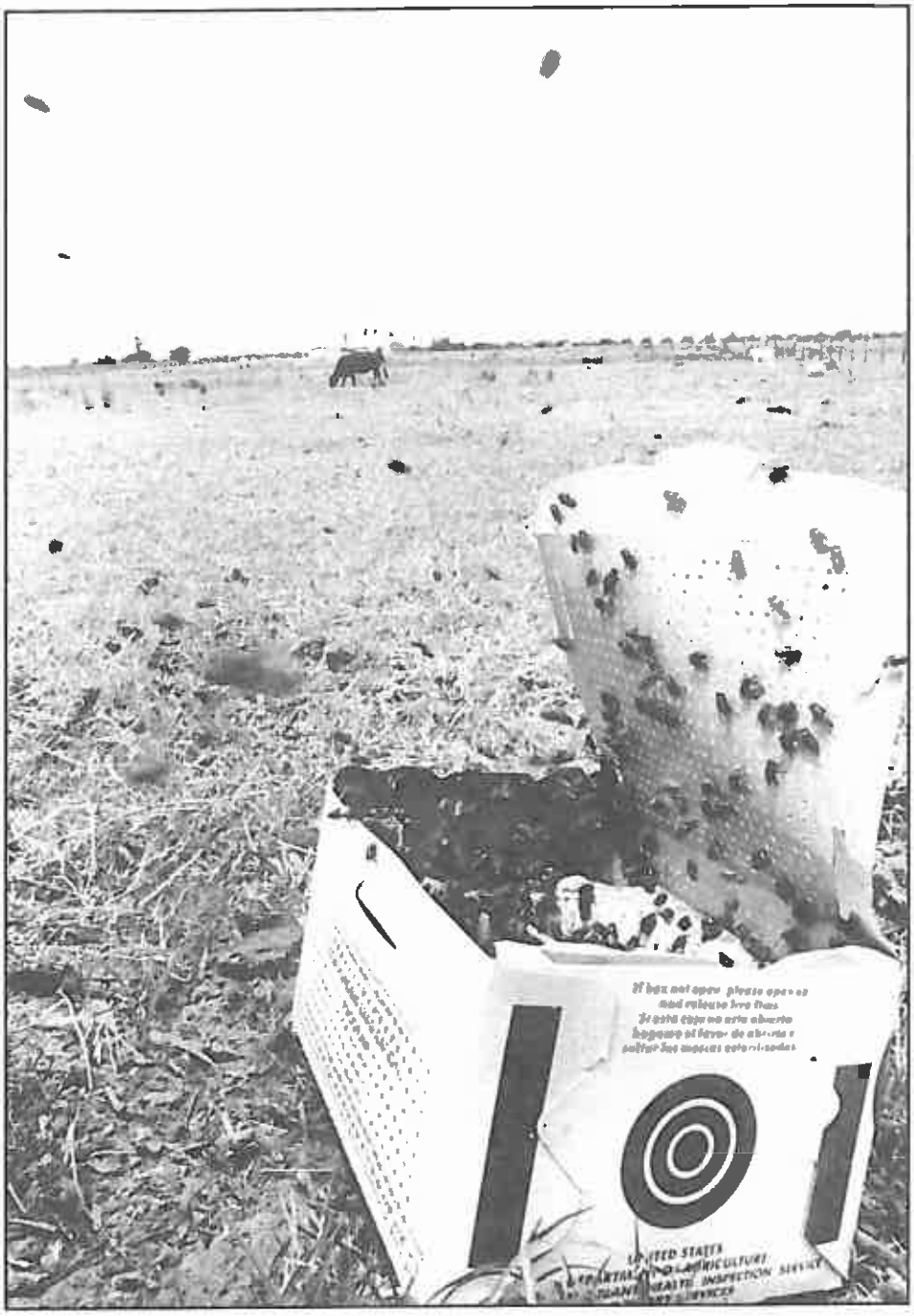
stand the cold, and of breeding only once, were the seeds of an idea. If the female bred with a sterile male, then the eggs would not hatch, and there would be no larval infestation. The effort would require millions of dollars and hundreds of thousands of hours to spread sterile male flies over millions of acres of farm and ranch land. Where and how would you get billions of sterile screwworm flies, not to mention the money? Even from a perspective of nearly 40 years later, the idea still seems crackpot, more like the ravings of a bunch of mad scientists. Some have described this insight of Dr. Knibling's as "the most innovative idea in entomology in the last 100 years."

World War II intervened, taking Bushland and Knibling from Menard to other jobs elsewhere; but it also introduced atomic radiation to the public at large. After the war, Dr. A.W. Lindquist happened across a scientific paper which described radiation producing sterility in flies. This news excited Drs. Knibling and Bushland, and reminded them of their pre-war ideas. Now relocated to a new laboratory at Kerrville, TX, Dr. Bushland began a series of experiments to validate the concept of using sterile flies to exterminate a wild population. With borrowed time on an X-ray machine at Brooke Army Hospital, Fort Sam Houston, he found that radiation dosages of 5,000 Roentgens or more would sterilize screwworm fly pupae, and that sterile flies could succesfully mate with wild flies.

Preliminary testing on Sanibel Island, off the coast of Florida, indicated that the sterile fly technique would work in the field. A later full-scale test, in cooperation with the Dutch government, on the island of Curacao, was successful in completely eradicating the screwworm fly in 14 months of full-strength fly drops (400 flies per square mile.) The Florida Cattlemen's Association then supported an eradication program on the Florida peninsula, where screwworms accidentally introduced from Texas in the 1930s were costing cattlemen over $20 million per year.

With a full-scale fly-release program, the screwworm threat in Florida and the Southeastern states was reduced to essentially zero in just two years. A quarantine line was established along the Mississippi to keep Southwestern cattle from bringing a fresh infestation to the Southeast.

Texas events of 1961-62 show plainly how serious a pest the screwworm fly really was to farmers and ranchers. Recognizing that any eradication effort would have to be pushed from the producer level, ranchers organized the Southwest Animal Health Research Foundation. Committees were organized in every county of the state to be the local voice of the screwworm program and, more importantly, to raise funds.



Sterile flies in boxes were air dropped to cover areas threatened by the fly.
(Dr. M.E. Meadows photo)

The first important money, over $3,000,000 in 1961 dollars, was gathered in voluntary contributions from Texas farmers and ranchers: 50 cents for a cow or horse, 10 cents per sheep, goat, or pig. The Sportsman's Clubs of Texas, under the leadership of Harry Jersig, was instrumental in raising money from sportsmen's groups to support the new and revolutionary program. The late Garner Fuller, at that time employed as a wildlife biologist by Jersig's Lone Star Brewing Company (and later TWA Secretary), was also a key participant in early fund-raising efforts. Over $1.5 million was raised in the first 60 days of solicitations.

Governor Briscoe says, "Dr. R.C. Bushland was the real key person in this effort. 'Bush' went all over the state to the meetings of county committees, really selling 'pie in the sky.' The experts at USDA said the screwworm program, although it had been successful in Florida, could never work in Texas because of the constant reinfestation

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A delegation of Texas cattlemen visit the screwworm plant in Sebring, Florida, March, 1959. From left: Dr. M.E. "Cotton" Meadows Director of the Screwworm Eradication Program; Norman Moser, President TSCRA; Dr. C.L. Campbell, State Veterinarian of Florida; Dolph Briscoe, Jr., TSCRA, and Leo J. Welder, TSCRA. (Dr. M.E. Meadows photo)

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by flies from Mexico. Bush was just so persuasive in the meetings that he really got the livestock producers to bet on the technique."

The fate of the program at this early stage was totally dependent on the ability of a scientist like Dr. Bushland to explain a complicated process in simple terms which laymen could readily understand, and he did a magnificent job of this. Not every rancher was convinced; Dr. Graham tells of one hard-bitten old rancher in the Hill Country who said, "Not no, but hell, no! I'm not putting any of my money into any such crackpot scheme; but I'll tell you what. If this crazy idea does work, I'll give you *double* next year." The following year, the Foundation received his check for exactly twice the amount originally requested.

Lt. Gov. Preston Smith, later to be Governor of Texas, appointed a committee of the 1963 Texas Senate to deal with the need for funds, while Byron Tunnell, Speaker of the House, named a similar committee of House members. The first Federal money for the screwworm program was arranged by Lyndon B.Johnson, at the time Vice President, who was successful in getting a $200,000 appropriation through the Senate as the first Washington contribution.

Johnson, after succeeding to the Presidency, insured the continuance of the screwworm program with instructions to the USDA to quit saying "It won't work in Texas," and to *make* it work. Federal support was said to be much more evident after this instruction.

With $650,000 of the first producer contributions, a plant was built in Mission, in far South Texas, for the sole purpose of raising and sterilizing screwworm flies. (Brown and Root constructed the plant in six months for just $1 over costs!) Locating the plant in the Rio Grande valley took advantage of the annual spread of the flies north from Mexico in the spring. By concentrating on preventing fly reproduction in a wide band along the Rio Grande, the flies could be kept from ever advancing to Central and North Texas.

To raise the tens of billions of flies necessary, workers seeded trays of ground meat with fly eggs. The earliest attempt at mass raising of screwworms, during the Florida effort, used ground horsemeat; when that became too expensive, a changeover was made to whale meat. The Mission plant began operations with whale meat, later changing to the meat of nutria—an aquatic rodent similar to the beaver. A still-later advance used a customized hydroponic mixture, whose major component was blood, to culture the flies. (The plant must have been an awful place to work for anyone with a sense of smell, although Dr. Meadows says, "You got used to it." Gov. Smith says, "Nothing ever stunk so bad as the Mission fly plant.")

The flies, 200 million of them a week, were then sterilized by radiation, placed into cardboard boxes which held as many as 2,000

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flies, and air-dropped to systematically cover Texas and Northern Mexico. Dr. Bushland says that screwworm drop aircraft were allowed much freer access to Mexican airspace than those of any previous operation.

Empty fly boxes were a common sight on Texas ranges. On one occasion, I saw an aircraft dropping flies over our Webb County deer lease. Every half mile or so, another box would be ejected from the rear of the plane, tumbling down to the brushland below with its cargo of sterile flies. Scientists had found that the sterile flies, although not so strong as those raised in the wild, were still capable of breeding with the wild females. Sterilized flies also lived a slightly shorter time—13-14 days, compared to 16 days for a wild fly.

Special drops were made in areas with heavy screwworm infestation, or where worms were found in new areas. Pure statistics then took over; with hundreds of thousands of sterile flies in the area, the mathematical probability was very high that the wild breeding female would become romantically involved with a sterile fly, thus laying infertile eggs which could not hatch into screwworm larvae.

For years the captive breeding, sterilization, and dropping of flies over Texas and northern Mexico continued, and the rate of screwworm infestations drastically declined. Special drops continued to effectively target outbreaks, and the problem declined until in 1976 the Mission plant was closed. A new facility, with a capacity of 500 million flies per week, has now been opened further south in Tuxtla Gutierrez, Chiapas, Mexico.

Operations continued there, and finally in February, 1991, it was announced that Mexico as well as the U.S. was screwworm-free. The announcement may have been slightly premature; approximately 50 cases of screwworms have been reported from Mexico in 1992. These are being treated just as earlier instances in Texas were: with immediate high-density drops of sterile flies. Dr. O.B. Oliver, currently at the USDA Mission facility, says that the majority of the fly samples currently received for identification at the Mission office are of fly species other than the screwworm.

The focus of present activities is shifting even further south in Central America, with a new fly plant scheduled to open in Panama in 1996, once the fly has been eradicated north of there.

Annual savings to U.S. livestock producers are estimated at $400 million, with expected total benefits to the U.S. and Mexico over $3 billion. No mere total on a cash register tape can ever accurately reflect the savings in suffering by the animals who were involuntary screwworm hosts, nor the hard, long work to treat and reduce that suffering.

The disappearance of the screwworm fly took away the necessity for twice-a-week looks at all livestock, as well as the need for many of the horses, dogs, and cowboys who had to do the looking. A breeder of quarter-horses told Dr. Bushland, "The success of your screwworm program has ruined my business. People just don't need as many head of horses anymore."

As a result of the lessened need for ranch hands to work livestock, the rural face of

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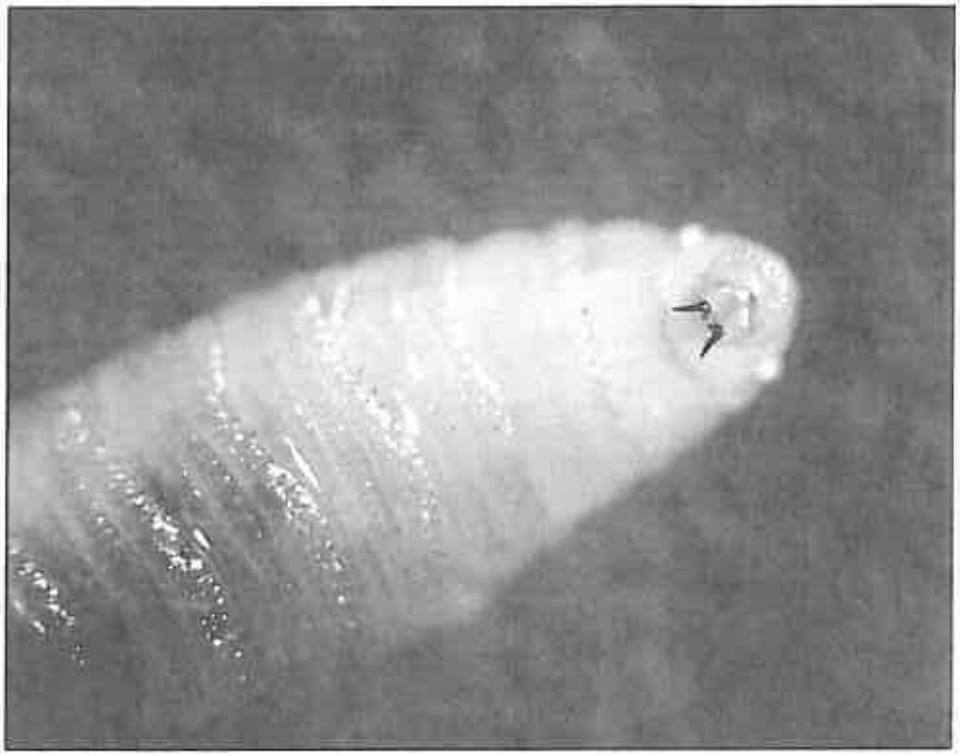
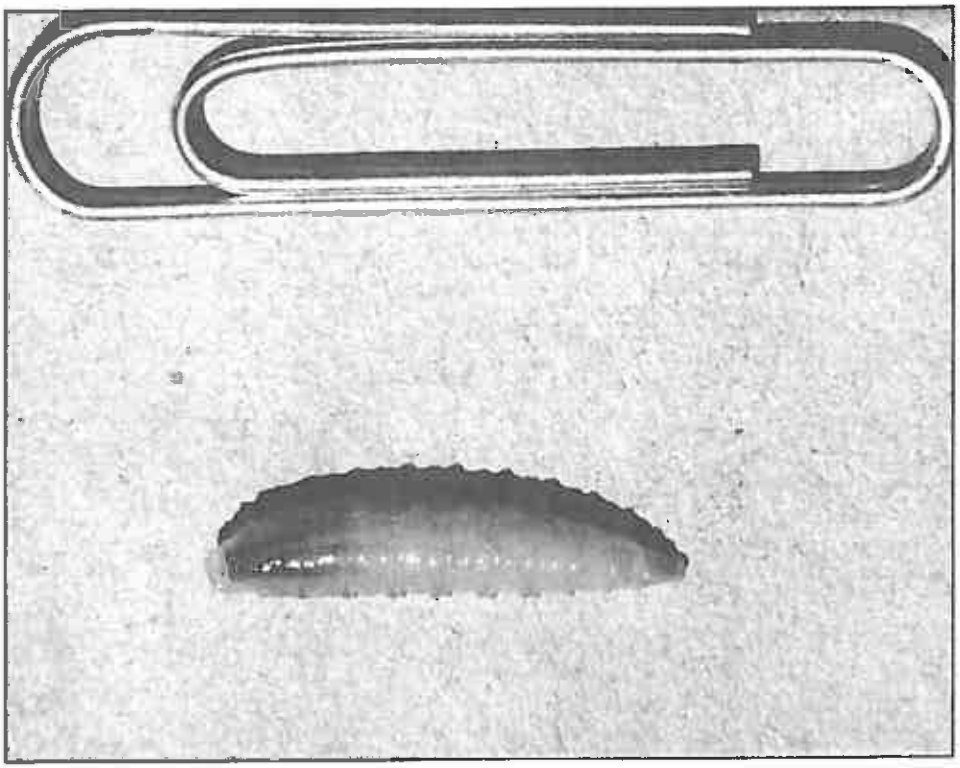


The screwworm larva, larger than life size (USDA photo)

A worker holds one of the trays in which the larvae were produced. (USDA photo)



Screwworm larva, next to a paper clip to show size. The larva's mouth is at the pointed end. (USDA photo)

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Texas began to change permanently, as fewer people made their livings in the rangelands. Deer populations exploded; TWA's David Langford says, "There was a dramatic change on the Esperanza Ranch in La Salle county. In 1958, we used to hunt all day and rarely see a deer. Just south of the house, there was a 2,000 acre barley field, and you'd never see more than a few deer on it. Then in 1965 when I came back to the Esperanza, there were deer everywhere, and you could see hundreds of deer in that same barley field."

These high deer populations were one result of reduced losses to screwworms, and introduced the problem of wildlife management to Texas landowners. Prior to the elimination of screwworm predation, there was no need to worry about keeping the wildlife population down to carrying capacity. Screwworms often eliminated nearly all fawns, and many of the does which gave birth to them. San Antonian Bill Scheidt, who hunted near Carrizo Springs in the 1920s, says, "We would hunt for a week, and maybe see only one or two deer. They would probably be pretty good ones, but there just weren't many deer."

Environmental groups and television programs tend to get all teary-eyed about wolves, lions, and other predators, but the most important predator in the long history of Texas wildlife was the ugly, hungry offspring of the screwworm fly. The elimination of the fly went unnoticed by most Texas residents, but was noted by relief by thousands of the rest. As David Langford says, "Just think about how it would be if the screwworms came back—what a change it would make in our lives." The change of lifestyle might be more substantial than we think; Dr. Bushland says that all of the medicines and smears formerly used to treat screwworms would be illegal under present-day EPA regulations.

The present situation, without the constant threat of screwworm infection to keep landowners alert and on guard, is labeled as "a potential time bomb" by some of the former researchers, now retired. With the prevalence of non-resident landowners, and today's weekend farmers/ranchers, a screwworm-infested animal could easily go undetected for weeks or until after death—time enough to hatch thousands of deadly flies. With the Mission plant now closed, Federal and state funding for screwworm detection/treatment at zero levels, and even formerly-used medicines now unavailable, a return of screwworms could be a full-fledged disaster. Dr. Graham says flatly, "South of Highway 90, ranching as we now know it would be impossible if screwworms came back." Livestock and wildlife professionals must be constantly alert to any sign of fly danger, and notify their county agents and livestock producer groups immediately.

Unfortunately, the demise of the screwworm now seems to be only a minor bit of history, forgotten and neglected by the people who produce television shows, and write for newspapers and magazines. The screwworm program, however, continues to serve as a model for effective international cooperation between producers and governments, and remains as *the* single most effective ecological program ever undertaken in Texas. Without the energy and contributions of Texas livestock producers and sportsmen, however, there would never have been a screwworm program, and Texas today would

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Thanks are owed to many who provided information for this article, to fill the many gaps in the author's knowledge and experience. In no particular order, we wish to thank Dr. Obie Oliver, Dr. R.C. Bushland, Gov. Dolph Briscoe, Jr., Dr. M. E. Meadows, Dr. O.H. Graham, Gov. Preston Smith, Mr. David Langford, and Mr. Andy Vestal. Also infinitely helpful, and an invaluable source for anyone wishing more information on the screwworm program, is *The Peaceful Atom and the Deadly Fly*, a book by Charles G. Scruggs, published by the Pemberton Press, Austin, 1975. Mr. Scruggs, a former editor of the *Texas Farmer Stockman*, was Acting Chairman of the Southwest Animal Health Research Foundation at its inception, and his book is an authoritative presentation of the history of the program.

Dr. Meadows helped immeasurably with photos, pamphlets, and clippings from his collection, as well as his remembrances of the screwworm campaigns in Florida, Texas, and Mexico.

A valuable later publication, detailing more specifically the scientific aspects of the program, is *Proceedings of a Symposium on Eradication of the Screwworm from the United States and Mexico*, O.H. Graham, Editor, published by the Entomological Society of America as Publication MPEAAL 62:1-68(1985).

The illustrations in this article were provided by the USDA, courtesy of Dr. Obie Oliver, and by Dr. M.E. Meadows.

CARTA VALLEY GIANT

Rocky E. Cooper

The sun had disappeared behind the West Texas hills and the last minutes of shooting light were disappearing when they first stepped from a cedar wall 600 yards away. The binoculars came to my face as I focused on the dots across the rock-strewn flat. The sight before me jolted me upright.

Six giant axis bucks, accompanied by some of their girlfriends, stood testing the air. As good as they all were, two were spectacular.

One white-horned giant, probably just out of velvet, boasted long tines. But I wanted to kill the other one then and there. (Over the years, my wife Dian and I have mounted a few hundred axis deer in our shop in Houston, so I know a monster when I see one.) This buck featured the most incredible mass I have ever seen, along with great tine and beam length. I knew I might never see a better axis.

Sensing no danger, they fanned out and approached the lake, and my blind. I prayed for them to hurry, as darkness crept closer and I knew my ride would arrive soon.

As I watched through the glass, I kept seeing what appeared to be two extra points behind the brow tines of the great buck. As he slowly came closer, it became too dark to see without the binoculars. I heard the truck, and looked back for my deer, but the flat was empty.

So went opening day of the 1992 spring turkey season. My father and I, along with some of my clients, hunted on Lawrence and Nell Marshall's Carta Valley Wildlife Ranch between Rocksprings and Del Rio. The Marshalls manage 12,000 acres under high fence for trophy whitetail, world-class exotics and some of the best turkey hunting one can find.

Driving through the front gate and seeing the rock-and-log lodge atop the highest hill, surrounded by deep, cedar-choked canyons and draws, reminded me this is a special place. I had worked with the Marshalls 10 years, and familiarized myself with the place's history.

Most of the trophy animals here were born on this ranch. But I thought some, including maybe my dream axis, existed without ever being seen by humans. For example, in 1989, a hunter killed a tremendous 23-point non-typical whitetail, scoring 183+. No one had seen this deer before. We tried to age him, but the only things left in his mouth were pieces of teeth.

Rocky Cooper and the Carta Valley Giant

Back at the lodge that night, I told the ranch's head guide, Ernie Berton, about the big axis. He had seen the big, white-horned buck, but not the one I was after.

We decided to concentrate on the general area in hopes he might return. We saw many other big axis during the next four days, with the hunters taking some fine trophies, up to 34 1/2 inches.

I had to leave Wednesday for Houston, but planned to return the following Sunday to meet the next group of hunters.

Sunday came, and I returned with Dian's words running through my mind, "If you see him again, don't miss!"

I tried not to think about him. I told myself it would be difficult to overcome such a missed opportunity. Too many times, newcomers pass up a great trophy the first morning never to see him or his equal again.

Sunday evening produced some promising young bucks and one, very good one right at dark, but not the GIANT. More of the same Monday morning. Monday evening Ernie and I stayed at the lodge with the truck, planning to check the blinds if we heard shots from any of the hunters.

We sat in the yellow truck next to the lodge, talking, 30 minutes before dark. "Look at that," said Ernie suddenly.

Walking along the hill opposite the lodge, on the other side of the ranch from where I first saw him, was guess who, and his five buddies. As the roar of my .340 echoed across the canyon, all six bucks ran into a large clump of cedar.

Falling rocks and busting limbs told us they were emerging on the other side. Five minutes later came a thrill I won't soon forget. Few animals can match the axis for sheer beauty.

Looking at him, I knew he would score high, but the measurements taken that night stunned me. With eight-inch bases that carried their mass all the way through 33-inch main beams, fourteen-inch brow tines, nine-inch caudal tines, as well as two extra points, he scored 163 1/8, ranking him number 5 in *Records of Exotics.*

My axis scored 371.9 on the Burkett Scoring System when Ronnie Kimbell measured

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entire pasture over a five- or six-year period. He can do a portion each year, and by the sixth year, the time will have come to return to the original section.

Throughout, this rancher should always leave fairly wide strips of brush standing adjacent to the "chopped country," providing cover for deer and other species. Such a program keeps brush in various heights. From a production standpoint, it does no good to have blackbrush, guajillo, granjeno and other brush species more than six feet tall. Unless you are running giraffes, animals cannot reach the most nutritious growth.

Rearing screwworms by the billions took lots of space and labor. (USDA photo)

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be a different place.

Someday, we may be able to say the screwworm is gone from Mexico; and, in some future year, from all of Central America. When the screwworm is finally gone, it is not likely to be forgotten; but neither will it be missed.