

QUWF Study Report 005 – Deer Exclusion Fencing Study: November 2016



The project was conceived to determine if there were viable methods, at reasonable economic costs, for the average hunters and landowners, to effectively exclude whitetail deer temporarily from food plots, crops, shrub plantings or orchards of small to medium size, 2 acres to 40 acres. The solution should be portable, self-powering for remote locations, and able to be easily moved. Ideally it should be reusable for many years. The theory being, a visible double fence method caused the deer not to want to jump across two objects at the same time due to depth perception confusion or concern. The electric portion would deter any physical contact but not be at all harmful, more attention getting than anything else.

Special Thanks to our sponsors, Bass Pro Shops, Cuddeback Game Cameras, Gallagher Fencing and the Missouri Department of Conservation, without whose initiative this would not have happened.

This was a planned three-year research project started in 2015 to determine if commercially available portable fencing would work to exclude whitetail deer from an active sunflower field, or food plot, protecting it until full growth had been achieved and then easily removing the fencing. However, the results were so conclusive after two-years, it was felt another year would not provide any further useful data. The process was designed to simulate the ability and resources of the average hunter/landowner or those that lease and use methods and products available and applicable to him/her locally.

This paper is written “to landowners and users” versus a scientific report so the style and format are directed to actual land users.

The Location:

To replicate an average food plot of a hunter or time strapped landowner, we picked spots that were common in criteria location, orientation and soil structure suggested to most landowner’s in Missouri. These fields are located on a recovered area from an abandoned farm circa 1920 to 1930.

Two fields were prepared the same way at the home office of QUWF. One would be a control, the other the excluded field.

Each lie in a north east /south west orientation and close to known whitetail bedding areas. Each field was approximately 1.5 to 2 acres in size and measured with a walking wheel. Each field was first sprayed with Roundup at 4 ounces per gallon set at a rate of 9.5 gallons per acre to kill all vegetation and weeds. It was applied with a Wylie Cat 1, 3 point AG sprayer set at 30 PSI at a speed of about 7 MPH with the nozzle feeds set at 50% to meet the right rates.

Field Preparation: Planting Time First Week in June.

Prior to this research, the control field had been plowed and harrowed and many rocks removed. The excluded field was being used for the first time but showed a dramatic difference in the rock content, much less than the adjoining field.

After waiting about 10 days after spraying for a good weed kill, the fields were tilled with a Land Pride reverse tine tiller to a depth of 5 inches. The previous year both fields had been plowed with a double bottom plow to a depth of 8 inches, harrowed and planted with winter wheat which was tilled back in the soil the previous spring. A significant amount of rocks were also removed to allow efficient tilling to be employed.

The fields were located in a designated no hunting/breeding and brooding 40 acre section of the company and both could be observed from the office. The excluded field was equipped with Cuddeback black flash cameras at each corner mounted on 3 foot T posts set 2 feet from the fence.

Lime and Fertilizer:

After tilling, as a recommended rule, 600 pounds of pelletized ag lime and 300 pounds of triple 13 were applied per acre with a broadcast Land Pride spreader, then a light discing completed to work it in the soil. Soil PH was about 6.5. The pelletized lime acts faster than regular ag lime for food plot use, and the triple 13 is readily available at most all garden center stores. Pelletized Ag lime also has a high purity rate so you are getting a good supply of lime. Bulk Ag lime may fall to levels of 65% purity, which means you are putting a lot of expensive dust on your land. Always check the purity rate if you are putting down bulk Ag lime and make sure the amount compensates for any low rates and then adjust your bulk rates accordingly to meet guideline specifications.



Seed and Planting:

25 pounds of black oil Maximillian sunflowers from Sharp Seed company, QUWF's seed supplier, were sewn on each field using an ATV Plotmaster unit which installed four rows at a time. The Plotmaster opened the furrow, dropped the seed and covered the seed rows nicely with a light rolling and dragging. The tested germ rate was 95%. The ATV was an ARTIC CAT 550cc model. The recommended setting on the Plotmaster was used at a setting of 5. As a result of the fluffy condition of the soil after tilling and still after using the Plotmaster, to get a good soil to seed contact condition, we rolled each field again with a Land Pride 3 PT Cat 1 Culti-packer. It was noted it was much easier to pull the Plotmaster with the tractor, a 50 HP model, than the ATV which worked much harder to keep a steady speed and constant vertical adjustment was needed to prevent sticking the Plotmaster and the ATV.



Choosing the Exclusion Fencing:

We chose the Gallagher portable fencing for several reasons. Their offices were located in Missouri, their products were available in most farm and home stores in the area and they have extensive experience developing portable fencing systems using cloth tapes and spun rope in agricultural applications for rotational grazing. Above all their representative was willing to roll up his sleeves and help us set up the field and give us a lesson in its use.

NOTE: Where the fence is to be installed along field edges, all brush must be sprayed, cut or removed as it will short out the system if it touches the wire or tape.

The Energizer:

The most important part of the system is what they refer to as the “Energizer” the portable power source providing the electric 8.0 MV kick to the fencing. Because we were dealing with remote locations, ours had to be portable, self-charging and of the right size for the acreage. Since we started this research, Gallagher has introduced several rechargeable versions based on acreage covered. Many now have self-contained batteries from 5 acres to 100 acres, at cost of less than \$150.00 and up. We chose the B100 model which includes a 10 watt solar recharging panel for the deep cycle marine battery (user supplied) placed inside the unit. This battery also is used for an ATLAS trap for shooting practice on the range in the off season.

Other than turning it on and off, there is not much to do on the unit once it is operational. It has a pulsing light to let you know it is running correctly. The solar panel needs to face in a southerly direction to maximize sun exposure.

Critical to the system is installing the three grounding rods about 5 feet apart, near the Energizer, following the fence line but located in between them. The rods, connectors and wire are available from Gallagher. This makes a grounding wire that connects each rod together and then runs to the Energizer ground terminal.

At the other end of the field another three grounding rods were installed, connected together, and they were attached to a lightning arresting switch hanging from the fiberglass post so if the fence was stuck by lightning, the electricity would go to ground.



A common T post driver was used on the grounding rods to pound them into the ground leaving about 8 inches above ground.

**We marked their locations after the season by leaving the fiberglass posts in place over the ground rods and wire. You would need a T post remover with a chain set up to pull them out. We intend to use them again for other plant tests.



Placing the Fiberglass Fence Posts:

This is where we learned a bit from our own experience. The representative was used to installing these fencing systems for cattle, and spaced posts about 25 to 30 feet apart. We soon learned this was much too great a span for wildlife usage and had to adjust accordingly.

For the inner fence located on the outer edge of the tilled and planted field, we highly suggest a 5 and possibly even a few 6 foot fiberglass fence posts. Some need to be higher to compensate for the change in elevation of the fence. Even a slightly rolling field can cause the fence to get low to the ground in some spots enabling contact with brush that will surely grow once the fence is in place.

We installed the 6 foot posts on all corners first using a common T post driver, only putting them in about a foot. We then went back and “filled in” with 5 or 6 foot posts spaced about 10 to 15 feet apart.

NOTE: Step on posts are not high enough to keep the Turbo Tape elevated on the inner fence.

We used the 6 foot lengths as well on two rolling contours where the fence could potentially be an issue, keeping it high in the center of the low area.

The inner fence will use the Gallagher rope fence, held to the posts with a wire clip, much like a giant cotter pin. The posts are pre-drilled to accommodate a multitude of fence heights. For the outer fence we used 5 foot posts and were able to use step on posts because the height of the wire was steady at 24 inches. We tied off the end near the Energizer then began stringing it around the entire field. Another ease of use, if you run out of rope fence simply tying another spool onto the end is done with a regular knot because the rope is woven with wire strands that carry the voltage and easily make contact with knotted splices.



The Turbo wire as they call it, came in a 2600 ft. spool so we were able to go twice around the field with one spool. We attached the lower wire at about 18 to 20 inches off of the ground, secured it around the field on the posts with the clips (we learned only to

bend one side of the clip), then ran the turbo wire up the post at the energizer and started the second strand at 36 inches off of the ground around the entire field again.

The neat part of this type of fencing, once we came back around, tying the ends together with a simple square knot will complete a circuit.

Next, we set the outside corner fence posts about 3 feet from the inner fence. These should be the solid fiberglass posts. This fence will have only one wire tape strung on it at about 24 inches above the ground. We can fill in with posts at the same 10 to 15 foot spacing but now you can use the step on 4 foot posts which are much cheaper. We still put the solid fiberglass about every 4th post to give a stronger fence line. We tied off the end of the wire tape and ran it around the field, attaching it with the clips.

Though the factory states grass touching the rope will not affect the flow of electricity, we found in areas where the fertilizer and lime hit the outer edges and growth was strong, it did in fact short the system. We sprayed the fence line with Roundup as a further precaution.

All brush and sprouts must be cut, sprayed or removed along the fence lines.





Once the entire field was fenced, we ran a simple piece of tape between the inner and outer rope and tape as shown in the picture, supplying power to both fences. Then we attached the power line from the Energizer to the outside tape using the red clamp on the power line from the Energizer.

Note the ground wire attached to the Energizer as well.

Now with the power turned on, we checked the voltage of all fences. It was powered up all around the field, all three lines were hot. We shut off the system to then install the lightning arrester at the south end of the field.

We went to the end of the field and installed the lightning arrester switch connecting the ground wire to the ground terminal and using another piece of tape, we tied it to the inner fence top line and connected the other end to the lightning arrester positive terminal. The fence was turned back on and the switch adjusted so it just broke current and then left it open in that condition. A surge in electrical current would close the switch, forcing the current to the grounding rods.

The fence was rechecked again at several places to ensure solid voltage was in all fence lines and locations. It was and the fence was ready for operation.

The entire fencing process took much less time to complete than the writing of this report to this point. In about 3 hours with two people the fence was up and operational around the newly planted sunflower field.



Field Growth and Observations Begin.

Year 1, heavy rains moved in after we planted and both fields suffered some loss from significant standing water for many days. None the less sunflower began to emerge on about 80% of each field within 7 days after the rains stopped, about 14 days from actual planting. The picture below shows the standing water which lasted for nearly two weeks.



On the unfenced field, deer, 8 to 10 daily, were observed moving in immediately at about two to three inches of growth and proceeded to eat the field to a dust stage. After several weeks, all emerging sunflower plants had been eaten to ground level. At the end of four weeks, nothing but weeds were growing in the field and deer damage to the planting had now fully occurred.

On the excluded, fenced field, the testing and curiosity began, referencing the photos included at the end of this report. The majority was a slow approach to the fencing, day or night and using a nose touch or a neck touch to the outer tape fence, either resulting in an immediate and force full retreat or a complete tumbling reversal of direction that only a whitetail can perform. The dominant doe was the first to touch and go, subordinates then tried and got the tickle. Fawns seem to learn

from the mother's reaction and did not test the fencing, at least under direct or camera observations. No fawns or adult deer were ever noticed within the excluded field. We also checked for tracks along the perimeter and into about 8 feet inside the fenced area.

We did note the adult dominant doe walked the entire perimeter many times after testing its worth. She was looking for the proverbial "hole in the fence" is the theory here.

Turkey hens seemed un-phased by the fence and would scoot under the inner fence easily. Gobblers, however, did not go under the fence. We never observed them coming in contact with the fencing or see a photo of it but if strutting, they would have made contact. Just another curious fact of observation.

The field grew at a great rate and the sunflowers in total, remained untouched by any of the whitetail who were present daily around the field. Some days as many as 14 deer were counted from the office.

A curious note, the photographs of youngsters, poults, fawn's and even two coyote pups occurred only at one camera location, one that was only feet from the edge of the field in the southwest corner. This indicates if you had not placed enough cameras, or cameras at every corner covering all fences, you would not have witnessed this at all. We did not see this from the office observations.

There was a group of 5 antlered bucks, appearing to be ages 2 to 3 years who appeared and frequented the field many times but they never approached the fencing in any form, either day or night in observations or taken by any camera pictures.



The evidence is solid for this first year of observation and cameras, the fencing played the critical role in keeping the deer out of the sunflower field. We did have to spray the fencing area as noted to keep the grasses and some brush from growing. We also added many posts to the fence as the winds whipped through, sagging occurred.

The solar panel worked as advertised and kept the marine battery at full charge through the late summer growing months. We tested the fence weekly with a hand held meter to ensure it was at full power, which is an accessory we highly suggest if you are considering this type of system.

Another pleasing observation was the significant number of honey bees on the sunflowers as they began to head out. Without them little pollination would occur.





Note the weeds in the background, that is what was left of the control sunflower field that was unfenced.

We thought we would be late on the peak of the sunflowers for the opening of Dove season September 1st. Turns out, the sunflowers headed out early and were on the down side when the opener occurred. Fencing was removed before opening day and the sunflowers were cut down with a bush hog for a maintenance and management mowing. The deer took less than 24 hours to accept the no fence area and hit the remaining heads and seed for days. Dove attraction was excellent for the opener but did not last long with all the heavy deer browsing and dove feeding heavily along with the entire flock of turkey, comprising of about 30 birds. This

provided a good food source for the wildlife and upon controlling whom eats what and when while utilizing the fencing control system that was installed.

Removing the Fence:

With the help of another conservationist, removal of the fence was relatively easy and quick. After shutting off the energizer, disconnecting the contacts and ground wire, the entire energizer box with solar panel was placed in the UTV. We then removed the lightning switch and put it in the UTV as well.

Rolling up the wire, we used a Gallagher wire reel. A bit heavy and expensive, it rolled up the wire and rope just fine. We found we needed another reel but this time we chose an extension cord reel from the hardware store which too was fast and efficient at must less cost.

Storage of all the posts and wire took very little space.

We also learned the clips used to hold the wire or rope to the fiberglass posts only needed one section to be bent and not both. Removal was fast but would be much easier with just one bend. The step-on posts simply pulled out of the ground as did the fiberglass posts with merely a simple wiggle. All were placed in the barn for next season and the battery was placed on a battery tender maintenance charger.

As stated above, within hours of fence removal, deer had moved on the field along with a flock of turkeys and dove's. It did not take the wildlife long to clean up the remainder of the field from what was left after the maintenance and management mowing was completed.

Note: Do not overfill the reels with the wire rope or tape when rolling it up for storage. Better to use another reel than overfill because, as we found out, if it gets off the reel as you are unwinding, it can become a bird's nest to try and untangle.

Year Two 2016 of the Study:

The exact same process was employed in 2016, on the same fields. Each was prepared the same, planted the same and the exclusion fence installed the same with more fiberglass posts and less spacing between them. Maximillian Sunflowers were planted again in mid-May from the same source, Sharp Seed.

The energizer and lightning switch were placed in the same locations and connected to the established grounding rods.

Note: The marine battery had been placed on a Battery Tender over the winter months. We highly suggest any battery in an ATV, generator or piece of equipment have its own Battery Tender to maintain a fully charged and ready condition.

We did have to spray the fence line after about 4 weeks as the thick grass and weeds again grew very quickly and had to be controlled to not short out the fence.

The weather in 2016 was not as extreme as 2015 however we did have above average rainfall but it came in waves not downpours and of shorter duration. The month before removal, August, had rain

showers about every 3rd day, totally unusual for our region of the country which normally is hot and dry. This we think was a big contributing factor for earlier than expected head out and an explosion of ragweed that was occurring all around the state that fall.

Observations Begin:

Once again within 7 to 10 days the plants began to emerge. At a growth height of 2 to 3 inches, the control field was eaten off within several days. The weeds began to overtake the field as well and no sunflowers emerged at all that were not consumed quickly by the fifth week after planting.

The excluded field performed very well, the sunflowers grew at a good rate and were not approached by the deer population at all. Once again, we checked for tracks inside the excluded field itself to confirm no penetration had occurred. The turkey exhibited the same movements. The hens and younger jakes would go under the fence and into the field but the adult gobblers would not.

Note: it appeared the deer had trained themselves or somehow remembered not to approach the double fencing. We had no approach or contact pictures at all, only pictures yards from the fence line itself and witnessed no observation of contact or penetration into the interior of the field.



The above photo of the 2016 field showed great growth and a good head out of the entire field.



Pleasing to see was the daily population of honey bees on the flowering heads throughout the entire field.

We did have abnormal rain patterns in August which might be a reason for the early head decline about 2 weeks before the dove season. Once the heads declined and the plants began die back the weeds and grasses began a quick overtake of the entire field. It is forever a gamble as to timing of planting and the weather but in 2017 we intend to wait until the last week in May or the first week in June to plant.

We removed the fencing in late August using the same process. However, the extensive weed population and now grasses had taken over the field and the dying back sunflowers made for a real challenge in mowing the field. It left a large amount of duff on the field, too much to plan a re-till and plant for fall. The field will have to be burned to remove the significant amount of chopped up grasses, weeds and sunflower.

Once again, within hours of fence removal the deer approached the field and after an initial patrol by the dominant doe, they were on the field in force. Doves had no more interest in the field from that day forward as there was too much ground litter for them to feed in effectively at that point.

Conclusions drawn from the two-year study project:

There are many options for landowners, hunters, even those who lease land to reach their stated goals, and established written goals are the first step in any management plan. One such option is exclusion fencing, in our case, the Gallagher brand. This provides a method to pick certain targeted animals and strive to keep them out of food plots, crops, shrub plantings or orchards. The new portable double fencing systems allow selection size by acreage of fencing desired and sizing the energizer to match controlling costs to only what you need. Models are available in many brands from 2 acres to 100 acres in coverage size. We used the larger Gallagher energizer which now allows us to test another layout idea in 2017 running an underground heavy copper wire in conduit from one field to another, then clamping on the tape /wire system. Both powered by the same energizer.

The fiberglass fence posts and clips we used on the inner fence served very well, and as noted we suggest 5 and 6 foot versions to allow for rolling ground fencing areas, dips and other elevation changes. If you use step on posts for the filler posts, get the 5 foot versions as well. Step on posts have a molded in clip to slip the wire or rope through. Step-ons should not be used on corners, they are not strong enough to support the corner sections.

The wire rope and tape come in a variety of lengths to suit your needs and is very easy to work with. Rolling it back up can be economically and efficiently done with common electric cord storage reels. The grounding rods, wire and clamps come in a small kit.

Total cost can run from a few hundred dollars to about \$1,500 depending on the size of the energizer and how many fiberglass posts you need to purchase based on about 3 to 5 acres of your field size. You will need firm, solid posts as a back bone of the design. Step on posts will not serve well in key areas like corners or long spans. Remember, this is a reusable system that can be moved and these will be re-used many years. The grounding rods can be pulled with a T post puller and a small section of chain or another set purchased so you can rotate fields without taking out the rods. However, it is much easier to leave them there and put in another set at another location allowing easy transfer back and forth.

NOTE: Keep an eye on the area under the fences and in between, you may need to spray to control the growth of thick grasses, shrubs, and weeds which can short out the system.

NOTE: If you do leave grounding rods in the ground for the next set up, mark them by leaving some of the white posts in place over their location. This prevents contact with any type of equipment by visible marking the grounding rods with a much more visible object.

Our use reflects good exclusion results over the two-year period of the test field, using the Gallagher Fencing system, keeping deer, in this case, out of a sunflower field. This directly allowed the sunflowers to mature and grow to a usable size for many wildlife species throughout the season.

If exclusion is in your management goals, this should work very well and at a reasonable cost, serving you for many years of your wildlife management. It sets up and comes down easily, is operational quickly, and stores with little space on a shelf. The posts we simply stood up against the end of the shelving unit strapped with a bungee cord stored for next year. However, deer are self-trained in many skills, especially when it comes to getting a food source, and it is not impossible for them to learn to jump a double fence though it is unlikely to occur from our study results and observations. That is why we used Cuddeback Cameras to monitor the field 24/7 as we do with all our wildlife habitat projects, studies and research projects.

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