Appendix A
Chicken Moat for Pest Management
(Non Technical Article for Dissemination purposes)
By Karen Spencer
December, 2013

What do rural gardeners on Colorado’s northern Front Range do when their crops are completely destroyed by grasshoppers two years in a row? What do they do when, year after year, deer trample and eat their garden plants and when raccoons binge on long awaited and lovingly grown corn?

We’re talking about sixteen gardeners with individual plots within a well-established 22,000 square foot community garden. These dedicated gardeners were becoming discouraged with attempts to garden on their open, rural piece of land surrounded by grassy fields and thriving herd of resident deer. One entomologist described our garden as “ground zero” for grasshoppers during boom years. And we had thought that wind, hail, and late season freezes would present the biggest gardening challenges!

Rather than throwing in the shovel, these gardeners got together and did some research on non-toxic and non-chemical pest management strategies. We landed on the novel concept of building a 561’ long chicken moat around our community garden. A moat diagram is provided at the end of this article.

So what’s a chicken moat? Picture two parallel fences 4-5’ apart surrounding the entire garden. The narrow strip of land between the fences is the “moat” where our existing flocks of 50 laying hens “patrols” the garden border for insect pests and graze on available grasses and weeds. As constructed, the chicken moat provides a durable, long lasting albeit expensive fencing system for which we expect durable and long lasting improvements in garden yields and gardener satisfaction. Moat design and operation details are provided in this article.

The community garden is within the Greyrock Commons Cohousing Community which is also home to all the affected gardeners. Financial support for the chicken moat project was received from two sources: the larger Greyrock community contributed $3800 for materials. A $4182 Specialty Crops Grant from Colorado State University allowed us to hire some skilled construction consultants and some operators of heavy equipment. Additionally MANY hours of less skilled, volunteer labor was provided by members of the Greyrock community. The combined efforts of the entire community allowed the chicken moat system to be designed, built and operational within 6 months- just in time for the 2012 growing season!

Chicken Moat System
The chicken moat is really a three part system: a double fence enclosing a narrow strip of land which is called the “moat;” strategically designed gates for access (people, garden carts); and a summer chicken coop attached securely and directly to the moat. Front end planning and thoughtful design are reflected in a functional and easy-to-operate final result.

Double Fence
The exterior fence is made from 6’ welded wire. Five feet...
of the exterior fence is above grade with a solar charged
electric wire strung near the top. The bottom foot of the
exterior fence is set 12" deep in a backfilled trench to
discourage digging by chicken predators (fox, raccoon).
A shorter 4’ interior fence is positioned 4-5’ inside the
exterior fence and separates the moat area (and
chickens) from the garden. The 4’ interior fence sits at
grade.

Because chickens require shade during hot, sunny
Colorado summers; the gardeners considered various
shade options. To supplement the shade provided by
many volunteer sunflowers growing next to or inside the
moat, we decided to plant hops on the garden side of the
interior moat fence. A total of 10 well distributed plants
quickly covered vertical sections of fence and began to
hang over the moat offering needed shade. Besides
shade, these fast growing, perennial hops plants made for
a more attractive and interesting fence line and the future possibility of a neighborhood brew.

Gates
A strategically designed main gate allows people to freely
enter and exit the garden area while preventing chicken
escapes through an open gate. The main garden gate is 6’
wide and accommodates people, tools, and loaded carts.
Below this gate and sunk into the ground is a 7’ long
“chicken underpass” made from a recycled 18” diameter
plastic culvert through which chickens freely travel.
Concrete ramps at both ends of the culvert allow chickens
to walk easily from the grade level moat, down under the
main gate then back up to grade level on the other side.
Besides providing endless entertainment for gardeners,
the underpass allows chickens to be fully contained inside
the moat as they circumnavigate the garden patrolling for
insects, eating grasses and weeds, and bingeing on cast
off produce from gardeners.

Additional garden access points are provided through two
matched pairs of 4’ wide gates. For each pair, one gate is
mounted on the exterior fence directly opposite a second
gate mounted on the interior fence. These gates provide
access to the moat area itself and facilitate any needed
moat or chicken care and maintenance.

Because of chicken predators in the area, all exterior gates are wrapped in welded wire fencing
with very narrow openings around the gate edges. Below each gate on the exterior fence is a
“threshold” of well secured weed cloth or recycled carpet to prevent predators from digging
under the gate to reach chickens inside the moat. This system has been very successful in protecting our flock.

**Summer Chicken Coop**
The final element in the chicken moat system is the 10’X 12’ Summer Chicken Coop. A people door and a chicken door are located on opposite ends of the coop. The people door provides easy access for chicken-related chores. The chicken door, which is closed each night, opens into a short 3’ tunnel which goes through the exterior moat fence and directly into the moat. The coop floor is made of hardware cloth so chicken droppings fall through and onto the ground below where they can be raked out and added to the compost pile. When the chicken door is open during the day, chickens travel freely between the coop (containing nest boxes, roosts, feed, water) and the moat.

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**Gardening Considerations and Findings related to the Chicken Moat**

Two growing seasons with the chicken moat have now passed and gardeners are pleased with the results even though 2012 and 2013 did not turn out to be bumper years for grasshoppers. Feedback from gardeners suggests that having an enclosed garden area dramatically changed the “feel” of the garden in positive ways including expanded and renewed gardening effort. Gardeners enjoyed having the neighborhood hens nearby as they gardened plus the opportunity to toss damaged produce over the fence to an appreciative chicken audience. One gardener remarked that a definition of “paradise” is an enclosed or walled garden such as ours! The Greyrock community gardens were indeed beautiful and productive in 2012 and 2013! We proudly hosted two public tours and advised many other local gardeners on how to effectively...
incorporate chickens and a moat system into overall garden design and operation. Our fencing approach immediately eliminated all deer and raccoon damage within the garden. Although deer can jump a very high fence, they do not jump a wide fence - our closely spaced double fence proved too wide for deer. The buried exterior fence with an electrified wire near the top also foiled all break-in attempts by fox.

To understand moat impacts on specific crops, a “citizen science” study was undertaken by one of the gardeners. Compared were identically planted garden plots, one inside the moat and one outside. Selected for study were crops that had been devastated by grasshoppers during 2010 and 2011: basil, broccoli, edamame, and butternut squash. Results indicated that all the study crops grown inside the moat had less insect damage to leaves and greater harvest yields than comparable control crops grown outside the moat. The significance of these differences, however, could not be determined because of small sample sizes and the possible influence of other variables like soil characteristics. While it’s not possible to attribute all observed crop benefits to the chicken moat, preliminary findings suggest that a well-designed chicken moat system may hold some promise as a pest management strategy. At a minimum, the moat ended years of damage from marauding deer and raccoons.

Unexpected Lessons Learned

- **Gates:** Training multiple gardeners to properly secure simple gate latches is challenging and requires ongoing education.
- **Food safety:** From a food safety standpoint, it is important to avoid crop contamination by chicken droppings that migrate into the garden. Consideration must be made for garden/moat slope and drainage. Because our site is flat and the garden is surrounded by undeveloped land, water does not readily run off into the garden. Additionally, we installed a 4’ path covered with weed cloth surrounding the entire garden. It is positioned next to the interior moat fence. This path provides added separation between the crops and the chickens, allows access to the hops growing along the fence, and allows gardeners to easily toss produce to the chickens.
- **End of season garden clean up:** Because our garden area is now fenced and secure, it is possible to allow chickens to free range inside the garden during several weeks in the late fall following the first killing frost. Chickens do a remarkably good job of “cleaning” by eating remaining foliage and scratching for insects and buried insect eggs. Quite possibly the late fall garden clean up by chickens is an important strategy for reducing the population of overwintering crop-damaging insects? At least we would like to think so!

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