

Toxic Weed a Concern for Michigan Horse Owners

Toxicity, Identification and Control of Hoary Alyssum in Forages

Steven Gower, Bruce MacKellar, and Jim Kells

Hoary alyssum (*Berteroa incana*) is a weed species that is widely distributed throughout the northeastern and north central United States and Canada. The plant is commonly found growing in closely grazed pastures, drought-stressed meadows, abandoned fields, and along roadsides. Hoary alyssum is well adapted to dry conditions, particularly in areas with sandy to gravelly soils.

Given the soil characteristics in some parts of Michigan, hoary alyssum could become an invasive weed species in pastures and hayfields throughout much of the state. Field reports from veterinarians and feeding studies conducted by university researchers have shown that hoary alyssum can be poisonous to horses. Some horses appear to be more adversely affected than others. Horse owners and hay producers in Michigan should be aware of the potential toxicity of this weed species for horses and be able to identify and control hoary alyssum in their pastures and hayfields.

Clinical Signs/Toxicity

Researchers at the University of Minnesota have reported that ingestion of hay containing a high level of hoary alyssum can cause horses to experience depression and “stocking up”, or swelling of the lower legs. Fever and short-term diarrhea may also accompany consumption of this plant. These symptoms can usually be observed 12 to 24 hours following ingestion of hoary alyssum in hay or pasture. Symptoms normally subside 2 to 4 days after the horses are removed from the source.

In extreme cases, severe swelling of the lower legs, apparent founder, stiffness in joints and death have been observed in horses ingesting hay containing high percentages (30 to 70 percent) of hoary alyssum. Results of ingestion of hoary alyssum are somewhat variable, however. In one study, only about half of the horses showed any clinical signs of toxicity when they ingested hay containing 30 to 70 percent hoary alyssum. The clinical signs are milder with ingestion of hay containing lower percentages of this plant. It is recommended that hay containing greater than 30 percent hoary alyssum not be fed to horses.



Figure 1. Hoary alyssum seedling.

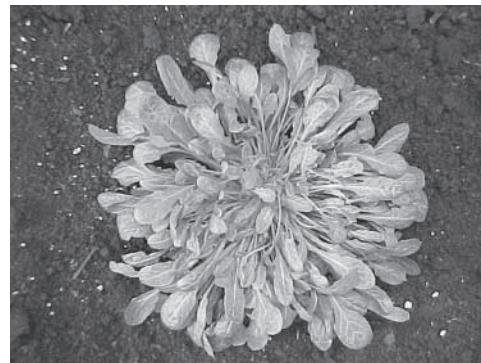


Figure 2. Hoary alyssum rosette.

Biology/Identification

Hoary alyssum is a member of the mustard family (Brassicaceae) and can exist as an annual, biennial, or short-lived perennial that reproduces by seed. Plants first form a basal rosette of leaves (figures 1 and 2), followed by an upright, central stem. Stems are 1 to 3 feet tall, very stiff and erect, with many branches near the top of the plant (Figure 3). Leaves produced on the stem are simple, alternate in arrangement, narrow and oblong, with smooth margins. The stems, leaves and seed pods are covered with rough, grayish-green star-shaped hairs. These hairs give the plant a pale green



Figure 3. Stem of hoary alyssum.

coloration. The name “hoary” denotes the rough hairs on the stems, leaves and fruit. Hoary alyssum has numerous white flowers with four deeply divided or notched petals. Seed pods are round to oblong (5 to 9 mm long, 3 to 4 mm wide), slightly flattened, hairy and swollen, with a short beak or point on the end (Figure 4). The seed pods are usually held close to the stems.

Control

Aside from its apparent toxic properties, hoary alyssum can reduce the overall quality, palatability, and yield of forages. High levels of mature hoary alyssum in hay can decrease crude protein and digestibility of the forage and may also reduce the animal's preference for the forage. Hoary alyssum can compete very well with forage growth when the crop is stressed, which can result in significant reductions in yield.

Proper hay and pasture management is essential to prevent or minimize the invasion of this weed species. Hoary alyssum tends to become a problem in pastures and hayfields following a period of stress, which could be caused by factors such as drought,

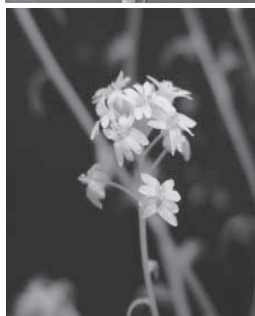


Figure 4. Flower clusters of hoary alyssum.

winterkill, overgrazing or poor soil fertility. Following good crop management practices during establishment and providing for the maintenance of the forage provide the basis of an effective weed control program. Factors such as proper planting date, seeding rate and variety selection, as well as insect control, adequate soil fertility, controlled grazing and proper cutting schedules, are important management practices that will provide optimum conditions for a vigorous forage crop.

When establishing new forages, it is imperative that weeds be controlled before initial seeding. Weeds are often controlled by seedbed preparation in conventional tillage systems and with burndown herbicides when no-tillage practices are employed. During the seedling year, MCPA and 2,4-DB will provide fair to good control of hoary alyssum. MCPA may be used when the forage is seeded with a companion crop.

In established forage legumes, an application of Sencor, Sinbar or Velpar in late fall or early spring to dormant alfalfa will provide the most effective control of hoary alyssum. Velpar may be applied to forage stubble between cuttings, but no other effective herbicide options exist beyond this point. Be sure to look at the rotation restrictions of Velpar before planting crops in areas treated with this herbicide.

In forage grasses, Banvel and 2,4-D ester applied in fall or spring should provide good control or suppression of actively growing hoary alyssum. Warning for southwestern Michigan in areas where grapes are grown (Van Buren, Berrien, and parts of Cass and Kalamazoo counties): a 2,4-D exclusion zone is enforced by the Michigan Department of Agriculture. In this zone, it is illegal to apply ester formulations of 2,4-D from May 1 to October 1. Amine formulations of 2,4-D and products containing dicamba can be applied in this zone. However, extreme caution should be used when applying these products in close proximity to grapes.

Stinger should also provide some level of hoary alyssum control, but this herbicide may be applied only to established forage grasses. Many pastures and hayfields grown for horse consumption are commonly grass-legume mixtures. Unfortunately, any herbicides labeled for control of broadleaf weeds in forage mixtures also have the possibility of detrimentally affecting the forage legume as well. Consult MSU Extension Bulletin E-434, “Weed Control Guide for Field Crops,” and the product label for harvest and rotation restrictions as well as other pertinent information.



**Youth
Corner**

Young Eyes Opened to New Experiences

Michigan State University was humming with life this past June 23-25, when nearly 3,000 youths from all parts of Michigan ranging in age from 11 to 19, traveled to Michigan State University to participate in the 2004 4-H Exploration Days. It offered more than 170 hands-on learning sessions, field trips and leisure opportunities.



4H'ers learn how to calibrate a manure spreader.

The goal of 4-H Exploration Days is to help youth learn new ideas, techniques and skills that they will be able to use in their 4-H groups and communities. In-depth learning sessions in a variety of interest areas, offer opportunities beyond the county level, made possible by access to Michigan State University's campus and resources.

The youths arrived at the campus early Wednesday morning, with educational sessions beginning early in the afternoon. The

following days included more educational sessions, as well as swimming, ice cream socials, bowling, canoeing, dancing, ice skating and the opportunity to view a show at the planetarium. Each night, the youth stayed in the dorms at Michigan State University, experiencing life on campus.

The MSU College of Agriculture and Natural Resources was involved in 4-H Exploration Days. The CANR Department of Animal Science offered many animal related hands-on learning sessions and opportunities to visit campus farms and interact with animals.

Among the numerous animal-related sessions were five horse sessions: Environmentally Friendly Horse Keeping, You Be the Judge, So You Want to Be a Horse Vet, The Gentle Giants and How Happy Is Your Horse? Environmentally Friendly Horse Keeping was a new addition this year. Developed by the Equine AOE Team, this session gave youths some hands-on experience with manure management and water quality. All of these classes, which were taught by Michigan State University professors and were informative, hands-on and, most importantly, fun!

All of the classes received great comments. The young people enjoyed the field trips, the interaction with the horses and the ability to apply their newly acquired skills. Despite the fact that some of the sessions were not what the youth had expected, they all agreed that they were not let down but rather had their eyes opened to something new and exciting!

MSU ARABIAN HORSE JUDGING WORKSHOP

(an approved clinic for Michigan 4-H Judges)

September 25, 2004

10 a.m. — 1 p.m., MSU Horse Teaching and Research Center, Collins Road, East Lansing, Michigan

The MSU judging team coaches will introduce the criteria for judging each class (halter, western pleasure and hunter pleasure). A class of four horses in each division will be judged and then critiqued by the instructors. After each class, an MSU judging team member will give a formal set of reasons.

This is a great opportunity to work out youth and collegiate judging teams on high quality horses or learn more about what horse show judges look for. Judging will begin promptly at 10 a.m. Lunch will be on your own. Cost is \$5 for students and \$10 for adults. All proceeds go to the MSU Horse Judging Team.

To register, contact Christine Skelly, MSU equine specialist. Indicate how many will be in your group and if you would like an MSU judging team representative to work with your group after lunch. Call Christine Skelly at 517/432-0383 or e-mail skellych@msu.edu



MSU Update

Horse Behavior and Related Management Practices

Dr. Christine Skelly

Horses are born with an inherited range of behaviors to fit many circumstances. These behaviors enable wild horses to deal with their environment and give them their best chance at survival. Even the domestic horse, which is unlikely to meet up with a horse-eating predator, instinctively will flee from anything strange. Horses' motto seems to be flee now and ask questions later. The best horse managers and trainers are those who understand the basic principles of horse behavior. These horse people, sometimes reverently referred to as "horse whisperers," have simply spent a lot of time trying to understand why horses act or react to events the way they do. Understanding basic horse behavior makes it easier to create a more horse-friendly environment.

Contactual Behavior

Horses are herd animals and feel most comfortable when they are with a group of horses that they know. Even horses that are housed in individual stalls may whinny as they leave the barn or get into the horse trailer. This instinctive need to be in contact with other horses is termed contactual behavior. For those of you who saw the movie "Sea Biscuit," you'll remember how the trainer calmed the temperamental gelding by putting a variety of animals and finally an old horse in his stall. This menagerie of companions was Sea Biscuit's herd and helped him become a champion.

Horses like being around other horses, so it makes sense to utilize this in our management strategies. When weaning foals, many managers will group weanlings together so that they can keep one another company. We also keep contactual behavior in mind when housing horses. New stall designs offer much more visual contact for horses across their stalls and from side to side. This gives the stalled horse a more secure herd sense.

Even stallions are handled differently than they used to be. In the past, there was a tendency to isolate stallions away from all other horses. Often this produced an aggressive horse with many stereotypes (repetitive, functionless behaviors, such as cribbing and weaving). Obviously, stallions cannot be turned out with other horses, unless you have a pasture-breeding program. But more often we see stallions housed right among the daily routines of the horse farm. These stallions tend to be more relaxed around other horses and easier to handle during the breeding season.

On the trail, you can encourage a young horse to cross a stream or go by a strange object by letting other horses go first. On the flip

side, it may be hard to convince a horse to leave his trail companions or go to the rail in an arena if the other horses are standing in the center. We spend a lot of our training time building confidence in horses so that they feel comfortable away from the herd. A firm but patient hand will go a long way in training a horse to leave the herd. This is not something that an inexperienced person should work on because many horses will become extremely anxious.

Ingestive Behavior

A horse's ingestive behavior is simply eating and drinking. Ingestive behavior is dictated by the horse's digestive anatomy. Horses are herbivores with very small stomachs. Because of their small stomach size, they can eat only small amounts continually. Horses are programmed to chew the majority of their waking hours, grazing 18 to 22 hours a day in the wild.

When we meal feed horses large amounts of grain, we run the risk of causing digestive disturbances such as colic or founder. We also take away the opportunity for horses to express their ingestive behavior, or desire to chew. In this scenario, horses are more likely to find an alternative to grazing such as chewing wood, or cribbing¹.

We can decrease the likelihood of these undesirable behaviors by feeding quality forage free choice. This means the horse has access to quality pasture or unlimited amounts of hay. Depending on their workload and reproductive status, a horse with unlimited access to quality forage would need little, if any, grain. Keep in mind that some breeds of horses and ponies may get too fat on unlimited forage, especially if the pasture is lush or they are offered high quality legume hay. These horses still need at least 1% of their body weight in good quality roughage.

Another aspect of ingestive behavior in horses is that, given the opportunity, they will overeat grain. Think of a kid in a candy store. Unfortunately, severe overeating can lead to colic and founder in the



horse. If horses are fed grain, it is important that the portions are small and divided into at least two meals in the day. It is also critical that the feed room is a fortress, and the horses cannot gain access to the grain.

Horses like sweet and salty foods but will avoid many selections that are bitter or hard to chew. If a horse has access to good

¹Grabbing an object with the mouth and sucking in air. This is an undesirable behavior and thought to be a means of coping with stress or pain. There may also be a genetic component that predisposes a horse to cribbing.



forage, he will avoid most undesirable weeds. If there is little to no grass, however, the horse will be less selective and more likely to eat a toxic plant. For a good review of toxic plants, log on to Cornell University's Toxic Plant Web site at <http://www.ansci.cornell.edu/plants/index.html>.

Horses will limit their feed intake if they are thirsty. It is critical that horses have free access to clean, fresh water. Horses will drink between 6 and 8 gallons of water a day for maintenance and as much as 18 gallons, depending on the weather, how much exercise they get and if they are lactating (milking). When traveling, you may need to bring water from home because some horses will refuse strange water on the basis of its smell or taste. Dehydration in the horse is a leading cause of impaction colics. In the winter, horses may limit their water intake because of cold water temperatures. It is important to keep water at a comfortable temperature to encourage drinking during all seasons.

Eliminative Behavior

Eliminative behavior refers to urinating and defecating. While it is extremely difficult to "potty train" a horse, there are pasture management strategies related to horse manure. Out in the pasture, horses will pick a spot to defecate and urinate. When you go into a pasture, look for the area with extremely tall grass — this will be the designated bathroom area. Horses won't eat around where they defecate, so the grass in this area is wasted and this site becomes a storage spot for parasites.

We can manage the pasture by dragging the manure on a dry, sunny day to break up piles and let the sun kill the parasite eggs. The grass should be cut no shorter than 6 inches in the late summer months to help control weeds and encourage utilization by your animals. During this time, a pasture rotation plan will give the pasture some time to rest. It is ideal never to graze pastures lower than 3 inches from the ground. Any lower and you will increase the horse's risk of ingesting sand (which can lead to sand colic) and picking up parasites.

Coprophagy, or the ingestion of fecal material, is eliminative behavior that is common in young foals. There has always been discussion that this is the foal's way of inoculating its gut with "good" microbes. However, studies have found no difference in the health of foals that did or did not ingest manure, though they can pick up parasites. This behavior just may be a way for foals to explore their environment. It is a good reminder to keep stalls picked out and to drag pastures as needed. If an older horse practices coprophagy, it could be an indication of boredom and may be alleviated with increased turnout or exercise time and free access to forage.

Allelomimetic Behavior

"Allelomimetic" is just a fancy term for horses mimicking one another. We have all experienced riding along the trail when one horse spooks and starts a chain reaction of all horses prancing and snorting in alarm. Though this can be annoying, it is important to remember herd dynamics and how this alarm system was critical to the survival of horses in the wild. In the wild, if one horse jumped and ran, the entire herd would follow. Injured or sick stragglers would fall prey to the big stalking carnivores. With constant training involving confidence building, horse/handler communication and redirection of energy, this instinct can be managed so that neither horse nor rider is at risk of injury. The handler should always be on guard and practice safe horsemanship.

It is thought that horses can learn to crib by watching other horses crib in a barn, so many people will not buy a cribber. However, the shared environment of the horses confounds these observations. If the horses are all housed in small stalls and fed large amounts of grain, with little turnout or exercise, there is a higher probability that you would see more cribbers in this stable.

Epimeletic and Et-epimeletic Behavior

"Epimeletic" means to give care or to nurture; as et-epimeletic is signaling for care. These behaviors are best illustrated with the mare and foal interaction. The foal will signal to the mare by whinnying, and the mare will respond by nuzzling the foal and letting the foal nurse. Older horses in the pasture will take turns grooming one another or standing head to tail and swishing flies off one another's face.



The mare and foal bond is extremely strong and can cause a lot of stress when weaning time comes. Older horses can also develop strong bonds, and in a sense, you are weaning them when you separate them. During the initial separation period, you may observe the horses running along the fence line and calling for the other horse. They may lose interest in feed and be hard to manage.



They can actually be dangerous to themselves as well as their handler during this stressful time. Managing horses during this time takes care and patience.

Gradual weaning has been shown to decrease the stress level of both mare and foal. In a gradual weaning strategy, a mesh fence line separates the mare and foal. In this way, you are eliminating only the nursing behavior. The mare and foal can still see, hear and smell each other through the fence line. Over several days as the mare's udder dries up, she will eventually travel farther from the foal. The foal in turn will become more interested in his new surroundings and friends if you group wean several foals together. Foals that have been creep fed² have an advantage during weaning because they are already accustomed to eating grain and forage. They maintain a more stable weight during weaning.

Investigative Behavior

Foals, yearlings and 2-year-olds are the equine version of Sherlock Holmes. They are curious about everything and exhibit a great deal of investigative behavior. As horses mature, they may lose some of their inquisitive behavior. However, a good manager never lets his/her guard down. Part of a good risk management program is for the farm manager to look at every aspect of the horse's environment and trouble-shoot potential hazards to the horse. Horses will get into everything, and danger may not be far behind. with training, can be taught to suppress this behavior while they are being handled. Sometimes the mare's heat period can be the scapegoat for just a poor mannered horse.

Sexual Behavior

Stallions' and mares' behavior can be driven by their hormones, especially during breeding season. Horses are long-day breeders, so in Michigan the natural breeding season begins in mid-April or early May and winds down in mid-September or early October. Mares exhibit their sexual behavior primarily when they are in estrus, or heat. This can last for 3 to 7 days and occurs about every 21 to 23 days during the breeding season. The one consistent thing about mares and their reproductive cycle is their inconsistency. However, a typical mare in heat will seem more excitable and frequently uninate and wink her vulva. During the height of her estrus, she is ready to accept a stallion for breeding. This behavior is why some people prefer working with geldings.

Administering hormones can control this exhibition of sexual behavior; however, this can be very costly over time. Most mares, with training, can be taught to suppress this behavior while they are

being handled. Sometimes the mare's heat period can be the scapegoat for just a poor mannered horse.

A stallion's sexual behavior is exhibited by his interest in mares and agonistic (aggressive) behavior toward horses considered as competition for the mares. He can become excitable and vocal, dropping his penis when he is around a mare in heat. An ill-mannered stallion is extremely dangerous to people and other horses. Stallions must be taught early on to display their sexual behavior only in a breeding scenario. Handling stallions takes years of horse experience, patience and some physical strength. A stallion that is trained using force and punishment is likely to rebel and turn very aggressive toward the handler. A stallion that is timidly handled will quickly turn into a dangerous bully. The best stallion handlers are superb at understanding a stallion's behavior and establishing themselves as the unquestionable leader.

Young colts can start exhibiting sexual behavior as early as 6 months of age, so it is important to keep them separated from fillies and mares until they are gelded. Horses do not respect family distinctions, and a colt will try to breed his own dam or sibling. The later a horse is gelded, the more secondary sex characteristics he will show. Some geldings will still exhibit signs of sexual behavior and may need to be kept separate from mares.

Agonistic Behavior

Horses show agonistic behavior when they are aggressive or responding to aggression. Horse herds have a very structured hierarchy, with the top horse eating first. The horse on the bottom rung may be timid around the other horses, especially during feeding. Herd hierarchy, though not very democratic, actually decreases conflict in the herd because all the horses respect their places and corresponding boundaries.

In a group pasture situation, this pecking order is disturbed when a new horse joins the group. The herd may pick on or threaten the new horse by chasing, kicking and biting him. If the new horse backs down, he will be the new low man in the hierarchy and the herd will easily adjust to the newcomer.

If the newcomer has a more dominant personality, fighting may ensue as the new horse tries to establish a higher rank in the herd. Fighting among mares and geldings usually involves chasing, blocking a pathway and kicking. Stallions, on the other hand, are much more violent in their fighting. They will stand on their hind legs and attack each other when challenged.

²Creep feed - providing grain to a foal while it is still nursing. The grain is usually provided free choice, and mature horses do not have access to the feed.



When introducing a new horse to a group, it is ideal to let the new horse explore the pasture alone. This will help prevent the horse from running into the fence when the other horses are in the pasture. The horse can be introduced to the group on the other side of the fence. After a few days of familiarity, you can turn the horse in with the group. If you know of a particular horse that is a potential troublemaker, you may want to keep that horse out of the herd until the new horse has found its place.

In conclusion, horses' behaviors should be the first consideration in management practices. The horses will be easier to manage, and both horse and handler will be happier and safer. Some simple management strategies based on horse behavior are:

1. When housing horses, allow them as much interaction with one another as possible.
2. Keep stallions separate from physical contact with other horses, but integrate them into the farm life to avoid complete isolation.
3. Feed horses as much quality forage as they can eat while maintaining a healthy weight.
4. Keep feed room doors locked.
5. Make sure that there are at least 3 inches of grass in pastures to

prevent sand colic, decrease parasite exposure, and reduce the chance of ingesting toxic plants.

6. Provide fresh, clean water at a comfortable temperature to ensure adequate hydration and reduce the chances of compaction colic.
7. Drag pastures and rotate them to reduce parasite load and forage waste.
8. Always practice safe horsemanship, especially when riding with a group. Your horse may react to another horse's spooking.
9. Creep feed and use a gradual weaning system to reduce separation stress in the mare and foal.
10. Practice caution when separating older buddies — they can go through a similar stressful period as weaning.
11. Keep objects out of a horse's reach. Keep doors locked and gates "horse proof" and secure.
12. Group horses by sex in the pasture if that is an option.
13. Remember, only expert horsemen with stallion handling experience should handle stallions.
14. Practice caution when introducing a new horse into a group. Let the horse explore its surroundings alone and meet the group over a fence.

MSU Horse Management Course

Offered by MSU Department of Animal Science and MSU Extension

A 15-week, hands-on seminar in equine care, management and issues related to horse ownership (*Must be 16 years of age or older.*)

MSU Horse Teaching and Research Center, East Lansing, Michigan

Tuesdays, 7-10 p.m., September 7 — December 14, 2004. Enroll by Sept. 1.

\$375 for all sessions (includes required text: *The Horse Industry Handbook*).

For more information, please contact the MSU Department of Animal Science, 1287 Anthony Hall, East Lansing, MI 48824; e-mail kwaite@msu.edu; call 517-353-1748; or visit the MSU Adult Equine Extension Web site at www.canr.msu.edu/horseadults/ and click on "Programs."

MSU Horse Management Course Enrollment Form

ENROLLMENT DEADLINE: September 1, 2004

Name: _____

City: _____ State: _____ Zip: _____

Phone: _____ Birth date: _____

e-mail: _____

Please make checks payable to "Michigan State University" and send to:
MSU Horse Management Course, 1287 Anthony Hall, East Lansing, MI 48824

Equine Program
Department of Animal Science
Michigan State University
1247 Anthony Hall
East Lansing, MI 48824-1225

**Letter from
the Editor**

I hope you enjoy the new look of the MSU Equine Newsletter. The Animal Initiative Coalition awarded a grant to the newsletter so that we could get a face lift. Thanks to the help of Ken Fettig, Margaret Weaver and Leslie Johnson of ANR Communication and Technology Services, the newsletter has a more professional appearance.

Sincerely,
Christine Skelly

Calendar of Events



August

20-22 Michigan State 4-H Horse Show
MSU Pavilion

September

9/7 - 12/14 MSU Horse Management Course
MSU Horse Teaching and Research Center
25 MSU Arabian Horse Judging Workshop
MSU Horse Teaching and Research Center

10-12 Michigan 4-H Standardbred Project Show and Sale
MSU Pavilion

October

1-3 Michigan 4-H Fall Horse Galaxy
Kettunen Center

November

19-21 Michigan 4-H Teen Horse Leaders Conference
Kettunen Center

For more program information, log on to www.canr.msu.edu/horseadults and www.canr.msu.edu/horsekids or call Carla McLachlan at 517-432-5402.