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Evaluating Cool-season Perennial Grass Pastures using the UK Horse Pasture Health Score Card

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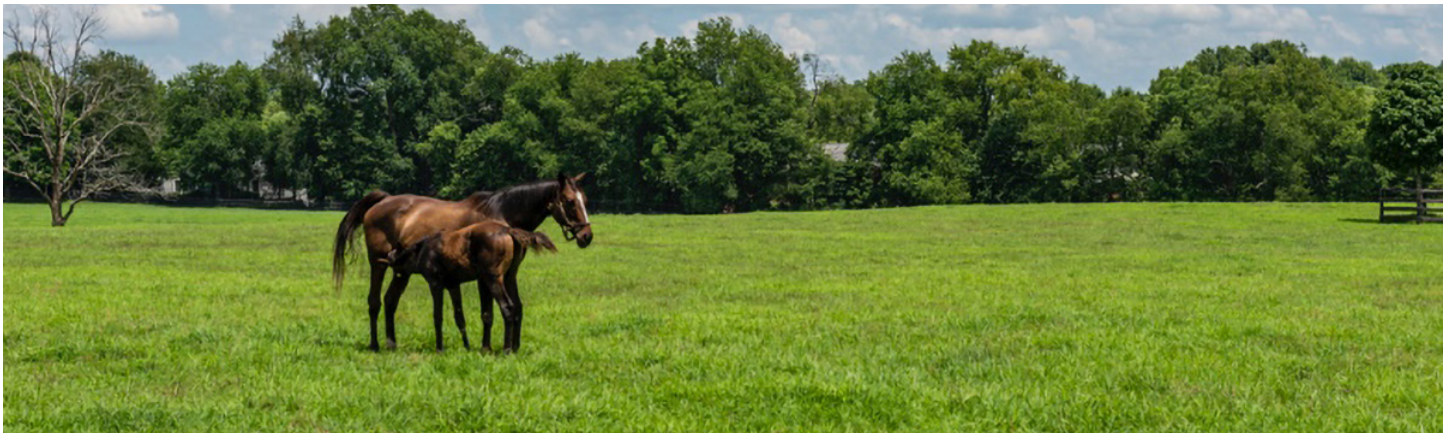

Figure 1. Horse pasture with dense cover of desirable grasses. Desirable Grass Cover Score: 4.

Providing quality forage is essential to horse health, and pasture can provide a significant portion of the horse's forage needs. Objective evaluation of a pasture's condition can help determine appropriate pasture management practices. The UK Horse Pasture Health Score Card (Table 1) can be used to evaluate horse pastures and determine what improvements should be made.

The Pasture Health Score Card uses 10 indicators to assess a pasture's condition.

Each indicator is scored from 1 to 5, with a 1 being poor and a 5 being good; each score includes a description for every indicator. To use to the Pasture Health Score Card, walk around a pasture and observe each indicator. Start at the entry gate into the pasture and work your way around the whole pasture, making sure to observe most of the pasture. Once back to the gate, use the score card to score each indicator based on the observations made in the pasture.

Once the score card is used on a pasture, the scores are added up and multiplied by two to generate a total score out of 100 that is generally from 50 to 100. The score is multiplied by two for easier interpretation based on the grading system in schools. Based on the total score, a general recommendation can be made. For example, the score may recommend that significant effort is needed to improve productivity or it may recommend that only minor changes are needed. When the general recommendation is made, look back at the individual scores for each indicator to determine where the most improvement is needed. If a pasture was given a score of 1 or 2 for broadleaf weeds, then a specific recommendation would be to apply an herbicide. If the pasture scored a 1 or 2 for desirable grass cover, then overseeding may be beneficial to improve the pasture's health. Publications on the UK Forage Extension website (https://forages.ca.uky.edu/foragepublications) will help determine more specific recommendations for a pasture after using the score card.

The pasture score card can be used multiple times throughout the year to determine changes in a pasture, or over multiple years to observe pasture changes over time. It is important to date and label pasture names on each score card to make it easier to compare the scores. It is also important to keep track of all changes made to pastures on a calendar or datasheet.

Indicators

Desirable Grass Cover. The desirable grass cover indicator helps estimate the percent of desirable grasses that are available in a pasture (Figure 1). In Kentucky, the three main desirable grasses are Kentucky bluegrass, orchardgrass and tall fescue. It is important to have a high desirable grass cover for two main reasons. First, desirable grasses can make up a large part of a horse's forage intake. Second, if there is a low percent of desirable grass cover then undesirable grasses and weeds can spread more easily. It should be noted that tall fescue is less desirable on broodmare farms because of toxicity issues for late term pregnant mares. The potential for toxicity can be determined through endophyte and ergovaline sampling measures (For more information on endophyte sampling, see *PPA-30: Sampling for the Tall Fescue Endophyte in Pasture or Hay Stands*, and visit the UK Veterinary Diagnostic Laboratory's website for more information on ergovaline sampling.)

Score of 5: Vast majority of cover-70% to 80%
Score of 4: Prominent cover-50% to 70%
Score of 3: Slightly more than half-30% to 50%
Score of 2: Present but not the majority-<30%
Score of 1: Little to none present

Figure 2. Bluegrass, orchardgrass, and tall fescue grasses.

Desirable Grass Diversity. Desirable grass diversity is an indicator that represents the various desirable grass species in a pasture. Again, the three main desirable grasses in Kentucky are Kentucky bluegrass, orchardgrass, and tall fescue (Figure 2). According to the Natural Resource Conservation Service, it is important to have desirable grass diversity because pastures with high grass diversity tend to recover quicker when there are negative impacts on a pasture. (For a guide to forage identification, see AGR-175: Forage Identification and Use Guide.)

Score of 5: Three species equally present
Score of 4: Primarily two species, evenly distributed
Score of 3: One dominant species with two others present in small quantities
Score of 2: Two species present, one is dominant
Score of 1: Monoculture

Figure 3. With the white clover present in this pasture, the legume score is 5.

Legumes. Having some type of legumes in a horse pasture can be beneficial. The main legumes you will find in horse pastures are white clover, red clover, and sometimes annual lespedeza or hop clover (Figure 3). (For a better guide to forage identification, see AGR-175: Forage Identification and Use Guide.) Legumes are beneficial to a pasture because they can fix nitrogen from the atmosphere into the soil. This can reduce the requirement for nitrogen fertilization. (For more information on pasture nutrient management, see AGR-200: Soil Sampling and Nutrient Management in Horse Pastures.) Having legumes present in a pasture also increases forage quality. Legumes, specifically white clover, have the potential of taking over a pasture when grazing is not managed. So, it is important to keep track on the proportion of legumes in a pasture. It is ideal to have 20-30% legumes in a pasture to have the benefit of nitrogen fixation and increase quality, but any higher amounts of legumes could hinder the production of other cool-season forages. High levels of legumes in horse pastures have been linked with colic and laminitis, especially when a horse is not normally grazing on legumes because of high levels of protein found in legumes. Red and white clover can become infected with black patch which causes a condition in horses called slobbers. While red clover is the most common legume that becomes affected, it can affect other legumes (For more information on slaframine toxicosis, see ID-230: Blackpatch of Forage Legumes: Cause of Slaframine Toxicosis or "Slobbers" in Animals.)

Score of 5: 20-30%
Score of 4: 0-20%
Score of 3: 30-50%
Score of 2: 50-75%
Score of 1: >75%

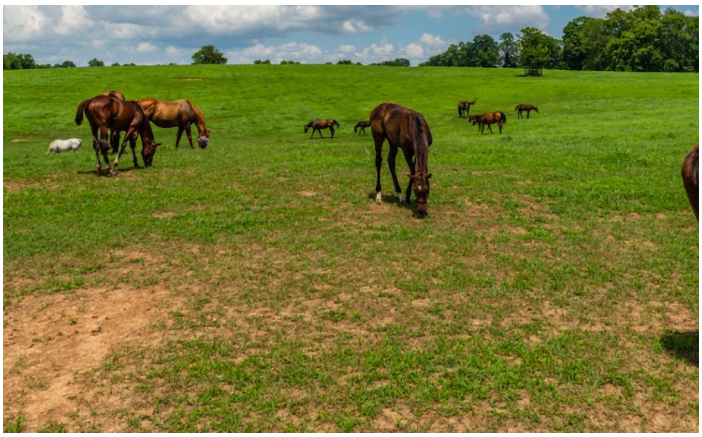

Figure 4. Bare soil where WSAG will take over in the summer. WSAG and Bare Soil Score: 4.

Bare Soil and Warm Season Annual Grasses. Crabgrass, foxtail, and goosegrass are the three main warm season annual grasses (WSAG) that will come up in a horse pasture. Bare soil is also included in the score because WSAG often will fill in the bare soil if the pasture has not been seeded but will then die out after frost in the fall (Figure 4). WSAG tend to occupy these bare soil areas between mid-May to mid-October. Horses will eat some WSAG but they are not desirable.

Score of 5: Little to none-<10%
Score of 4: Minimal-10-20%
Score of 3: Moderate-20-30%, dominates some areas but not present across the entirety of the pasture
Score of 2: Significant across pasture-30-50%
Score of 1: Majority of pastures->50%

Figure 5. A horse grazing in a pasture full of the weed plantain.

Broadleaf Weeds. Broadleaf weeds are a common occurrence in horse pastures and small percentages are not a concern (Figure 5). Knowing how many and what weeds are in a pasture is important for weed control. If weed control is a main concern, it will be important to note the commonly occurring weeds in a pasture so that an accurate herbicide recommendation can be made. A few common weeds in Kentucky pastures are buttercup, plantain and ragweed (For a more complete list of broadleaf weeds and the corresponding herbicides, see AGR-207: Broadleaf Weeds of Kentucky Pasture). There are many cell phone apps, such as Picture This and iNaturalist, that can be downloaded for free or for a small price that can help identify weeds in pastures.

Score of 5: Scattered to no weeds present-<2%
Score of 4: Minimal weeds present, does not hinder forage productivity-<10%
Score of 3: Moderate weed presence-10-25%
Score of 2: Significant weed pressure, limits forage productivity-25-50%
Score of 1: Excessive weed pressure->50%

Figure 6. Nimblewill with seedheads present.

Perennial Weedy Grasses. Nimblewill is the main perennial weedy grass that occurs in horse pastures in Kentucky (Figure 6). Nimblewill is a native grass to Kentucky, therefore it thrives well in Kentucky horse pastures and is hard to control. Unfortunately, horses will not eat nimblewill due to it being unpalatable. Another common perennial weedy grass in Kentucky is johnsongrass. Horses will eat johnsongrass but it is still considered an undesirable species because of its tall growth habit and when consumed over time can lead to health issues.

Score of 5: Scattered to none-<2%
Score of 4: Minimal present-<10%
Score of 3: Moderate presence-10-25%
Score of 2: Significant pressure, limits forage productivity-25-50%
Score of 1: Excessive pressure prevents forage productivity->50%

Figure 7. Overgrazed pasture with low grazing management. Grazing Management Score: 2.

Grazing Management. The grazing management indicator is based on the height of the desirable forages growing in a pasture. Horses tend to graze close to the soil and often graze in the same areas which can lead to an overgrazed pasture (Figure 7). Pastures that are grazed low to the soil repeatedly often becomes less productive which can allow undesirable species to take over the over grazed area. Overgrazing can also lead to soil erosion and weed encroachment. There are some forages and specific forage varieties that can be planted that are known to be more tolerant to horse grazing. (For more information on cool-season grazing tolerance, see the 2021 Cool-Season Grass Grazing Tolerance Report).

Score of 5: Desirable species grazed uniformly with an average height of > 4 in.
Score of 4: Some spot grazing around dung and urine spots, not grazing below 3 in
Score of 3: Spot grazing is prevalent throughout the pasture, <3 in
Score of 2: All desirable species are grazed below sustainable height, < 3 in
Score of 1: All desirable species are grazed out

Figure 8. Seedheads present in pasture. Stage of Growth Score: 1.

Stage of Growth. When there are seedheads present on a plant, it limits the amount of vegetative growth because the plant is using its energy for seed production (Figure 8). In the case of tall fescue toxicity, there is a high concentration of ergovaline in the seed head and stem (for more information on endophyte-infected tall fescue, see ID-144: *Understanding Endophyte-Infected Tall Fescue and Its Effect on Broodmares*). Mowing can control seedhead growth and increase vegetative growth.

Score of 5: Thick vegetative growth and no seed heads
Score of 4: Vegetative growth with few or no seedheads emerging
Score of 3: Some seedheads emerging
Score of 2: Some seedheads fully emerged
Score of 1: Significant seedheads limiting vegetative growth

Figure 9. High-traffic pad in use. Loafing Area Score: 5.

Figure 10. Loafing area extends into the grazing area of pasture. Loafing Area Score: 2.

Loafing Areas. Loafing areas are where there is excessive horse traffic, such as by the gate, water, and fence line (Figures 9 and 10). These areas can quickly be reduced to bare soil, which decreases the amount of desirable grass cover and encourages weed growth. Bare soil turns to mud in wet weather which can be dangerous for horses and people. Mud is also not good for horse hoof support and can lead to horses losing shoes. Using a heavy traffic pad can help prevent mud from forming in an area that is going to be bare soil due to the increased traffic (For more information on high traffic pads, see *ID-164: High Traffic Area Pads for Horses*).

Score of 5: Effective pads around gate and water
Score of 4: Minimal to no loafing areas
Score of 3: Area is less than a horse length ~8 feet
Score of 2: Extends into pasture grazing area
Score of 1: Covers significant portion of the pasture

Figure 11. Pasture with thatch.

Thatch/Color. Thatch or plant residue is dead plant matter that is covering the soil (Figure 11). When there is a lot of thatch occurring in a pasture, it can limit the productivity of desirable species. The overall color of the pasture is another good indicator of pasture health. A dark green pasture is an indication of a productive pasture because the dark green leaves show that nitrogen is adequate in the soil and is being efficiency used by the plant. Adequate nitrogen allows grass to grow more vigorously and improve forage quality. If there is a heavy thatch layer present, this often suggests that soil microbiological activity is low because the soil microbes are essential for plant residue decomposition.

Score of 5: Deep green color and no thatch present
Score of 4: Green and/or minimal thatch present
Score of 3: Light green and/or moderate thatch present, <0.5 inch thick
Score of 2: Yellow color and/or significant thatch present, 0.5-1 inch thick
Score of 1: Brown color and/or heavy thatch present, >1 inch thick

Interpretation of Scores

To determine a pasture's health based on the score card add the scores from each indicator and multiply by 2. The score is multiplied by two for easier interpretation based on the grading system in schools.

20-31: Significant effort, including time and expense, required to enhance productivity
32-51: Needs immediate management changes to return to a productive state
52-71: Improvements would benefit productivity and/or the environment
72-85: Minor changes would enhance pasture productivity
86-100: No changes in management needed at this time

When assessing the results of the score card, it is important it also look at the individual score for each indicator to see where changes should start to be made (for more information on improving horse pastures see https://forages.ca.uky.edu/files/improving_ky_horse_pastures.pdf).

The cool-season perennial grass pasture health score card is a new tool that can be used by horse owners, county agents, and consultants to help determine a pasture's overall condition. Horses thrive on productive pastures, but careful management is required to maintain productive pastures. Having quality pastures can also benefit farms economically with reduced need for supplemental hay and grain. This score card can help pinpoint problems occurring in a pasture, and suggest potential solutions, but it will not automatically fix the problem. It is important to use other resources, such as UK Forage Extension publications, your local county agent, and NRCS to help determine the best management practices for the pastures on your farm.

Table 1. Cool-season Perennial Grass Pasture Health Score Card					
Indicators	1	2	3	4	5
Desirable GrassCover	Little to none present	Present but not the majority (<30%)	Slightly more than half (30-50%)	Prominent coverage (50-70%)	Vast majority of cover (70-100%)
Desirable GrassDiversity	Monoculture	Two species present, one is dominant	One dominant species, with two others present in small quantities	Primarily two species, evenly distributed	3 species equally present
Legumes	>75%	50-75%	30-50%	0-20%	20-30%
Bare Soil & Warm Season Annual Grasses (CG, FX, GG)	Majority (>50%)	Significant across pasture (30-50%)	Moderate, dominates some areas but not present across its entirety (20-30%)	Minimal (10-20%)	Little to none (<10%)
Broadleaf Weeds	Excessive weed pressure prevents forage productivity (>50%)	Significant weed pressure, limits forage productivity (25-50%)	Moderate weed presence (10-25%)	Minimal weeds present, does not hinder forage productivity (<10%)	Scattered to no weeds present (<2%)
Perennial Weedy Grasses (NW, JG, BU)	Excessive pressure prevents forage productivity (>50%)	Significant pressure, limits forage productivity (25-50%)	Moderate presence (10-25%)	Minimal present (<10%)	Scattered to none (<2%)
Grazing Management	All desirable species are grazed out	All desirable species are grazed below sustainable height (< 3in.)	Spot grazing is prevalent throughout the pasture (< 3in.)	Some spot grazing, mostly around dung and urine spots, not grazed below 3 in.	Desirable species grazed uniformly with an average height of > 4 in.
Stage of Growth	Significant seed heads limiting vegetative growth	Some seed heads fully emerged	Some seed heads emerging	Vegetative growth with little to no seed heads	Thick vegetative growth and no seed heads
Loafing Areas	Covers a significant portion of the pasture	Extends into pasture grazing area	Area is less than a horse length (~8ft)	Minimal to no loafing areas	Effective pads around gate and water
Thatch/Color	Brown color and/or heavy thatch present, >1 in. thick	Yellow color and/or significant thatch present, 0.5-1 in. thick	Light green and/or moderate thatch present, <0.5 in. thick	Green and/or minimal thatch present	Deep green color and no thatch present

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