Arizona Range and Livestock News
ARIZONA COOPERATIVE EXTENSION

July 2021

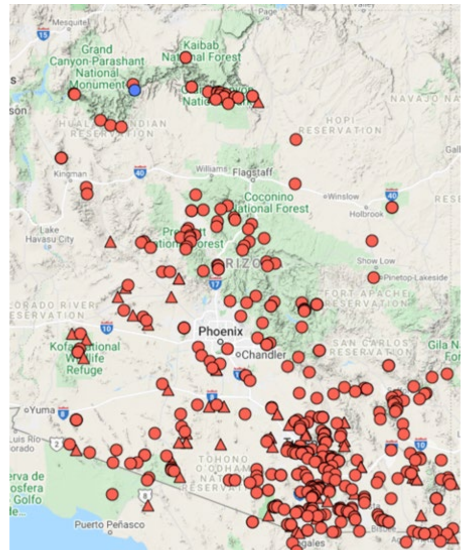
Featured Plant

Arizona cottontop
Digitaria californica (Benth.) Henr.
Ashley Hall, Area Assistant Agent - Gila and Pinal Counties

Characteristics
Arizona cottontop is a warm season, native, perennial bunch grass growing one to four feet tall with round and hard stems. The base of the plant is often knotty, swollen, and pubescent.

Leaves are flat, dark bluish-green that cure to a gray or straw color. The leaves can reach a length of three to five inches long and 1/8 to 1/4 inch wide. They pull away from the stem, exposing a purple to green internode that is smooth but can have sparse hairs.

The inflorescence is a closely branched panicle reaching three to five inches long. The inflorescence is spikelet covered with white, silvery hairs. This gives the seed head a cotton-like appearance, hence the name Arizona cottontop. At maturity, the seeds drop from the branch, leaving behind branches that look slightly like broom straw.



Occurrence

Arizona cottontop grows predominately in Arizona, southwest New Mexico, most of Texas, into southern Mexico, and the panhandle to midwestern section in Oklahoma. It will grow in plains, steep slopes, chaparral, and semi-desert grasslands. It is most abundant in well-drained sandy soils or gravelly loam soils. It is rare for cottontop to form dense stands and is more commonly observed growing in interspaces with other grasses, burrowed (*Haplopappus tenuisectus*) and mesquite (Prosopis species). In Arizona, cottontop is most abundant in the southern part of the state, but can be found throughout the state at 1,000 to 6,000 feet in elevation.

Forage Value

Cottontop will grow rapidly after spring and summer growth. While growing, it provides highly palatable forage. The leaves ill cure well and depending on the year some stems can remain green in the winter. As the growing season continues palatability decreases, with the lowest palatability at maturity. During years when stems remain green cottontop becomes an important inter forage for livestock and wildlife.

Grazing Management

Since cottontop is can be palatable throughout the year, it is often overgrazed. In areas where overgrazing of this species has occurred, providing rest during the summer should allow cottontop to recover. Outside of summer months, it stands up well to grazing.

Sources

Digitaria californica Retrieved June 27,2021, from http://swbiodiversity.org/seinet/

Ruyle, G. B., and Young, D. J. (Eds.). (2003). *Arizona Range Grasses: Their Description, Forage Value, and Grazing Management.* Tucson, AZ: Cooperative Extension, College of Agriculture, University of Arizona.

Stubbendieck, J., Hatch, S.L., and Landholt, L.M. (2003). *Sixth Edition of North American Wildland Plants: A Field Guide*. University of Nebraska Press

Monitoring Minute: Measuring Frequency

Kim McReynolds, Area Agent

Frequency is the vegetation attribute that describes the probability of finding a species within a given area. The probability is based on the occurrence of that species in a series of sample units. For example, if a species has a frequency of 75%, we expect it to occur in three out of every four quadrats of a particular area examined.

Frequency is regularly used in monitoring programs because it is a rapid technique that provides precise results. Although a sensitive index of changes in a species over time, additional data must be collected to reveal which other attribute caused the change.

Frequency has less relevance in inventory applications, because it does not provide an absolute measure of species abundance.

Frequency is expressed as a value between 0% and 100%, representing the proportion of quadrats where the particular species was found during sampling. For example, if we observed 200 quadrats and found the target species in 156 of those quadrats, the frequency would be:

$$\frac{156 \text{ found}}{200 \text{ observed}} \text{ X } 100\% = 78\%$$

Considerations for frequency include the following.

1. Frequency is a simple vegetation attribute to measure because it only requires identification of the species in each quadrat, and does not require that individuals are distinguished, measured, or counted. Therefore, data collection is usually a more rapid procedure than for other vegetation attributes such as biomass, cover, or density, which involve counting or subjective quantification. This advantage is most apparent in rangeland vegetation characterized by a relatively low species richness, but diminishes in vegetation with complex species composition.
2. Frequency values are determined for individual species because an overall frequency for the entire vegetation cannot be obtained, in contrast to other attributes such as biomass, cover, or density.
3. Likewise, it is not possible to obtain a meaningful expression of species composition from frequency data because the absolute abundance is not measured, only the presence of a species is measured.
4. Frequency can be a sensitive method to detect vegetation changes at a site. Its ease and speed of data collection means that frequency is suited to large areas, so it is sometimes adopted by State and Federal agencies for descriptive rangeland inventory or monitoring programs.
5. However, causes of the differences in frequency estimated between repeated sampling can be difficult to interpret because frequency is an index that integrates the density and spatial patterns of key species. For example, if frequency declines over time, it may be because individual plants are more sparsely scattered over the entire area, or because the range of the species distribution has constricted.

6. In some cases, just knowing that there has been a change in the vegetation may meet the objectives of the monitoring program. In other situations, frequency can be used as a general monitoring procedure, that is followed by more detailed investigations to understand the cause of a change in frequency.
7. The following aspects of sample units are also important to consider when designing sampling protocols to determine frequency: nested quadrats, rooted or canopy dimensions, species groups, specific guidelines on sample unit size for frequency, sources of sampling error.

From: *Guidelines for Monitoring Arizona Rangelands*, George B. Ruyle, Kim H. McReynolds, Larry D. Howery, and Mitchel P. McClaran.

Artificial Insemination Clinic

After much anticipation of being able to hold in-person events again, Extension hosted an AI Clinic June 4-6 at the Rimrock Headquarters of UA V Bar V Research Ranch. During this clinic, participants learned about cattle anatomy, estrous synchronization, animal handling, herd health, understanding EPDs, AI equipment, and handling practices. To learn about the AI process participants were able to practice using a bovine simulator, uterine tracts, and live cows.

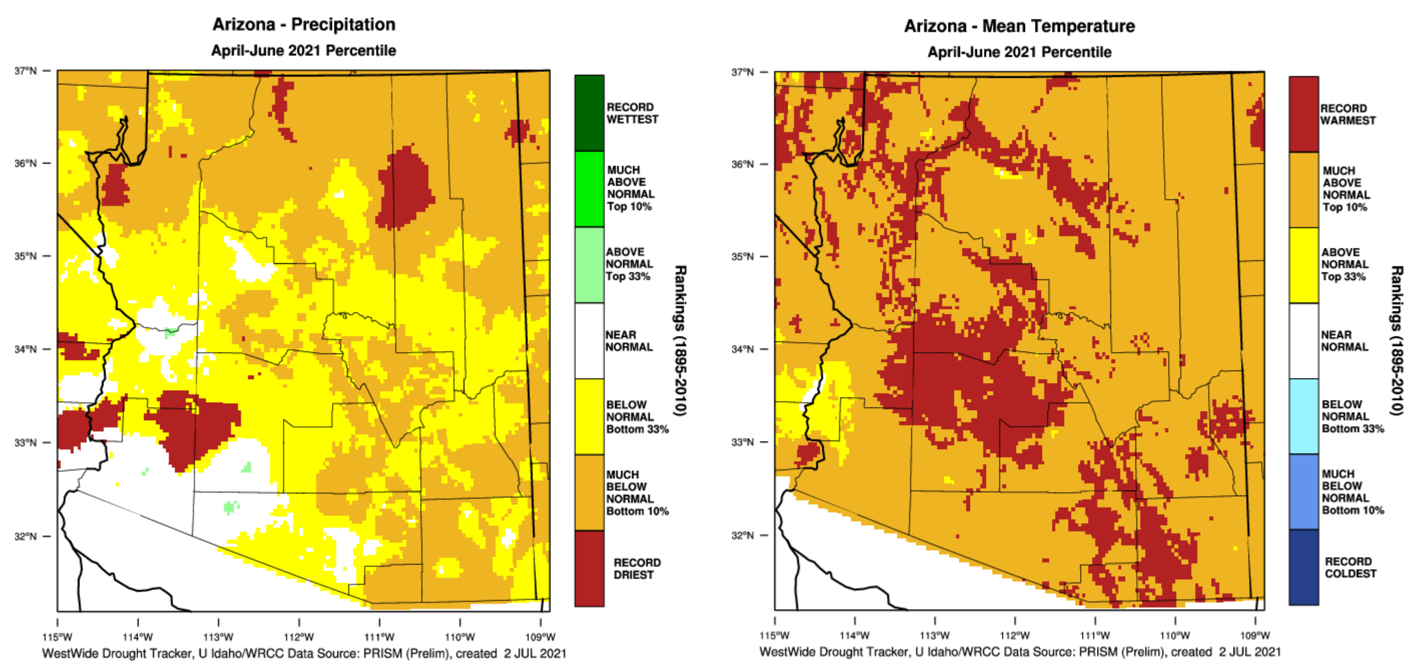
Those who attended responded in the post-clinic survey they were more likely to implement AI practices they had learned on their own operation, were more likely to perform AI practices themselves for their operation, and were more confident in their abilities to perform AI practices.

Future clinics will be held at the cost of $750. This includes lunch for two days, take home AI Kit ($350 value), and ABS AI Management Guide. The clinic is limited to 12 participants in order to provide a higher teacher-to-student ratio. If interested in participating contact Andrew Brischke (brischke@arizona.edu) to be put on a waiting list for future clinics by request.

Arizona Seasonal Climate Summary: Spring/Summer 2021

July 1, 2021 - Arizona was on a weather and climate roller coaster the past three months. April started off warm and dry and it looked like that might have been the beginning of a repeat of last year's record spring heat, but temperature moderated by mid-month. An unsettled weather pattern even brought a bit of increasingly rare April precipitation to parts of northern Arizona. Flagstaff even observed some accumulating snow late in the month. The unsettled weather pattern carried over into May helping to keep temperatures down to average levels, but brought little in the way of precipitation. The cooler weather probably helped keep fire danger levels down to average levels even with the extreme background drought conditions present across the region. This would all change as the cooler weather pattern gave way to extreme June heat. By the second week of June record temperatures and soaring fire danger indices helping numerous fires grow rapidly to record sizes including the Telegraph fire which was to date over 180,000 acres in size. The large ridge of high pressure that created the extreme heat did usher in some early season monsoon moisture which fell across parts of central and northern Arizona in late June.

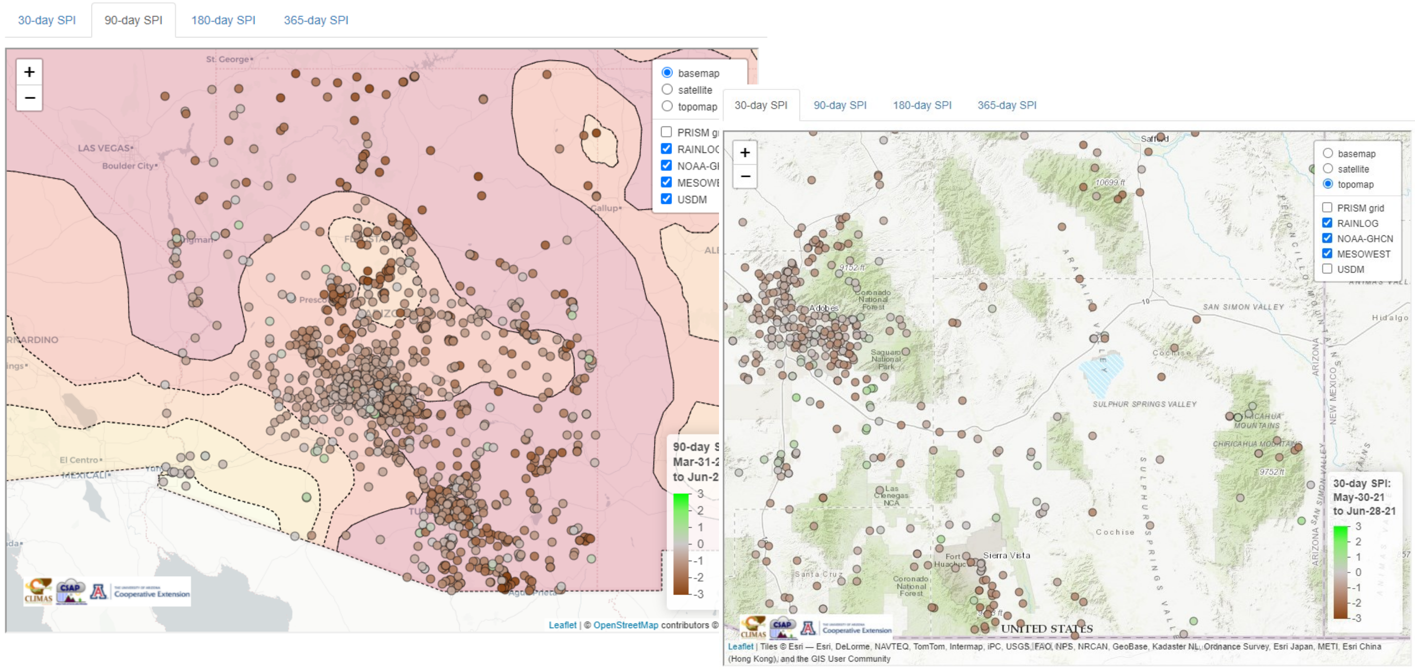
The latest U.S. Drought Monitor map (June 29th https://droughtmonitor.unl.edu/CurrentMap/StateDroughtMonitor.aspx?AZ) still shows most of Arizona in extreme to exceptional drought. Changes to this map will be slow over the summer depending on where and how much monsoon precipitation falls. Seasonal precipitation outlooks are somewhat optimistic that much of Arizona will observe above-average precipitation through the early part of the monsoon season.



April-June precipitation and temperature rankings from the WestWide Drought Tracker

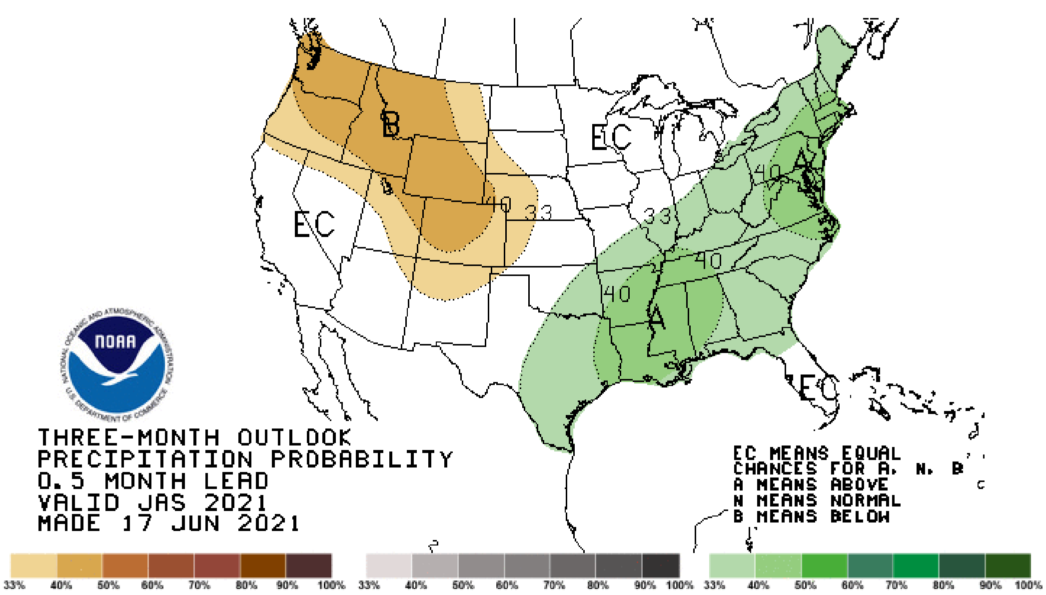
(http://www.wrcc.dri.edu/wwdt/)

More information available at :
http://cals.arizona.edu/climate
http://www.climas.arizona.edu
Questions /comments? Contact Mike Crimmins, crimmins@email.arizona.edu



Arizona experiences large amounts of spatial variability in precipitation, making it difficult to monitor drought conditions accurately. Many gridded climate products (e.g. Westwide Drought Tracker) use rain gauge observations to make statistical estimates on a coarse grid, but are often lagged in time (monthly). The Station-based Drought Tracker (figures above) was developed to take advantage of the numerous rain gauges reporting across Arizona in near-real time to make daily assessments of changes in short-term drought conditions. Gauges from the NOAA Global Historical Climate Network (including CoCoRAHS volunteer observations), the RainLog network (volunteer observers) and the MesoWest network (including many county flood control gauges and home weather stations) are queried for total precipitation over the past 30, 90, 180, and 365 days and converted into drought index value (the Standardized Precipitation Index). The drought index value (SPI) indicates how unusual the total precipitation amount is (0 being near average while positive values indicate wet conditions and negative dry) at that location relative to the 120 year estimate at that location provided by the PRISM gridded climate dataset. The most recent US Drought Monitor is also plotted to aid with production of the map each week. More info: https://cals.arizona.edu/climate/AZdrought/

The July-August-September seasonal precipitation outlook issued by the NOAA Climate Prediction Center in mid-June depicts equal chances of above, below or average precipitation (equal chances, EC) for the July-August-September season across most of Arizona. This is due to lack of a forecast signal and confidence in a shift towards either a wetter or drier conditions for the monsoon season. This isn't uncommon for the summer season as the monsoon precipitation outlooks are notoriously difficult. Models do suggest that precipitation may be above-average for July for most of Arizona, but then possibly drier than average for August and September. There is wide spread among several models so confidence is low, especially in the later summer period. Temperatures, due to long-term trends continuing, are expected to be above-average for the upcoming summer season. (more info at: https://www.cpc.ncep.noaa.gov/products/predictions/long_range/seasonal.php?lead=1)



Addressing Issues with Cattle and Horses in the Arizona Heat

Dr. Betsy Greene and Dr. Joslyn Beard

During the summer it's not uncommon for Arizona to experience extreme high temperatures, especially during peak hours in the day. Whether gathering and working cattle on horseback, trail riding, or at the rodeo, it's important to keep in mind the negative impact of hotter temperatures. Fortunately, horses and cattle have several built-in physiological mechanisms for heat dissipation and the ability to adapt to the environment.

They can release excess body heat through sweat (evaporation), wind, breeze or fan (convection), and cold hosing or misters (conduction). If horses and cattle are provided fresh, clean water, adequate hay/feed, and shade, most will be fine. Livestock can also gain or lose heat through radiation (sun or hot-sand or cold-snow/ice footing, etc.), but as we hit higher temperatures, they cannot lose that heat in that way when the environment is hotter than their body.

How do you know when heat stress can happen?

Because we can't control the weather, it's important to be able to identify when livestock may experience a heat stress event, and we do this using a heat index. Horses and cattle have decreased ability to dissipate heat when the air temperature and the relative humidity combined (heat index) gets too high. There are different methods to calculate Heat Index, and below you will see a simplified guide for horseback riding, as well as a more formula-based cattle heat index. Both give good information on identifying dangerous conditions for your animals.

Heat Stress in Horses

Horses are most effective at handling heat at a heat index score of 130 or lower (Table 1). That means if you have dry heat like us, we are still able to work with horses on a 100-degree (F) day with 20% relative humidity (100 + 20 = heat index score of 120), but we still need to be on alert for signs of heat stress. Horses become less efficient at effectively dissipating heat with a score between 130-150, capacity is greatly reduced over 150, and conditions could be deadly when the heat index is over 180. Factors such as fitness, stress levels, type of work/riding, and physiological state of the horse (growth, pregnancy, lactating, etc.) can all impact the horse's ability to handle high heat index days as well. When considering when and how long to work a horse in the heat, obviously, the earlier in the day, the better…get up with the sun and get your work done before the temperature soars. This also corresponds to working cattle.

Table 1: Guidance for Working Horses in Hot Weather

Air Temperature (F) + Relative Humidity (%)	Horse Cooling Efficiency
Less than 130	Most effective
130-150	Decreased
Greater than 150	Greatly Reduced
Greater than 180	Condition may be fatal if horse is stressed

https://extension.umn.edu/horse-care-and-management/caring-horses-during-hot-weather

Heat stress in cattle

For cattle producers, it's incredibly important to be able to identify a heat stress event in their operations. Cattle on range or pasture are typically not as susceptible to heat stress compared to feedlot cattle. Range cattle have greater chances to seek shade, water, and the environment itself has more opportunities for air movement to help keep animals cool. Cattle in the feedlot are more restricted in addition to having increased heat radiation from their footing (concrete or dirt). Cattle have a thermoneutral zone around 75 degrees (F), when temperatures rise above 80 degrees (F) the animal is entering in the upper critical temperature area where heat stress can occur. Due to Arizona's dry climate, when temperatures rise above 98 degrees (F) this is considered a danger zone, be ready for a heat stress event (Table 2). Depending on humidity, the danger temperature could be lowered due to decreased effectiveness to dissipate heat. Because we can't control the weather, it's important to be able to have a management plan in place for heat stress events, to not only prevent animal death loss. but also help with decreasing performance loss, especially in feedlot gains.

Table 2: Heat index ranges for heat stress in cattle

Cattle Heat Stress Index	
Normal < 75 degrees F	No Stress
Alert 75-78 degrees F	Expect ≥ 10% production loss
Danger 79-83 degrees F	Expect ≥ 25% production loss
Emergency > 83 degrees F	Expect ≥ 45% production loss

Heat Stress/Exhaustion

If the forecast puts your animals at risk for heat stress the first thing to do is to recognize the signs. After that there are many easy ways to decrease the impact/risk/severity of those high temperature heat indexes on your livestock.

Horses

Heat stress in the horse can progress quickly to heat exhaustion if signs are not recognized and treated. If your horse seems depressed or slow, has an increased temperature (may only be 1 degree), dehydration (greater than 1 second skin pinch or pale, dry gums), increased respiratory rate, and/or rapid shallow breaths, or stops sweating/sweats excessively they may be experiencing heat stress. If the horse gets to the point of heat exhaustion, the respiration rate may be greater than 60-80 breaths/minute (normal is 8-16) and gums appear dark red and capillary refill time (press and release on the gum) is greater than 2 seconds.

Dealing with Heat Stress in Horses

If your horse exhibits signs of heat stress while riding, get off, remove saddle and blanket, offer your horse water, hose them down, use ice starting at the head, an alcohol bath can be used if water is not available. Move to shade if possible and use any breeze (natural or fan) to dissipate heat, and don't hesitate to contact your veterinarian if your horse is not recovering or drinking. If you believe your horse has progressed to heat exhaustion, contact your veterinarian immediately.

Make sure your horse is in good condition and well hydrated prior to riding. Always make sure fresh clean water is available, possibly adding electrolytes to encourage adequate drinking. Check the heat index (Air Temp (F) + relative humidity) and do not ride if the heat index is high (for sure if >180). Encourage the horse to drink before, during and after rides, and consider training your horses to drink “flavored” water (e.g. Gatorade, molasses, sprite) to help ensure they will drink “strange” water when available.

Cattle

The initial stages of cattle heat stress are increased breathing, drooling, and the animal is normally standing or restless. As heat stress progresses cattle will have open mouth breathing or light panting, and really breathing through the flanks. If cattle are experiencing a full heat stress event they'll be panting very heavily, head down, and isolated. To check for heat stress is to count breaths per minute (Table 3).

Table 3: Cattle health guidelines for breaths per minute

Cattle Breaths Per Minute at Rest and During Heat Stress	
Normal	90
Alert	90 - 110
Danger	110 - 130
Emergency (contact veterinarian immediately)	> 130

Ways to Reduce or Mitigate Heat Stress

Provide lots of fresh water. Animals will increase their water consumption by nearly 3x their normal rate.

Avoid any activities in the “peak” heat of the day. Work with horses or cattle earlier in the day when temperatures are relatively low. If you work cattle in the heat, consider working smaller bunches in shorter periods of time to decrease stress.

Provide shade for your animals (natural or a shade structure). Metal structures can help reflect heat, but a sturdy structure with great airflow that blocks the sun is all you need. Make sure natural shade (trees) have adequate canopy cover.

Feed animals at the coolest parts of the day. With cattle, since peak heat production from rumination occurs 4-6 hours after eating and they will absorb radiant heat from the ground, plan for rumination while it is cool.

If you have any further questions or concerns regarding heat stress, please contact:

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