UNIVERSITY OF FLORIDA
Cooperative Extension Service
Institute of Food and Agricultural Sciences

edis

Climate-Based Management of Lawns[1]

Grady L. Miller, Sydney Park-Brown, Carol Stiles, Michael Dukes, Fred Royce, Jim W. Jones, Fedro S. Zazueta, and David Zierden[2]

Recent advances in atmospheric research have made it possible to predict climate, with a relatively high level of certainty. Knowledge of climatic conditions allows us to develop a seasonal management strategy for the lawn and other landscape features -- particularly in irrigating, mowing, fertilizing and preparing for pests and diseases.

This publication provides recommendations on strategies for managing turf given that future climate conditions are predicted based on the El Niño phenomenon.

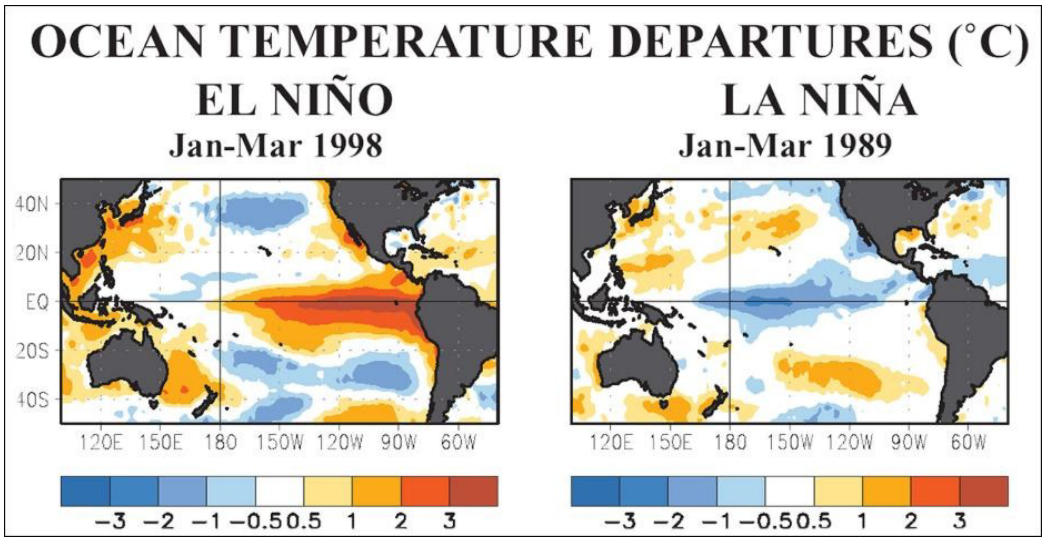
The New Science of Climate Prediction

Weather is the atmosphere changing from day-to-day: a rainstorm or a cold snap. Climate is weather averaged over several months: a wet summer or a cold winter. Until recently, it was very difficult for meteorologists to predict the climate of upcoming seasons.

Because of its size, the Pacific Ocean plays a major role in regulating the earth's climate. Oscillations of the Pacific Ocean's sea surface temperature above and below normal are a common occurrence.

In 1982-1983, the world's climate was affected by a strong temperature increase in the Pacific Ocean. This brought frequent winter storms to California and high rainfall along the Gulf of Mexico Coast, while other parts of the country experienced a warm and dry winter. As a result, world attention focused on the influence that the ocean has on climate. It was observed that ocean temperatures affect climate because they shift the position of the jet stream across the continent. This in turn influences fronts and other weather systems for several months. Because the jet stream is strongest in winter months, climate shifts are more pronounced in the cold season. Careful study of these phenomena led to the ability to predict climate using sea surface temperature.

When the temperature of the Pacific Ocean is higher than normal the phenomenon is referred to as an El Niño event. When the temperature of the Pacific Ocean is lower than normal the phenomenon is referred to as a La Niña event (See Fig. 1). When the temperature is normal, the event is referred to as neutral.



CREDITS: Mike Halpert, Climate Prediction Center, National Weather Service, NOAA

Figure 1. Sea surface temperatures in the eastern equatorial Pacific Ocean define El Niño and La Niña. Warmer sea temperatures mean El Niño, while cooler temperatures in this equatorial region indicate La Niña. The panels show the amount (in degrees centigrade) that sea surface temperatures were above the long-term average during a particular El Niño period, and the amount that they were below the long-term average during a La Niña period. Notice the spread of warmer-than-average (orange-red) water to the coast of North, Central and South America the El Niño year. Also, remember that El Niño and La Niña correspond to temperatures in the equatorial Pacific Ocean. Other areas of the Pacific and other oceans may or may not follow this pattern. EQ indicates "Equator." Each 20 degrees of latitude is marked north and south of the Equator. Meridians are marked every 30 degrees E (east) and W (west) of Greenwich, England along the bottom of each map. The scale beneath each map indicates degrees centigrade below or above the long-term average temperature.

El Niño typically brings 30%-40% more rainfall and cooler temperatures to Florida in the winter, while La Niña brings a warmer and much drier than normal winter. Table 1 summarizes the effects of El Niño and La Niña on Florida's climate.

Note that in Table 1 El Niño/La Niña effects start in October and peak during January through March. They are weaker during April through June. Also El Niño/La Niña has little effect during the months from July through September.

How Do I Know If This Year Is El Niño, La Niña or Neutral?

Information about the current El Niño/La Niña status and the implications for Florida climate are provided by The Florida Consortium and can be found on the Web at http://fawn.ifas.ufl.edu

Table 1. Influence of El Niño/La Niña on Florida Rainfall and Temperature

PHASE	Seasons			
	Oct-Dec	Jan-Mar	Apr-Jun	Jul-Sep
El Niño	Wet Cool	Strong Wet Strong Cool	Weak Dry	Normal
La Niña	Dry Weak Warm	Strong Dry Strong Warm	Weak Wet	Normal Weak Cool
Neutral	Normal	Normal	Normal	Normal

Recommendations for Lawn Management

Turf growth, quality, and its associated pests and diseases depend largely on climate conditions. Advance knowledge of likely climate conditions allows the landscape manager to prepare in advance a strategy to maintain the landscape system. For example, with knowledge that a wet warm climate period is approaching, the manager can:

- Prepare for fungal disease control
- Use slow-release fertilizer
- Adjust irrigation schedules to apply water in the early morning when temperature and humidity are near dew point -- do not irrigate during the evening or night.

Likewise, knowledge of an upcoming dry period, or a risk of drought, will give some opportunity for managers to encourage deep root growth by increasing irrigation intervals and water application amounts. In addition, weakened turf may be susceptible to insect attacks.

Forward strategic planning will result in actions that will improve management, augmenting the quality of the turf while reducing costs, use of resources and environmental impacts (see Table 2).

Table 2. Recommended Practices for Managing Lawns in The Landscape Based on Climate

Conditions Generated by Climate			
Management	Dry	Normal	Wet
Mowing	Raise mowing height: Saint Augustine Grass (SA) & Bahia Grass (BH) - 4", Centipede Grass (CN) - 3". Mowing frequency may be reduced, but important not to let grass grow higher than normal and then scalp, which will compound stress. Sharpen mower blades.	Regular mowing height: SA & BH - 3"-4", CN - 1.5"-2". Sharpen mower blades	Regular mowing height: SA & BH - 3-4", CN - 1.5"-2". Sharpen mower blades
Irrigation	Irrigate to wet the soil deeply (8"-12") and less frequently. Avoid light frequent irrigations. Monitor stress carefully. Wait until 60% of turf shows stress to initiate an irrigation. Irrigate early morning or late at night. Over watering when water use is permitted does not improve the quality of the turf. Watch for dry spots and irrigate them with a hose, if permitted.	Use conventional irrigation recommendations from IFAS Circular 829 . Apply 1" of water when 40%-60% of the turf shows stress. If using an irrigation controller, make sure that you adjust the frequency seasonally, without changing the irrigation amount.	Manually set irrigation timer, and install a rain shut-off device. Irrigate at half the rate of a normal year and only when 30% of turf shows stress. Irrigate in early morning when dew is present. Irrigating late afternoon or evenings may result in disease problems.
Fertilizer	Fertilize with minimum nitrogen (N) application and balanced potassium fertilizer. SA & BH - 2 lbs per 1000 sq. ft., Cent - no fert.	Apply fertilizer as recommended in IFAS Document SL-21 .	Apply N fertilizer to meet quality expectations; SA - 4 lbs, Cent - 2 lbs, BH - 3 lbs per 1000 sq. ft. Increased N loss; use at least 50% slow release N source.
Insects	Stressed turf is more susceptible to insects: mole crickets, sod webworms, army worms, cutworms and chinch bugs. Dry conditions may delay emergence of some insects.	Inspect the lawn weekly at least twice per month to determine if damage is beginning to occur and whether insects are the problem. Follow recommendations on insect control in the FL Lawn Handbook , and IFAS Circular 1149	Except for spittlebugs, fewer insect pests during wet year. Monitor for spittlebugs and for thatch buildup (FL Lawn Handbook).

Conditions Generated by Climate			
Management	Dry	Normal	Wet
Disease	Monitor disease incidence. Stressed turf may be more susceptible to take-all root rot and other diseases. Manage irrigation to avoid stress and irrigate during early morning.	Mature grasses maintained by proper cultural practices are not likely to be severely damaged by diseases. For further information, see disease section of FL Lawn Handbook .	Higher disease incidence of Brown Patch, Leaf Spot, fairy ring, slime molds, root rot. Treat with appropriate fungicide and reduce irrigation to minimize wetness during night.
Aerification	Aerate dry areas to increase water infiltration and promote deeper rooting.	Lawn will generally not need aerification unless subject to repeated traffic beyond normal cultural practices. For further information, see IFAS Fact Sheet RF-LH032 .	Wet soils are subject to increased compaction. Aerification during late spring or early summer reduces compaction.
Weeds	More common in weak turf, particularly goosegrass, crowsfootgrass, sandspur. Some herbicides can cause additional phytotoxicity to turf, delay application of spot treatments, unless weeds are perennial and hard to control.	Good cultural management that encourage a dense thriving turf, minimizes weed infestations. Monitor irrigation amounts and follow fertilizer recommendations. For further information, see IFAS Fact Sheet ENH-84.	Some weeds are more common during wet years, particularly alligator weed, dollarweed, sedges and torpedograss.

Footnotes

1. This document is AE 319, one of a series of the Agricultural and Biological Engineering Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. First published: September, 2001 . Visit the EDIS Web Site at http://edis.ifas.ufl.edu.

2. Grady L. Miller, Associate Professor, Environmental Horticuture Department.; Sydney Park-Brown, Extension Agent IV, Hillsborough County Office; Carol Stiles, Assistant Professor, Plant Pathology Department; Michael Dukes, Assistant Professor, Agricultural and Biological Engineering Department; Fred Royce, Graduate Assistant, Agricultural and Biological Engineering Department; Jim W. Jones,

Professor, Agricultural and Biological Engineering Department; Fedro S. Zazueta, Professor, Agricultural and Biological Engineering Department; University of Florida; and David Zierden, Assistant in Research, Florida State University.

References

The Florida Consortium. El Niño, La Niña and Florida's Climate: Effects on Agriculture and Forestry. Florida State University, University of Florida, University of Miami. 1999.

Copyright Information