

Whither Weather



James Fischer

Weather underlies much of beekeeping. Like most agriculture, beekeeping can be viewed as an "engine" that is driven by the weather. And while you can't change the weather, you can use both historical data and forecasts to take advantage of, or at least plan your beekeeping work around the weather.

But are the forecasts in the newspapers any good? While they are more accurate than in the past, why depend upon something found next to the horoscopes? Many better sources of information exist:

The World Wide Web – Clearly, the easiest method if you have computer access. If not, check with the public library, local schools or a

A 10-day forecast for Medina, Ohio.

Medina, OH (44256)		Hi (°F)	Lo (°F)
Last Updated Monday, October 20, 2003, at 2:14 PM Eastern Standard Time			
Pleasant forecast			
Tonight Oct 29	Partly Cloudy		43°F
Tue Oct 30	Partly Cloudy UV Index: 2 Minimal	56°F	45°F
Wed Oct 31	Scattered Showers UV Index: 3 Low	62°F	46°F
Thu Nov 1	Partly Cloudy UV Index: 3 Low	67°F	50°F
Fri Nov 2	Scattered Showers UV Index: 2 Minimal	67°F	46°F
Sat Nov 3	Partly Cloudy UV Index: 3 Low	62°F	40°F
Sun Nov 4	Showers UV Index: 2 Minimal	56°F	38°F
Mon Nov 5	Scattered Showers UV Index: 2 Minimal	51°F	37°F
Tue Nov 6	Partly Cloudy UV Index: 2 Minimal	53°F	40°F
Wed Nov 7	Mostly Cloudy UV Index: 2 Minimal	51°F	35°F

nearby college – most have "public access", for free. At the end of this article is a list of websites with official weather data. They are good places to start.

State Climatologists – Most states have a taxpayer-funded person or department that focuses on your state. Contact information is listed at the end of the article. The data may be for your whole state, or just a city or region. You may have to dig deeper.

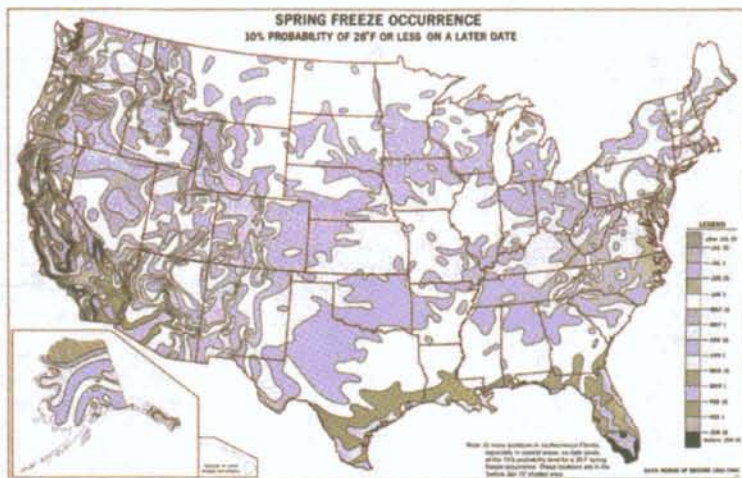
Almanacs – While it takes some effort to understand the arcane notation used in its densely printed pages, "The Old Farmer's Almanac" has been the standard reference for over 200 years.

Local TV Meteorologists – TV meteorologists spend significant time doing things like school visits. Imagine how happy they would be to get some interest from an adult. These people can bury you in information, as TV stations pay big money for access to good data.

The Public Library and Reference Librarians – These people are amazing. If they do not have what you need, they will call other librar-

ies and get it. They are also experts in the art of finding information in general, and know of information sources that you never dreamed of. Their services are free, and they are an under-utilized resource.

Ag Extension and Specialists – They support farmers, and know



about weather data that is specific to local agriculture. It should be clear that the best data is the "most local" data available.

Better Forecasts

Is the 3-day or 5-day forecast the best you can get? Far from it. New computer models and better weather satellites now allow accurate prediction of "airmass" events (temperature, for example) as far into the future as 10 days. For example, go to www.weather.com, and type in your zip code or city name.

At the top left of the web page are the current conditions, for your 'local' area, and further down is the

the 10-day forecast for the same area.

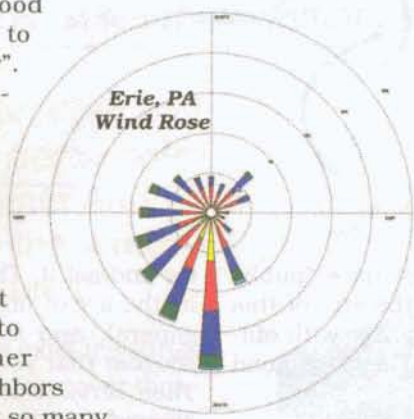
A 10-day forecast allows you to pick the best days for apiary work in advance. No more arriving late and out-of-breath at social events due to an unexpected "good day" tempting you to "just inspect a few". No more grim plodding through defensive hives on a bad day, just because you missed out on prior good weather. And, the data supports your argument of not being able to attend the dinner party with your neighbors since there are only so many

good days available.

Let's break down the weather into specific parameters, and see how they can be used by beekeepers.

Temperature

Record highs and lows are rarely set. This means that the high and low temperatures for any one day are fairly consistent from year to year. You can use these averages to plan early Spring inspections and reversals. Fall medicat-



Daily Averages and Records

Medina, OH (44256)
October
Sunrise and Sunset Times are in local time for 2001

	28	29	30	31
Sunrise	6:54 AM	6:55 AM	6:56 AM	6:58 AM
Sunset	5:28 PM	5:27 PM	5:26 PM	5:24 PM
Avg. High	56°F	56°F	55°F	55°F
Avg. Low	35°F	35°F	34°F	34°F
Mean	46°F	46°F	45°F	45°F
Record High	80°F (1946)	80°F (1946)	79°F (1946)	81°F (1950)
Record Low	21°F (1936)	21°F (1965)	20°F (1980)	16°F (1988)

tions, and other seasonal events, that are temperature critical.

Highs and lows are available at www.weather.com. Type in your zip code or city name, and click on "Averages & Records". Click on a month to get the averages and records for each day of that month.

Climatologist Listing For the USA

State	City	Phone	E-Mail	Website
Alabama	Huntsville	256-961-7763	christy@atmos.uah.edu	www.atmos.uah.edu/aosc/
Alaska	Anchorage	907-257-2737	auclima@uaa.alaska.edu	www.uaa.alaska.edu/enri/ascc_web/ascc_home.html
Arizona	Tempe	480-965-6265	azclimate@geography.asu.edu	http://geography.asu.edu/azclimate/
Arkansas	Fayetteville	501-575-3159		
California	Sacramento	916-574-2614	morkb@water.ca.gov	
Colorado	Fort Collins	970-491-8545	pielke@atmos.colostate.edu	http://ccc.atmos.colostate.edu
Connecticut	Storrs	860-486-0135	xiusheng.yang@uconn.edu	
Delaware	Newark	302-831-2294	leathers@udel.edu	www.udel.edu/leathers/stclim.html
Florida	Tallahassee	850-644-6951	obrien@coaps.fsu.edu	www.coaps.fsu.edu/climate_center
Georgia	Athens	706-583-0156	climate@bae.uga.edu	http://climate.engr.uga.edu/
Hawaii	Honolulu	808-956-2324	chu@soest.hawaii.edu	
Idaho	Moscow	208-885-6184	climate@uidaho.edu	www.uidaho.edu/~climate
Illinois	Champaign	217-333-0729	j-angel@uiuc.edu	www.sws.uiuc.edu/atmos/statecli/index.htm
Indiana	West Lafayette	765-494-8105	kens@purdue.edu	http://shadow.agry.purdue.edu
Iowa	Johnston	515-270-6907	istatec@nelins.net	
Kansas	Manhattan	785-532-7019	mknapp@oz.oznet.ksu.edu	www.oznet.ksu.edu/wdl/
Kentucky	Bowling Green	270-745-5983	KYClim@wku.edu	http://kyclim.wku.edu/kcc/
Louisiana	Baton Rouge	225-388-6870	jgnymes@lsu.edu	www.srcc.lsu.edu/LQSC/index.html
Maine	Orono	207-581-3441	gzielinski@maine.edu	www.umaine.edu/mainclimate/
Maryland	College Park	301-405-7223	climate@atmos.umd.edu	http://meto.umd.edu/SC/sc.html
Mass	North Reading	617-275-8860	climat@wx.com	
Michigan	East Lansing	517-355-0231	scmfired@pilot.msu.edu	http://climate.geo.msu.edu
Minnesota	St Paul	651-296-4214	mcwg@soils.umn.edu	www.soils.agn.umn.edu/research/climatology/
Mississippi	Mississippi St	601-325-3915	wax@geosci.msstate.edu	www.msstate.edu/Dept/GeoSciences/climate/
Missouri	Columbia	573-882-8599	AkyuzF@missouri.edu	www.missouri.edu/~moclimate
Montana	None			
Nebraska	Lincoln	402-472-5206	adutcher1@unl.edu	www.nebraskacclimateoffice.unl.edu
Nevada	Reno	755-784-1723		
NH	Durham	603-862-3136	bdk@hopper.unh.edu	www.unh.edu/geography/climate.html
New Jersey	Piscataway	732-445-4741	drobins@rci.rutgers.edu	http://climate.rutgers.edu/stateclim/
New Mexico	Las Cruces	505-646-2104	tsammis@nmsu.edu	http://weather.nmsu.edu/
New York	Ithaca	607-255-1749	KLE1@cornell.edu	
NC	Raleigh	919-515-1440	sethu_raman@ncsu.edu	www.nc-climate.ncsu.edu
North Dakota	Fargo	701-231-8576	john.enz@nds.nodak.edu	http://ndawn.ndsu.nodak.edu
Ohio	Columbus	614-422-2514	jcrogers@magnum.acs.ohio-state.edu	www.geography.ohio-state.edu/faculty/rogers/statclim.html
Oklahoma	Norman	405-325-2541	ocs@ou.edu	www.ocs.ou.edu
Oregon	Corvallis	541-737-5705	oregon@oce.orst.edu	www.ocs.orst.edu/
Pennsylvania	University Park	814-865-3197	knight@mail.meteo.psu.edu	www.ems.psu.edu/PA_Climatologist/
Puerto Rico	Mayaguez	787-265-5416	a_winter@rumac.uprm.edu	http://atmos.uprm.edu
Rhode Island	Kingston	401-792-2937	ltn101@uriacc.uri.edu	
SC	Columbia	803-737-0800	brown@dnr.state.sc.us	http://water.dnr.state.sc.us/climate/sco
South Dakota	Brookings	605-688-5678	bender.al@ces.sdstate.edu	www.abs.sdstate.edu/ae/weather/weather.htm
Tennessee	Knoxville	865-632-4222	lhambert@tva.gov	
Texas	College Station	979-845-5044	n-g@tamu.edu	www.met.tamu.edu/met/osc/osc.html
Utah	Logan	435-797-2190	djensen@cc.usu.edu	http://climate.usu.edu/
Vermont	Burlington	802-656-3060	State.Climatologist@uvm.edu	www.uvm.edu/~ldupigny/sc
Virginia	Charlottesville	804-924-0549		http://wsrv.clas.virginia.edu/~climate/
Washington	None			
WV	None			
Wisconsin	Madison	608-263-2374	stclim@macc.wisc.edu	www.acs.wisc.edu/~sco
Wyoming	Laramie	307-766-6659	stateclim@wrds.uwyo.edu	www.wrds.uwyo.edu/wrds/wsc/wsc.html

When using this data, keep in mind that the "record" is the worst-case extreme of temperature, and "averages" are much more likely.

Degree Days

Degree Days track the cumulative effect of a Winter or Summer in terms of how cold or warm it has been for how long. They come in three flavors; heating, cooling, and growing, but they all work the same.

Beekeepers will be interested in the Heating Degree Days, as they compare one Winter to another, and give early warning of abnormal winters. The data is updated weekly in most cases, so you can use the "cumulative deviation from norm" to see how Winter is shaping up.

Degree Day reports for cities that have official weather stations can be found at NOAA's website but your State Climatologists or a local oil, gas, or electric company will likely have data that is "more local".

First & Last Freezes & Frosts

The last freeze and frost dates allow you to better estimate blooming dates for important nectar sources, and better plan your supering for producing varietal honey. (A more accurate approach would be to start counting Growing Degree-Days rather than calendar days to predict blooming dates.)

A typical Spring freeze map is shown. The first freeze and first frost dates can be useful in planning your winter prep work.

State Climatologists may have even more detailed maps, but all are presented in terms of a 90% probability.

Winds

While local terrain is key to shielding hives from the wind, you need to know what the average winds are at a prospective or existing apiary site. These averages are at NOAA's website.

The prevailing direction of the wind is also of interest when scouting new apiary locations. Since wind directions change over time, a chart called a "wind rose" is used to plot both speed and direction. Good examples can be found at the excellent PA Climatologist web site. A wind rose for Erie PA is shown on the opposite page.

The longer "petals" mean that

Websites of Interest

www.weather.com
www.weather.unisys.com
www.cpc.ncep.noaa.gov/products/analysis_monitoring/edus/degree_days/
<http://wfi.ncdc.noaa.gov/oa/climate/stateclimatologists.html>
<http://wfi.ncdc.noaa.gov/oa/documentlibrary/freeze/frost/frostfreemaps.html>
<http://aa.usno.navy.mil/data/>
http://www.msc-smc.ec.gc.ca/index_e.cfm
<http://www.meds-sdmm.dfo-mpo.gc.ca/cmoss/links.html>
<http://www.ucar.edu/ucar/>

Forecasts, Averages
Forecasts, Averages
Degree Day Data (NOAA)
US Climatologists List
First/Last Frost/Freeze (NOAA)
Sun Azimuths (USNO)
Canadian Meteorological Service
Weather Servers - Other Countries
UCAR & NCAT Weather Data

(Editor NOTE: Contents of this box are subject to massive update and revision without notice!)

the wind blew more often from the indicated compass direction. The colors indicate the wind speed, with the long red sections meaning that the wind blew often at 7-10 mph. Clearly, the wind in Erie comes mainly from the South and Southwest, so you want to orient hive entrances to the Southeast to avoid Erie's prevailing winds.

Since wind roses are most often plotted from more than a decade of data, they are much more useful than one's own observations during a limited time period.

Precipitation

The amount of rain affects blooming. You can track precipitation on both a year-to-date and a month-to-date basis. This data is often listed with the average temperature data. A severe "drought" period would indicate the need to consider providing apiary water for one's bees. Monthly precipitation totals for US cities can be found on the NOAA website.

The Sun

Over the course of the year the

apparent position of sunrise and sunset move around the horizon as the Earth tilts on its axis.

When placing hives, one may want to verify that terrain will not shade the hives during early spring. This is easy to do with nothing more than a sun azimuth chart and a compass.

An "azimuth" is a compass sighting of the sun at a particular time. It is given in terms like "degrees East of North", a complicated way of saying "degrees as shown on a compass aligned with true north". This data is available at the US Naval Observatory website and in almanacs.

Sunrise/sunset times for any day of the year at any location are also at the USNO website and at weather.com on the same page with the temperature data mentioned before. Clearly, sunrise time can be crucial when moving hives.

Complain about the weather all you'd like, but ignore it at your own peril! ☹️

James Fischer is nobody important, and likes it that way. He keeps bees and watches clouds in the Blue Ridge Mountains of VA.



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