

CHATS WITH THE WEATHER MAN

Friday, March 17, 1933.

(FOR BROADCAST USE ONLY)

Speaking Time: 10 Minutes.

OPENING ANNOUNCEMENT: And now a snappy, sparkling greeting from the Weather Man. For, today, the Weather Man chats with you about frost. He brings you his Weather Chats at this time every two weeks through the cooperation of the United States Weather Bureau.

--ooOoo--

Along about this time of year, folks in many parts of the country are keeping their eyes peeled for signs of frost.

Orchardists have fruit to protect and gardeners their truck crops.

So, today, we're going into a few simple points on when and where you can expect frosts and how the fruit or vegetable grower can protect his crops from frost damage.

Of course, as farmers learned long ago, frost protection begins with the location of your garden or orchard. You try to pick a place for your trees or vegetable crops where they will have good air drainage. If you put your orchard or garden in a low place or depression with no place for cold air to drain out, the heavy, cold air will flow down into the low place and stand there all night long like water in an undrained swamp. Crops or trees in those cold-air swamps may freeze on a night when crops or trees in a more favorable location escape unharmed. So, if you put out any truck crops or trees, pick a place where the cold air will drain away from your crops and trees.

But, of course, unless you protect your crops and trees in some way, they may freeze no matter how well the cold air drains away. So, let's take up a few simple ways to judge the danger of a freeze on a particular night and to tell whether your fruit or vegetables need protection.

First, we find you often can judge the danger of frost pretty well by the amount of moisture in the air.

When the air is close and damp, we're much less likely to have a bad frost than when the air is dry. Floyd D. Young, frost specialist in the Weather Bureau, explains why. When the air is full of moisture, the moisture acts about like a hover over a brood of chicks. It absorbs heat waves as they rise from the warm earth and reradiates right back down to the ground.

Then, the moisture in the air helps keep the air warm in still another way.

3/17/33

The invisible particles or molecules of moisture in the air are capable of furnishing a lot of heat. That may sound strange. But let's consider how that moisture got up in the air in the first place and what ~~keeps~~ it up there.

Suppose we have a kettle of cold water sitting on the stove. We light a fire under the kettle. The water gets warmer and warmer until it reaches the boiling point. After the water begins to boil, the temperature stays the same no matter how high you turn the fire. Why doesn't it keep on getting hotter? Well, after the water starts to boil, all the extra heat you put under the kettle goes to make steam -- wholly invisible gaseous water, not the fog you see beyond the spout, that is condensed steam. When this invisible water vapor, whether it comes from a kettle on a stove, or from the surface of a river or lake, is cooled it collapses, so to speak, and comes down as dew, or frost, or in some other way, especially as fog and cloud.

What happens to the heat when this condensation occurs? Does it vanish in some mysterious way?

No, as dew or frost begins to "fall" after sundown or fog or cloud forms, the heat escapes into the air. That heat does not warm the air to a higher temperature but keeps it from cooling as much as it otherwise would after the sun goes down. So, naturally, a lot of moisture in the air means a lot of heat will escape when the dew begins to "fall." A lot of moisture means less danger of frost.

Young has worked that idea into a simple rule. He says, "If the dew begins to 'fall' while the temperature is still as high as 45 degrees, you know the air is pretty well soaked with moisture. You also know the temperature will drop rather slowly during the rest of the night."

And then Young goes ahead to tell us the likelihood of frost depends not only on how much moisture is in the air overhead but also the amount of moisture underfoot. If the ground is wet from a heavy rain, the temperature may drop fairly steadily after sundown until it comes to that of the surface. Then, as the air cools further, the stored-up heat in the water escapes to it and helps check the fall in temperature.

So, there you have two pretty good guides as to the danger of a heavy frost during the night: We're not likely to get a heavy frost if the air is full of moisture or if the ground is wet.

Those two points tie in closely with a third point.

You've all heard the old saying, "Three days rain and then a frost." Well, Young tells us that old saying has some truth in it. For, as you know, our weather comes in bunches. We get a few days of rain and then a few days of clear weather. So, after three days of rain, we often get a night with a clear sky and very little wind -- the very kind of weather when you can expect a frost.

But, as a matter of fact, we're more likely to get a heavy frost the second night after a rain than the first night.

On the first night, the ground is still pretty wet. A lot of moisture is evaporating into the air. This evaporation lowers the temperature. However, when dew starts to fall, and again after the air has cooled to the temperature of the surface, the moisture in the air and the water in the ground let loose a lot of heat to the air. That heat tends to ward off a heavy frost.

But, by the second night, the ground has dried out somewhat, and the air is drier, and the wind has died down. So, we're likely to get our worst frost the second night after a rain.

By the time the third night rolls around, the weather usually has warmed up quite a bit. The temperature may be too high for frost. But you can't always depend on that. If the weather happens to be clear and cool over a wide stretch of country, and if weather conditions are rather settled, we may get a bad frost not only on the third night after a rain, but even as late as the fourth night.

So, there is another general rule about when to expect frost: We sometimes get a bad frost the first night after a stretch of rainy weather. But we're even more apt to get a bad frost the second night.

Then, of course, we can tell something about the danger of frost by the wind and the clouds.

As everybody knows, we usually don't get frost as long as a moderate wind is blowing. The reason is simple. The wind mixes the warmer upper air with the layer of cold air near the ground and so keeps the air near the ground above the freezing point.

We are also fairly safe from a heavy frost as long as heavy, low clouds cover the sky; that is, unless those clouds happen to pass away during the night. Here, again, the explanation is easy. Those clouds absorb the heat waves as they rise from below and reradiate heat back down to the ground.

But, remember, I'm speaking only of clouds that hang heavy and low. If the clouds are thin, and white, and fleecy-looking -- and if the clouds ride high up in the sky -- we may get a bad frost even when the sky is entirely covered. For those white, fleecy clouds -- the kind the weather men call cirrus clouds -- are little particles of ice floating around probably 20 or 30 thousand feet from the ground. Naturally, being 40 degrees to 50 degrees below zero, they don't send much heat to the earth. Neither do they help much in keeping away a frost.

So, we can say, a moderate wind or heavy, low-hanging clouds may prevent a frost. But those white, fleecy clouds riding high in the air have very little effect on the temperature.

And now let's run over the frost pointers Young has given us in one, two, three form:

First, put your orchard or garden in a place where it will have good air drainage.

Second, we're much less likely to have a bad frost on a night when the air is full of moisture than when the air is dry. If the dew begins to "fall" while the temperature is still above 45 degrees, you can look for a rather slow drop in temperature during the rest of the night.

Third, the saying, "Three days rain and then a frost," has considerable truth in it. However, we're more likely to get a heavy frost the second night after a rain than the first night.

Fourth, we're not apt to get frost when a moderate wind is blowing.

Fifth, heavy, low-hanging clouds usually keep away frost.

But, sixth, thin, white, fleecy-looking clouds have very little effect in keeping up the temperature.

--ooOoo--

CLOSING ANNOUNCEMENT: And that concludes another Chat With The Weather Man, brought to you by Station _____ through the cooperation of the United States Weather Bureau. We'll have another Weather Chat for you at this same time two weeks from today.

###

National Oceanic and Atmospheric Administration

ERRATA NOTICE

One or more conditions of the original document may affect the quality of the image, such as:

Discolored pages
Faded or light ink
Binding intrudes into the text

This has been a co-operative project between the NOAA Central Library and the Climate Database Modernization Program, National Climate Data Center (NCDC). To view the original document, please contact the NOAA Central Library in Silver Spring, MD at (301) 713-2607 x124 or Library.Reference@noaa.gov

HOV Services
Imaging Contractor
12200 Kiln Court
Beltsville, MD 20704-1387
July 23, 2010