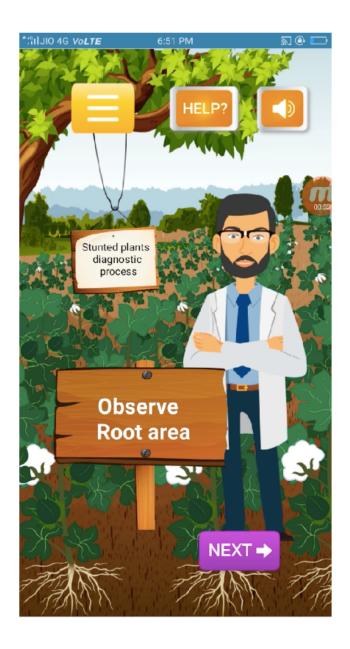
What the App will do?

- Unique voice based- Talking App for the illiterate farmers
- Four Indian languages (Hindi, Gujarati, Telugu & Kannada)
- Works on GPS location of the field and connects to weather data and background soil health data
- Runs software to monitor plant growth with heat units
- Runs software to measure air and soil temperature
- Runs software for water stress to recommend irrigation
- 56+ Animations on insect pests, diseases and diagnostics
- 146+ images related to diagnostics
- Printable pdf data sheets of information and recommendations related to the final diagnosis
- Compiles all diagnostics and issues voice advisories to communities within a zip-code area
- Image analysis to be linked to Artificial intelligence



What the App will do?

- Complete diagnosis for
- Soil health and plant health
- Soil nutrient deficiencies
- Insect pests and beneficial insects
- Diseases and nematodes
- Agrochemical toxicities
- Extreme weather changes
- **Based on diagnosis,** the App provides eco-friendly recommendations as animation movies and data sheets
- Connects data to 'core environmental and social sustainability indicators



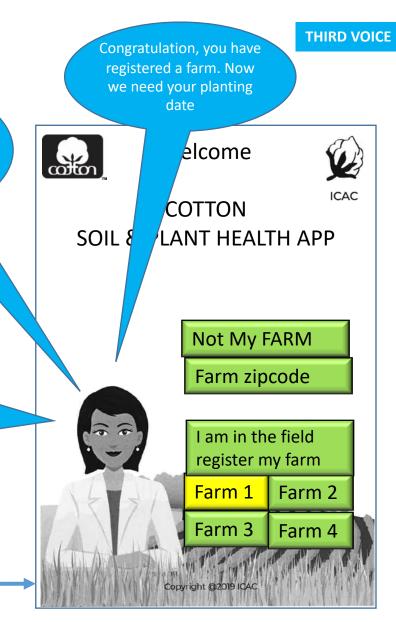
SECOND VOICE

You can also use the App for diagnosis even if you do not register a field, but we need the zipcode.

FIRST VOICE

Welcome to the cotton soil and plant health app. To provide the most accurate comments this App needs to register your farm while you are standing in it. Please walk into your farm and press a farm number. If you are not in your farm the App will take you to the general diagnostic section.

Static image of person in field. Replace grass with cotton plants



During 1st voice the Farm buttons appear then in 2 seconds

Play 2nd voice and NOT IN FIELD button appears

When NOT IN FIELD button is pushed, Farm Zip code button appears. When a valid Zip code is entered GO TO Home screen frame 6.

When Farm 1 button is pushed 3rd voice plays and goes to Month page frame 3

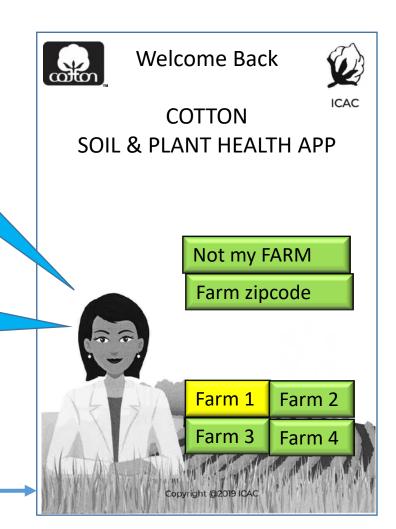


You have selected a field that needs to be registered. Please register it on the Welcome page

Welcome back, please select the farm you want to investigate by pushing on that button. You can also use the App for diagnosis on other farms.

FIRST VOICE

Static image of person in field. Replace grass with cotton plants

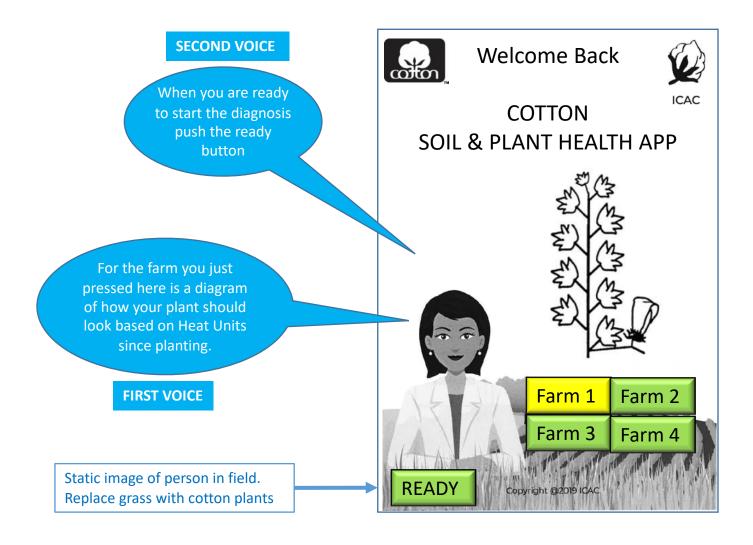


During 1st voice Farm buttons appear. When a previously registered farm button is pushed GO TO Welcome Back Page 2 if days<60. for days from planting >60 go to Home page, frame 6

Then 2nd voice and NOT MY FARM button appears.

If NOT MY FARM button is pushed, Farm Zip code button appears. When a valid zip code is entered go to Home screen frame 6.

If a non registered farm button is pushed 2nd voice plays and returns to Welcome Page.



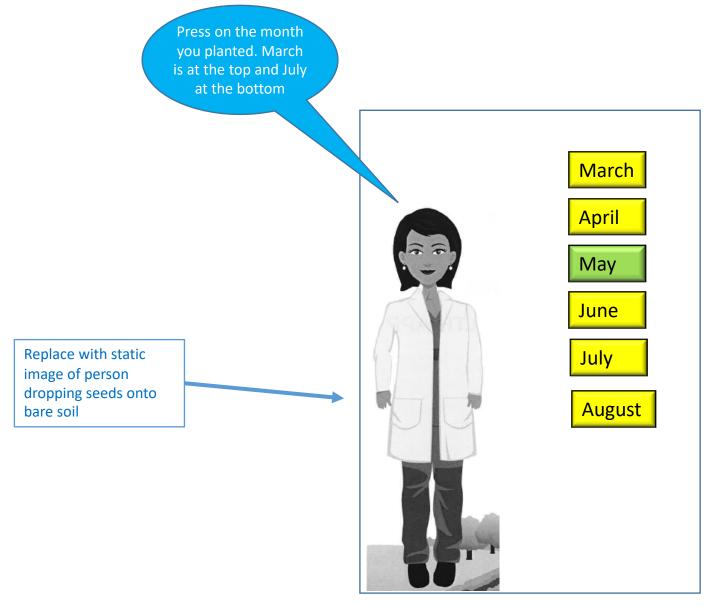
The Farm button should light up and the predicted plant should appear.

This is the same graphic as in frame 5 but will only be used for days after planting <60.

Delay 2 seconds then play the 2nd voice and READY button appears.

When READY button is pushed, GO TO Home screen frame 6

Frame 3, Month Page



Only include months of planting based on look up table from GPS. In this example May and June are the key months in this region so showing 2 additional months before and after.
Button lights up green when finger touches. She says the month when button touched and turns dark green when pressed while other buttons disappear.
GO TO Day page, frame 4

F Т Th Sa Su M W

Use same static image as in frame 3

Press on the day you planted



Use the same format as the Months in frame 3

After the planting day is selected the APP determines if it has been 5 days or more since planting and calculates DD60's for 5 days after planting.

For DD60<30 in first 5 days after planting say comment C6a in notes below and then GO TO frame 5

For 31<DD60<120 in first 5 days after planting say comment C6b and then GO TO frame 5

For DD60>120 in first 5 days after planting say comment C6c and then GO TO frame 5

Frame 5 first 45 days only Press on the plant to learn more Here is a diagram of how about heat units your plant should look or press NEXT to based on Heat Units identify problems since planting. in your field **SECOND VOICE FIRST VOICE** Static image of standing person **NEXT**

Comment C1a

Use this page for days after planting <60.

Show a stylized plant based on the following DD60s equation and look up table based on the following formula.

Convert daily max and min temperature to oF, average these two, then subtract 60 and accumulate starting 1 day after planting. For DD60 of 0-50 show nothing. DD60 of 51-100 show just cotyledons. 101 to 150 show cotyledons and 1 true leaf. 151 to 200 show 2 true leaves and cotyledons. Starting at 201 show only true leaves and increase leaf number by 1 for every 50 heat units. After the stylized plant appears she says

"press on the plant to learn more about heat units or press NEXT to identify problems in your field". After she speaks the NEXT button appears.

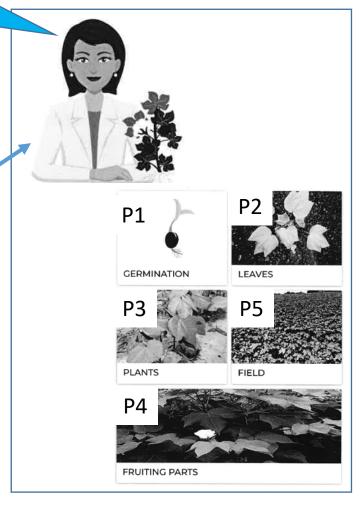
If the plant is pressed play C1a then GO TO Home page, frame 6. NEXT button pushed GO TO Home page, frame 6.

For days after planting >60 skip this frame and GO TO Home page, frame 6.

Frame 6, Home Page

Select the plant part
that you are
concerned is not
progressing or is
unhealthy:
Germination, Leaves
Plants, Fruit and Field

Static image of a person with a cotton plant from ICAC is good example.



Use the same format as the Months Page in frame 3. When voice mentions "germination", "leaves, "plants" "fruit" or "field" or the image is touched it lights up and the name is repeated.

When a button is pressed the APP GOES TO frame 7 for Germination, or frame 12 for Leaves.

AT THIS TIME WE ARE ONLY CREATING GERMINATION AND LEAVES SECTIONS

Frame 7 Comment 1

These pictures show healthy roots during germination. Click on the picture to learn how to examine roots. Do your roots look like these?

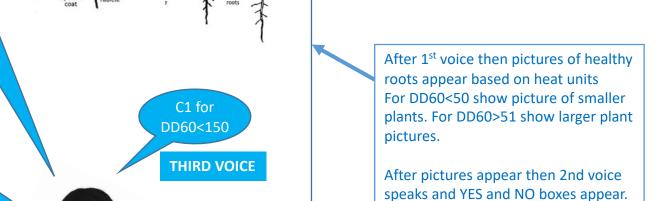
radicle emerging

SECOND VOICE

Problems with germination need to be investigated by carefully digging up at least 5 slow-emerging seedlings and inspecting the roots

FIRST VOICE

Static image of a person kneeling over in a bare field



YES

NO

If the root image is clicked the 3rd voice says C1 for DD60<150 then

If YES box is pressed go to frame 8

If NO box is pressed go to frame 10

returns to 2nd voice

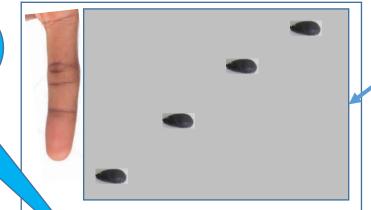
SECOND VOICE

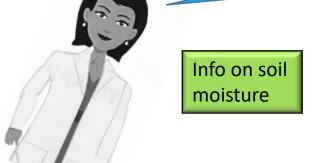
Emergence should have occurred by now so check the soil moisture. To learn more click the box.

Emergence should be occurring now so check the soil moisture. To learn more click the box

FIRST VOICE

Same static image of a person kneeling over in a bare field from frame 7





If <100 DD60 say 1st voice then 3rd voice and show diagram

If >100 DD60 say 2st voice then 3rd voice and show diagram

If Info on soil moisture box is clicked then run C2 then return to frame 8

If seed 1 or 4 is touched GO TO C3 and then frame 9
If seed 2 or 3 is pressed GO TO frame 9

If the soil is moist how deep is the seed? Press the seed that best represents the depth from the surface compared to your finger

THIRD VOICE

Frame 9 roots healthy, depth ok and moistures ok Comment C4, C7, C8, Q12

It is possible that the seeds are weak. For info on Seed Testing click on this box, but since this takes 7 days for now we will assume the seed is ok and check on other causes of slow emergence

SECOND VOICE

If the seed has washed away you must fill in the gaps. For info on gap filling click on the box

FIRST VOICE

Standing image of a person in a bare field from frame 5

Is it also possible that your soil is salty which delays germination. To learn how to test for salinity click the salinity box

Picture of thick shank and crusting from animation

San. 'ty Testing

Seed Testing

Gap Filling **THIRD VOICE**

Another problem could be crusting.
Click the picture if you see this problem

FOURTH VOICE

Hopefully this has been helpful, we will remind you next year of the issues in your field

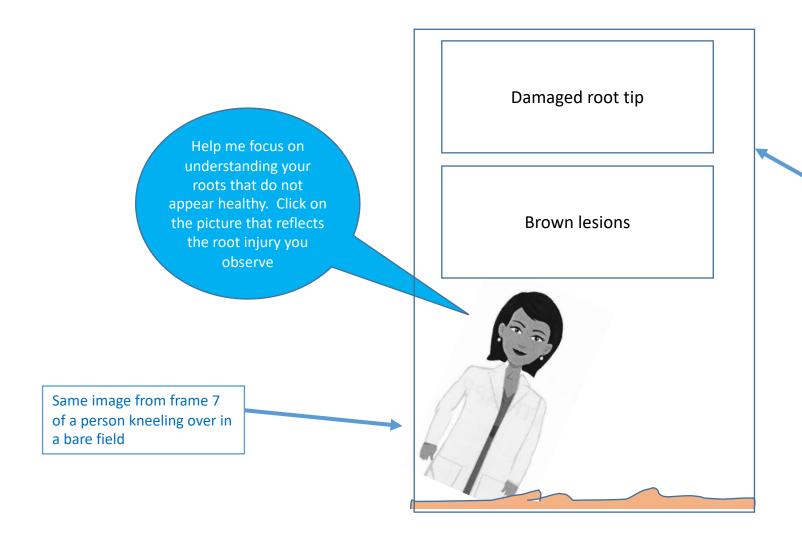
FIFTH VOICE

Say first voice then show Gap Filling Box then Say second voice and show Seed Testing Box, then say 3rd voice and show Salinity Box, then say 4th voice and show thick shank picture

When finger touches each box the voice says "info on gap filling" or "info on seed testing" or "info on Salinity" or "info on crusting" for each pressed box go to comment C4 for gap filing, C7 for crusts, C8 for salinity, Q12 for Seed Testing.

After the comments from each box or if no box is pressed after 5 seconds say 5th voice.

If Seed Testing box is pressed, APP brings up frame 11 in 7 days.



At same time as voice, show all pictures

When Black Root Tips is pushed play C10

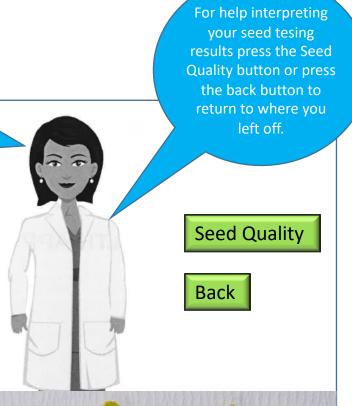
When Brown Lesions is pushed play C11

Frame 11 seed testing results

Comment C5

It is time to unroll the moist towel used to check the seed germination. If less than 7 of the seeds have a root less than 4 cm this is likely a low quality seed lot.

FIRST VOICE



4 cm-

Open with 1st voice and show pictures of healthy roots.

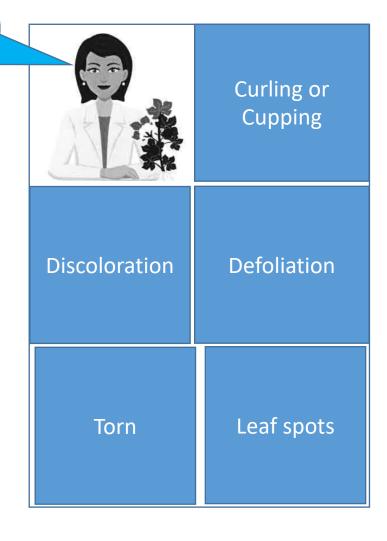
Person should be pointing to roots.

After 3 seconds play second voice and show Seed Quality and back buttons which returns the user to where he/she left off

Seed Quality button GO TO C5 and a back button which returns the use to where he/she left off

Frame 12, leaf categories of problems

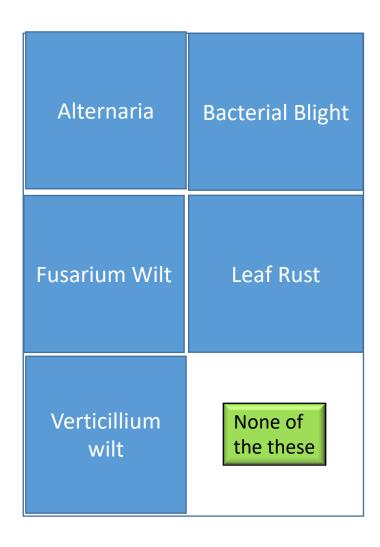
To help us better guide you to a diagnosis and corrective action please select the types of leaf damage you are concerned with



Open with voice and show 5 pictures

When any button is touched, say the words on the button.

Leaf spots GO TO frame 13 Curling or cupping GO TO frame 15 Discoloration GO TO frame 16 Defoliation GO TO frame 22 Torn GO TO frame 24 Do any of these leaf spots look like the problem in your field



Open with voice and show 5 pictures

After 2 seconds show "None of these" button.

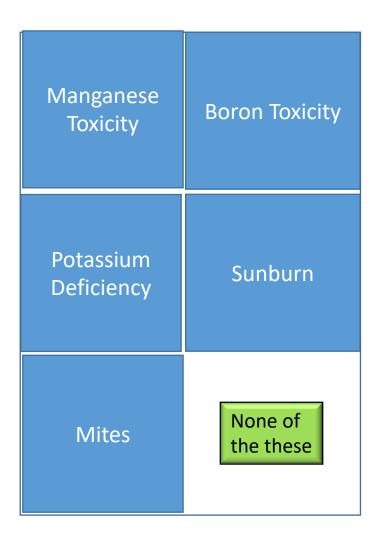
When any button touched, say the words on the button.

When pushed go to C13 for Alternaia, C14 for Bacterial Blight, C15 for Fusarium Wilt, C16 for Leaf Rust, C17 for Verticillium Wilt.

When None of These button is pushed GO TO frame 14

Frame 14 leaf spots but not disease Comments C18, C19, C20, C21, C22, C88

> Here are 5 more causes of leaf spots. Do any of these match your field?



Open with voice and show 5 pictures

After 2 seconds show "None of these" button.

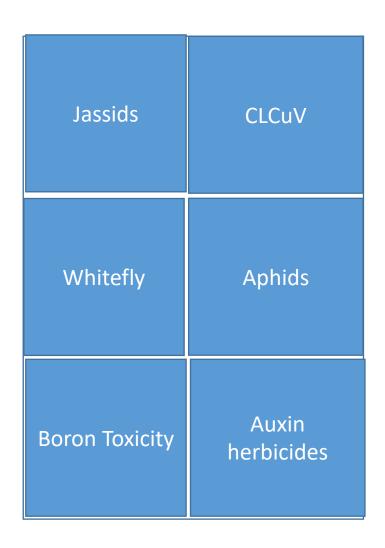
When any button touched, say the words on the button.

When Mn is pushed GO TO C18, C19 for Bo, C20 for K, C21 for Sunburn, C22 for Mites.

When None of These button is pushed GO TO C88

Frame 15 Leaf curled or cupped Comments C19, C23, C24, C25, C26, C51

Do any of these symptoms of leaf curling or cupping appear in your field



Open with voice and show 5 pictures

After 2 seconds show "None of these" button.

When any button touched, say the words on the button.

When pushed go to C25 for Jassids,

C26 for CLCuD,

C23 for Whitefly,

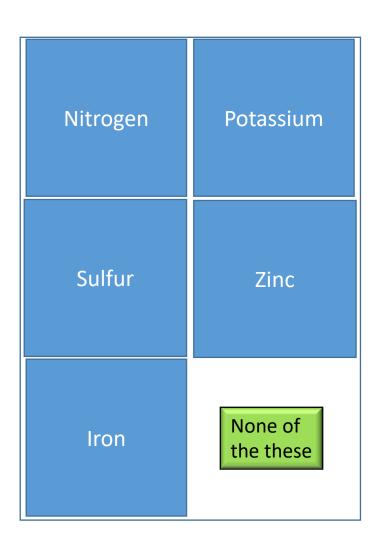
C24 for Aphids,

C19 for Boron.

C51 for Auxin

Frame 16 Discoloration from nutrient deficiency Comments C20, C30, C31, C39 and C40

Healthy leaves are green. Nutrient deficiencies cause specific leaf symptoms



Open with voice and show 5 pictures of classic nutrient deficiency

After 2 seconds show "None of these" button.

When any button touched, say the words on the button.

N go to C40

K go to C20

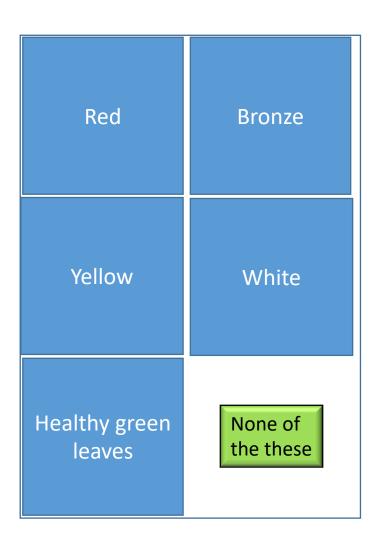
S go to C39

Zn go to C31

Fe go to C30

For "None of these" GO TO frame 17

Many stresses discolor leaves. What color are your leaves.



Open with voice and show 5 pictures

After 2 seconds show "None of these" button.

When any button touched, say the words on the button.

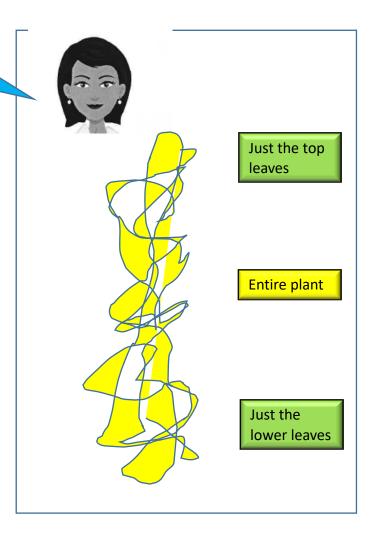
GO TO frame 6 and omit "leaves" when Healthy green leaves is pushed GO TO frame 15 for Yellow GO TO frame 19 for White, GO TO frame 20 for Bronze if DD60>1000 or if <1,000 go to frame 21 GO TO frame 20 for Red.

For "None of these" GO TO frame 19 and do not show "discoloration" picture.

Frame 15 yellow leaves Comments C30, C39, C40

Where are most of the yellow leaves?

Just the top leaves
Just the lower leaves or,
entire plant



Open with voice and show buttons as voice says each of the 3 options, Top, Lower and Entire.

If pushed top, then GO TO C39
If pushed Lower, GO TO C40
If pushed Entire, GO TO C30

ani

Some herbicides cause leaf whitening. Do you YES have symptoms like these? Pictures of herbicide injury

Open with voice and show YES and NO buttons and pictures after the voice.

If pushed YES, then go to C88

Frame 20 bronze leaves Comment C20, C31

Look at the pictures of Potassium deficiency. Is this occurring in your field



Pictures of K deficiency

Pictures of Zn deficiency

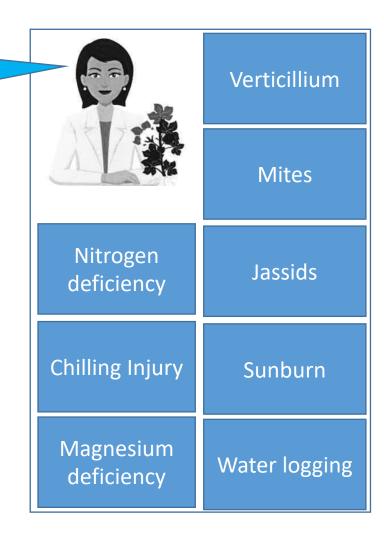
Open with voice and show YES and NO buttons and pictures during the voice.

If pushed K, then go to C20

If pushed Zn, then C31

Frame 21 red leaves Comments C17, C21, C22, C25, C38

Red protects leaves from many stresses.
Start by selecting the picture that best fits your plants.
You will receive help to verify a cause or return to this screen to consider other causes of red leaf stress



Open with voice and all pictures.

If Verticillium go to C17

If Mites go to C22

If Jassids go to C25

If Sunburn go to C21

If water logging go to C38

If N deficiency go to C40

If Chilling Injury go to C85

If Magnesium go to C??????????????

Where is most of the defoliation occurring

FIRST VOICE

Open with 1st voice and show buttons as voice says each of the 3 options, Top, Lower and Entire.

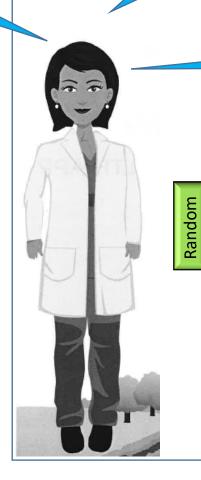
If pushed top, say 2nd voice and GO TO frame 24

If pushed Lower, GO TO frame 23 If pushed Entire, say 3rd voice and GO TO frame 23 after 3 seconds.

If pushed Random GO TO frame 24

Defoliation first in the top of the plant is usually caused by insects and sulfur defiency

SECOND VOICE



Just the top leaves

Entire plant

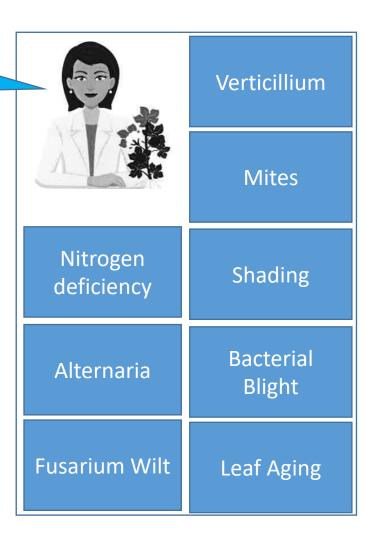
Just the lower leaves

Defoliation in the entire plant likely started in just the lower leaves.
Examine plants where just the lower leaves have shed

THIRD VOICE

Frame 23 defoliation in the Lower plant Comments C13, C14, C15, C17, C22, C40, C86, C87

Defoliation first in the bottom of the plant has many causes Start by selecting the picture that best fits your plants. You will receive help to verify a cause or can return to this screen to consider other causes of defoliation.



Open with voice and all pictures.

If Alternaria GO TO C13
If Bacterial Blight GO TO C14
If Fusarium Wilt GO TO C15
If Verticillium GO TO C17
If Mites GO TO C22
If N deficiency GO TO C40
If Leaf Aging GO TO C86
If Shading GO TO C87

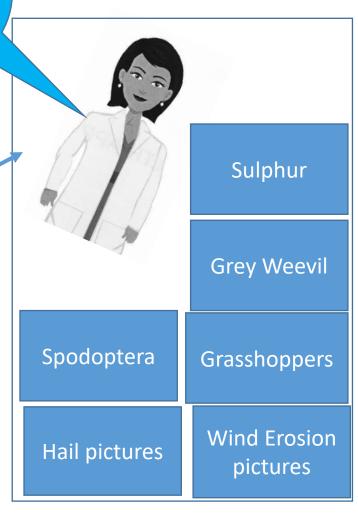
Have back button on each C page

Frame 24 torn leaves Comments C32, C33

> Several insects feed on leaves do you see these insects . Also consider sulfur, hail and erosion

FIRST VOICE

Show picture of someone holding a leaf close to their face and inspecting for insects.



Open with 1ST voice and all pictures.

If Spodoptera GO TO C32
If Grasshoppers GO TO C33
If Gray Weevil GO TO C33
If hail GO TO C84
If erosion GO TO C35
If Sulphur GO TO C39