

## Storm Damaged Onions – What Next ?

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Severe storms with high winds, hail, and blowing soil particles can injure onion leaf, neck and bulb tissues. White to yellow spots, holes, cankers, round to irregular in shape and size develop on damaged tissue. Defoliation caused by hail is one of the most damaging effects of a storm. Hail damage reduces functional leaf area and predisposes the plant to infection by plant pathogens including bacteria and fungi. Storms can also affect bulb growth and development, and storage quality and longevity. Defoliation has a greater impact on marketable yield classes (colossal, jumbo, mediums) when it occurs near the onset of bulbing. After a storm event, it is important for growers, consultants and insurance adjustors to evaluate the extent of damage to the onion crop at that particular stage of growth and determine if the crop can be salvaged and taken to harvest. This will help growers and shippers make an informed and economically viable decision on insurance claims or subsequent production and pest management strategies. The following diagrams were developed by the Onion ipmPIPE project to help define onion growth stages and to record pertinent crop information related to storm damage. Additional resources can be obtained at the following web sites: <http://apps.planalytics.com/aginsights/pipehome.jsp> and <http://onion.coop/>.




FIGURE 1




FIGURE 2



FIGURE 3



FIGURE 4



**Onion ipmPIPE**  
Diagnostic Pocket Series

### Storm Damaged Onions

*Allium cepa L.*

**AUTHORS:** H. F. Schwartz (Colorado State University)  
**PHOTOGRAPHS:** Courtesy of H. F. Schwartz [01/2011]

**ALLIUM TYPE:** Fresh Market and Storage Onion; protocols based on National Crop Insurance Standards; compare damaged and non-damaged portions of field or fields of the same variety, plant age

- \_\_\_\_\_ Record Stage of Plant Growth (V1 to R9)
- \_\_\_\_\_ Record Dates of planting, storm event(s), evaluation
- \_\_\_\_\_ **ESTIMATE PLANT STAND LOSS (NUMBER/ACRE)** [FIG. 1]  
Measure number of plants between furrows (bed width) by 10–20 ft [3–6 m] = 1/1000 Acre [Hectare] at 5 to 6 representative sites in the affected area or field
- \_\_\_\_\_ **ESTIMATE DEFOLIATION (PERCENT LOSS)** [FIG. 2 & 3]  
Estimate percent of foliage damaged (bruised) or removed by the storm activity (10–20 ft [3–6 m] x 1 bed wide at 5 to 6 sites)
- \_\_\_\_\_ **ESTIMATE BULB DAMAGE (PERCENT AFFECTED)** [FIG. 4]  
Evaluate percent of 50–100 bulbs at 5 to 6 sites for evidence of storm damage (as cuts, nicks, dents, bruises) on exposed outer 2–3 fleshy scales



## Onion ipmPIPE Diagnostic Pocket Series

### Bulb Growth Stages of Onion

*Allium cepa* L.

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**PHOTOGRAPHS:** Courtesy of H. F. Schwartz [01/2011]

**ALLIUM TYPE:** Fresh Market and Storage Onion

Both pre- and post-bulb production are technically vegetative growth phases that occur during the first cycle of growth after planting (seeds, transplants, sets).

#### PRE-BULB GROWTH STAGES

- 1 • radical and flag leaf emergence (10–30 days post seeding) [Fig. 1]
- 2 • one to two true leaves (30–50 days p.s.)
- 3 • three to four leaves (50–70 days p.s.) [Fig. 2]
- 4 • five to seven leaves (70–90 days p.s.) [Fig. 3]
- 5 • eight to 12 leaves, bulb initiation (90–110 days p.s.) [Fig. 4]

#### POST-BULB GROWTH STAGES

- 6 • bulb diameter of 2.5 to 4.0 cm (110–130 days p.s.)
- 7 • bulb diameter of 4.0 to 7.5 cm (130–150 days p.s.) [Fig. 5]
- 8 • bulb diameter greater than 7.5 cm (150–170 days p.s.)
- 9 • bulb enlargement complete, greater than 50% cropped to dry down (more than 170 days p.s.) [Fig. 6]

Reproductive Stages do not technically begin until the second cycle of growth after vernalization of the mature bulb; the bulb will then produce a scape or seed stalk [Fig. 7] and umbel [Fig. 8] which produces true seed after fertilization.

## Onion ipmPIPE Diagnostic Pocket Series



### Bulb Growth Stages of Onion

*Allium cepa* L.



FIGURE 1



FIGURE 2



FIGURE 3



FIGURE 4



FIGURE 5



FIGURE 6



FIGURE 7



FIGURE 8