Sunflower Bloom-Growth Staging for Sunflower (Head) Moth Control

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- **R4**: The inflorescence (flower) begins to open. When viewed from directly above immature yellow petals (these are actually not flowers) are visible. (You are looking at the back side of these soon-to-be showy ray petals.)
  - Some producers see this initial yellow color and tend to include these as "in bloom" when determining stage of growth and % bloom for timing sunflower (head) moth sprays
- **R5**: This stage is the beginning of true physiological flowering. The stage is divided into sub-stages depending on the percent of the head area (disk flowers) that has completed or is currently flowering (e.g., R5.3 is 30%, R5.8 is 80%, etc.).
  - R5 is based on head area, not the fractional distance from the edge to the center, e.g. if the head is flowered in about 30% from the outside edge the total area of the outside 30% of the head is about 50% of the total head area, hence R5.5).
- For a full-season guide to sunflower stages of growth:
  - http://www.ag.ndsu.edu/pubs/plantsci/rowcrops/a1145.pdf
  - http://www.sunflowernsa.com/growers/growth-stages/

Sunflower Bloom Stages
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Upper left: Pre R4, no ray petals showing yet on the face of the head.

Upper right: Early R4, bracts are starting to pull back, and you can see the back side of the ray petals.

Lower left: Mid R4, bracts are further pulled back, you can see the raw petals more.

Lower right: Late R4, back side of ray petals are fully exposed, and are starting to lift off the face of the head but not yet erect. This head is still not at physio-logical bloom, but will be the next morning.

The sunflower heads depicted here are not "in bloom" and would *technically* not be counted in actual sunflower % bloom. However, practical insect management guidelines for the timing of the initial sunflower (head) moth sprays with pyrethroids or similar insecticides—*as historically developed and recommended by Texas A&M AgriLife entomologists*—will count late R4 as blooming when determining percent field bloom.

Sunflower Bloom Stages
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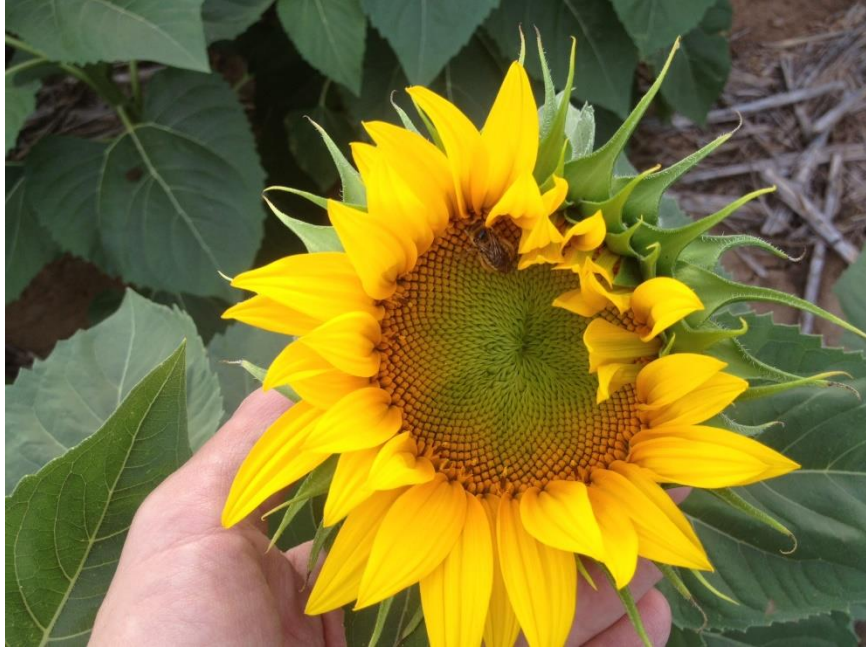
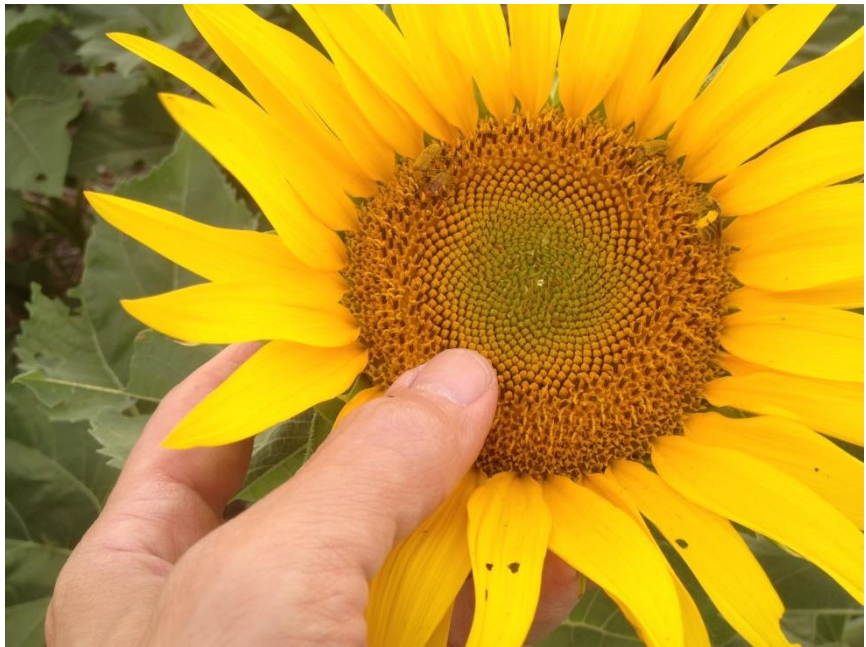
Upper left: R5.0, some ray petals now stand erect and part of the face is exposed. In a close up view there is actually 1 floret (disk flower) that is in bloom just above thumb tip.



Upper right: R5.05, all ray petals are now erect or open and there are florets around the outside edge of the head that have started flowering.

Lower left: R5.1, all the way around the outside edge of the head there are disk flowers in bloom, about 10% of total area of the face of the sunflower.



Lower right: R5.5, about half of the total area of the face of the head is or has already bloomed. The darker erect structures are about ¼” in length, and they bloomed the morning the picture was taken.

Sunflower Bloom-Growth Staging Differences

Individual Head Bloom vs. Field Bloom

- The previous slides describe the opening of the sunflower head to expose the true (disk) flowers and the initiation of physiological bloom. This is the bloom for an individual head.
- Field Bloom is determined differently. In this case it is a measure of ALL sunflower heads that are in any stage of physiological bloom, regardless of the degree of bloom an individual head is in. All blooming heads are counted equally toward Field Bloom whether just at initial bloom (R5.0), late bloom (R5.9), or even completed bloom.
- For timing of sunflower (head) moth sprays use Field Bloom to gauge decisions about your initial application.
  - Texas A&M AgriLife entomologists who have developed the sunflower insect timing recommendations for sunflower included any head with ray petals that are lifting off the face of the flower or have already become erect (even if physiological bloom is not present)
  - If growers and scouts count heads from late R4 toward Field Bloom that is desirable and in line with Texas A&M AgriLife recommendations as timing of sunflower (head) moth sprays is critical. Texas A&M AgriLife believes timing is your most important control decision for this insect, more so than what insecticide you use. Thorough coverage is also very important. Extension would rather you spray a day early than spray a day late.