Canola Growth and Development

**Emergence**
The hypocotyl pulls the cotyledons above the soil surface. The growing point is between two cotyledons. The taproot grows vertically and the secondary roots grow as the cotyledons become flat. The neonot is in a position where it can be observed. The taproot grows vertically and the secondary roots grow in a position where they can be observed. The hypocotyl pulls the cotyledons above the soil surface. The growing point is between two cotyledons. The taproot grows vertically and the secondary roots grow as the cotyledons become flat. The neonot is in a position where it can be observed.

**SECOND LEAF**
Two leaves fully expanded. The rate of leaf expansion is 7 to 10 days per leaf. Rapid canopy establishment improves light capture, water, and nutrient availability.

**Management:** Scout for insects, weeds, and diseases. Watch for early-season symptoms of blight or rust. Use disease-resistant varieties.

**FIFTH LEAF**
Four leaves fully expanded. The total number of leaves a plant produces depends on factors such as genetics, planting date, soil nutrient levels, and moisture.

**Management:** Complete weed control by 4 to 6 weeks after emergence. Take a foliar nutrient test to determine if additional nitrogen is needed. Apply a foliar fungicide if blackleg lesions or blue mold are present.

**SIXTH LEAF**
Six leaves fully expanded. This is the maximum number of leaves needed before dormancy. Canola may produce 10 to 15 leaves on the main stem. The end of leaf development coincides with vernalization.

**Management:** Continue scouting for blackleg lesions. Nutrient and water demands increase until the overwintering stage.

**Overwintering**
Canola overwinters in the rosette stage. The stem becomes fibrous. The plant produces smaller leaf cells with a higher proportion of insoluble substances, increasing freeze tolerance.

**Management:** Apply nitrogen in a split approach, with a quarter to a third applied preplant, and the remainder top-dressed at spring greenup. Sulfur is also critical and can be applied in the fall or with the nitrogen top-dress. Apply herbicides as the plant resumes growth in the spring. Scout for army cutworm.

**Stem elongation**
Growth resumes when days length and average temperatures reach 40 degrees Fahrenheit. Stem elongation begins with leaf expansion and the initiation of flower buds. In the absence of the upper leaves, the main shoot emerges from buds. Each branch develops one to four leaves and a flower bud cluster. Fifteen to 20 leaves develop.

**Management:** Nutrient demand increases significantly and the plant is more susceptible to frost damage.

**10% Flowering**
10 percent of the flowers are open. Flowering begins when the first flower buds, usually on the main stem and continuing upward, with these or more flowers appearing each day. Secondary branches begin flowering 2 to 3 days later.

**Management:** Drought and heat may limit branching and reduce yield. Fertilizing improves flower bud development. Using slow-release fertilizers can help control blackleg.

**30% Flowering**
30 percent of the flowers are open. Seeds per pod are defined as the opening of the flower. A reduction in photosynthesis or capacity can cause flower abortion, reducing potential pods and seeds per pod. About 40 percent of open flowers become productive pods.

**Management:** Evaluate the risk for sclerotinia stem rot, especially if the field or neighboring fields have a history of canola. Fungicide applications should be made at 30 to 50 percent flowering to control sclerotinia.

**50% Flowering**
50 percent of the flowers are open. Flowers that opened in the first 10 days and were successfully pollinated are forming pods and seeds. Flowering usually lasts 30 to 40 days. A healthy pod can be critical for seed development. Maximum pod fill rate is achieved.

**Management:** Several flowers can be lost due to stress conditions and the plant can still recover if leaf, stem, and pod areas remain undamaged as conditions improve. Scout for insects and disease issues that feed on flowers and pods.

**90% Flowering**
90 percent of the flowers are open. Active seed formation is progressing in early formed pods, and more pods are developing. Competition for resources between open flowers and pods interrupts flowering. Pods are expanding rapidly, reaching maximum fresh weight and length by the end of June in the northern tier.

**Management:** Powdery mildew and Alternaria spp. may reduce seed and set if wet conditions are prevalent at late flowering/early pod filling. Fungicides may be applied.

**Beginning ripening**
The occurrence of downy mildew can turn into a problem in the future. Damage to the plant can result in yield loss. Nutrient and water demands increase until the pod is fully developed.

**Management:** Scout for early signs of disease or nutrient deficiency. Begin harvest as soon as the crop is fully ripe. Canola swathed in a windrow ripens in 4 to 12 days.

**Fully ripe**
Seeds are mature and losing moisture, and final seed weight has been achieved. All pods have reached maturity and are split easily along the center membrane.

**Management:** Harvest should occur at 8 to 10 percent seed moisture. Begin harvest as soon as the crop is fully ripe. Canola swathed in a windrow ripens in 4 to 12 days.

**Pod and Seed Development Timeline**

<table>
<thead>
<tr>
<th>Stage</th>
<th>Days</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>10% Flowering</td>
<td>30</td>
<td>10% of flowers open.</td>
</tr>
<tr>
<td>30% Flowering</td>
<td>40</td>
<td>30% of flowers open.</td>
</tr>
<tr>
<td>50% Flowering</td>
<td>60</td>
<td>50% of flowers open.</td>
</tr>
<tr>
<td>90% Flowering</td>
<td>80</td>
<td>90% of flowers open.</td>
</tr>
<tr>
<td>Beginning Ripening</td>
<td>100</td>
<td>90% flower set.</td>
</tr>
</tbody>
</table>

**Sparking**
Pods are light green and moist. Seeds are brown, green, and firm when rolled between thumb and forefinger. 30 to 40 percent moisture.

**Turning**
Pods are turning light green to yellow. Seeds are dark green, and turning 30 to 40 percent moisture.

**Fully Turned**
Pods are turning light green to brown. Seeds are dark brown or black. 20 to 30 percent moisture.

**Top third**
Pods are light green and pliable. Seeds are green and firm when rolled between thumb and forefinger. 40 to 45 percent moisture.

**Middle third**
Pods are turning light green to yellow. Seeds are dark green, and turning 30 to 40 percent moisture.

**Bottom third**
Pods are turning light green to brown. Seeds are completely formed (dark brown or black). 20 to 30 percent moisture.

**Vegetative**

- **Emergence**
- **Second Leaf**
- **Fourth Leaf**
- **Sixth Leaf**
- **Overwintering**

**Reproductive**

- **10% Flowering**
- **30% Flowering**
- **50% Flowering**
- **90% Flowering**
- **Beginning Ripening**
- **Fully Ripe**

**Pods**
- **Pod Development**
- **Pod and Seed Development Timeline**

**Seeds**
- **Seed Development**
- **Seed Moisture**
- **Seed Weight**

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**Procrop Canola Growth and Development**

**Reproducible**

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**K-State Research and Extension**

**Great Plains Canola Production Handbook**

**Oklahoma State University – Kansas State University – University of Nebraska**

**Prosoco Grown and Development**

**State of New South Wales, Australia, through Department of Primary Industries**

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