First Report of Horned Lark Damage to Pre-emerged Winter Canola Seedlings
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Winter canola is considered the most promising, domestically-produced oilseed feedstock for the biodiesel industry and for diversifying wheat-based cropping systems in the Inland Pacific Northwest (PNW). Winter canola field experiments conducted in east-central Washington were completely destroyed, and commercial fields were damaged, over several years by large flocks of horned larks (\textit{Eremophila alperestis} L.) that ate the cotyledon leaves of pre-emerged and newly-emerged seedlings (Fig. 1). Horned larks are permanent year-round residents of the PNW. Through the years, several measures were attempted to control horned lark damage in newly-planted winter canola fields. These were:

(i) A loud propane-powered noise cannon (such as that used in fruit orchards) was placed inside the plot area and set to explode at one-to five-minute intervals. Explosions initially caused the birds to take flight, but they soon returned to feeding. Horned larks soon became accustomed to the cannon booms, after which they fluttered briefly about a meter off the ground before resuming feeding.

(ii) Bird netting such as used to protect cherry trees was spread on the surface of a 0.5-acre irrigated winter canola experiment the day after planting. Segments of netting were connected with plastic ties. Horned larks wedged themselves underneath the netting in small gaps where netting segments were attached and travelled under the netting to eat pre-emerged cotyledon leaves. Several dozen horned larks died after becoming trapped in the netting. The sight of dead horned larks did nothing to deter their companions. Essentially all canola seedlings in the experiment were destroyed.

(iii) Concurrent with placing bird netting on the soil surface, a life-size great horned owl replica was mounted on a 5-ft-tall perch in the plot area two days after planting. This appeared to have little to no effect on deterring horned larks.

(iv) A large quantity of garlic was mixed with canola seed in the drill before planting. Immediately after planting, additional garlic was then mixed with water and applied uniformly on the soil surface with a plot sprayer. A light water irrigation of 3 mm was then applied to incorporate garlic into the surface soil. A very strong odor of garlic was emitted from the plot area following these treatments. This had little to no effect as horned larks completely destroyed the plot before seedlings emerged from the ground.

Repellent seed treatments can be used to protect newly-planted crops from bird depredation. In 2016, we will field test a non-toxic anthraquinone-based seed treatment for the protection of pre-emerged and newly-emerged winter canola seedlings from horned lark depredation.
Fig. 1. The Horned lark is a ground-dwelling bird commonly found in open areas and in fallow fields throughout North America. Photos by Terry Sohl (with permission) and S.J. Werner.