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Drones put to work hunting weeds

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Alberta Agriculture weed researcher Chris Neeser, left, talks with Alberta Wheat Commission grower relations co-ordinator Brian Kennedy about using small, unmanned aircraft to photograph and identify weed problems in fields during a July 17 field day in Cypress County, Alta. | Barb Glen photo

> Alberta Agriculture experiment | Researchers explore new ways to use images taken from unmanned aerial vehicles

CYPRESS COUNTY, Alta. — Weeds cannot duck and cover when a drone flies overhead. Researcher Chris Neeser is counting on that.

The Alberta Agriculture weed pest specialist is experimenting with using unmanned aerial vehicles (UAVs), also called drones, or radio controlled aircraft, to identify weed problems in crops.

Neeser is working with Jan Zalud of JZ Aerial in Calgary to develop a protocol on how to acquire and process overhead field imagery captured by UAVs and then determine how accurate, useful and economical it is in identifying weed issues.

He will compare the results with conventional methods for weed identification and scouting.

At a field day in Cypress County near Medicine Hat July 17, Neeser said farmers are interested in aerial technology, and many have either bought a UAV or are thinking about doing so.

“Is this just a toy or is it actually something that will help you make money?” said Neeser.

He and Zalud started to answer that question by collecting normalized difference vegetative index (NDVI) images of quarter section fields in Alberta’s Starland and Newell counties.

JZ Aerial is using a commercially available camera attached to a small, fixed-wing craft. The camera filters have been modified to photograph near infrared, green and blue instead of filtering out the near infrared spectrum.

The plane flies a grid pattern, taking a photograph every 2.8 seconds. It makes 11 passes on a quarter section and can be flown manually or using an autopilot program.

Near infrared images make plants stand out in the photographs, said Neeser. Areas of lush foliage reflect a greater amount of infrared light.

“Of course, the more plants there is, the better the canopy, the more photosynthesis, in other words, and the more of that infrared you get.”

His experiment results in photographs showing six centimetres per pixel, which is not enough to see individual leaves but does show rows and the area between them.

“For the purposes of this project, we don’t need centimetre accuracy. We’re happy with half a metre or so.”

After the UAV collects the photographs, the multiple images are stitched together to form an image of the entire field. Distortions are removed by adding ground reference points and GPS location to the data.

Neeser said his research is in the early stages, but he sees promise.

“When it comes to looking for weeds, this is something that may be useful for detecting weed patches in fields at the early stages just after seeding, when you have to make decisions about your weed control,” he said.

Its usefulness in weed identification may be limited in later crop stages, he added.

However, UAVs could be useful in early identification of other crop problems, such as late blight in potatoes.

Lloyd Van Eeden Petersman, a field representative with Taber Home and Farm Centre, said he sees that potential, although UAVs will never replace personal field scouting.

“It will never replace walking through your field. It may give you an idea of which piece of the field you need to watch, which field you need to walk, which parts of the field you need to walk … if they can start measuring water deficiencies or with a thermal camera measuring hot spots in the field,” he said during a July 23 corn field day near Taber, Alta.

Take potatoes. If there’s areas where there’s high insect pressures or disease pressures building, the plant should start to show that internally just by temperatures, by stresses, long before you can see that from the gravel road.”

Van Eeden Petersman is working with Felix Weber of Ag Business and Crop Inc. in Ontario to test UAVs on cornfield scouting.

Zalud said other UAV field uses include collecting data on moisture levels, hail damage, herbicide treatment response, field traffic patterns, soil compaction, water runoff, irrigation problems and delineation of zones useful for prescription mapping.