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Looking At GPS Trackers For Guard Dogs

Keeping track of livestock guard dogs (LGDs) has gone high-tech with GPS trackers. Collar units are available in a variety of styles using cell phone services, satellite communications and, more recently, Long Range Wide Area Networks (LoRaWAN) systems. Picking which one is best for an LGD owner can be a challenge, suggests Bill Costanzo, LGD research associate with Texas A&M.

"Key features to consider are battery life, monthly service cost and if it's waterproof," says Costanzo. "When we started working with trackers, some lasted only a couple of days, a week at the most. The ones we work with now go from 30 days to 150 to 160

days. They can report on the dog's location every 15 min., and the battery will last for 5 or 6 months."

How often a tracker is programmed to report can also affect battery life. That extended battery life is available with LoRaWAN trackers. Relatively new for LGD GPS location, the trackers use repeaters at 4-mile intervals to collect reports and forward them to the LGD owner. If traditional power isn't available, the repeater may be powered by a solar array.

"Tracker features are also important," says Costanzo. "Some are pretty advanced. They can tell you how fast a dog is traveling; some can tell the dog's temperature. That can

be important with a young dog that chases livestock. You need to know when it happens and correct it."

Monthly service fees are important, he adds. However, actual service may be even more important. "Is there an operator you can talk to? If so, are they available 7 days a week or less? Are they open 24 hours a day or 8 to 5? Some offer only online chats or email responses. See what you are paying for," says Costanzo.

Another key feature to consider is how it communicates with the LGD owner. "Does it use cellular or satellite service to communicate with the LGD owner?" asks Costanzo. "This can affect battery life, but also may also limit options."

In the case of cellular service, Costanzo recommends asking if a tracker is set up for your local service provider, or if it takes a multi-service SIM card to work with multiple service providers. "Some of our trackers get service from multiple companies, but they may not all be great every day," he says.

Software offered with the tracker is another feature to explore. "Is it easy to use?" asks Costanzo. "Every company has phone apps, but some are not very good. Others allow you to do everything on your device that you could do on your computer."

The grazing specialist warns against getting into a long-term contract. "Don't go more than a year at a time," he says. "The technology is constantly changing with new

features and longer battery life."

Costanzo has tried a few different commercial trackers sized to fit on a dog's collar. Currently, he's working with 40 to 50 trackers. Until recently his highest recommendation has been the Oyster3.

It can use either cellular or a LoRaWAN system to communicate and is fully waterproof. It's sturdy and easy to attach to a collar. It uses 3 AAA batteries and claims 10+ years of battery life. Features include being able to set location boundaries with alerts should the dog leave the area.

Most recently, Costanzo has been exploring ear tag-sized trackers with mini-solar panels to keep them charged. The units are around 3 in. long, 1 1/2 in. wide and about 1/2 in. thick. The features are attractive enough to counter his recommendation of year-by-year contracts.

"The nice thing is you buy the tracker and the service for 3 years and never have to change a battery," says Costanzo. "We have worked with a satellite-based one called the GSAT. It has a little loop at each end that can be attached to the collar with buttons like used with ear tags."

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Custom Vineyard Robot

Will and Jerry Natzel are getting help with their 12 acres of grapevines this spring from a robotic assistant. Frustrated with the need for repeated spraying for Japanese beetles, the Natzels started looking for a robotic alternative. They found one with the help of South Dakota State University (SDSU) mechanical engineering students.

"My dad is a mechanical engineer, and I have a degree in design and architecture, so we set out to build an autonomous sprayer," says Will Natzel. "We applied for and received a grant from USDA's Sustainable Agricultural Research and Education (SARE) program to build a robot."

Jerry Natzel graduated from the mechanical engineering department at SDSU, so he reached out to the robotics club for help.

The students there were eager to get involved. Natzel shared his expertise and the grant to help cover costs. Last summer, the first-generation prototype was up and running. Students used a radio frequency controller with a remote joystick to control the self-propelled sprayer.

The 48-in. wide work cart is built around a modified zero-turn lawn mower with 5 to 6-ft. booms to either side. It is equipped with a 48-volt battery pack and a 25-gal. spray tank.

"The students removed the motor, drive system, deck, and seat," says Natzel. "They added batteries and electric drive motors on the two rear wheels and installed a proprietary control board. The bulk of the work done on it has been software development."

After successful trials in 2022 on a few acres, the sprayer will be back in the field this coming summer. Changes include GPS guidance and a sonar-based eStop safety sensor for obstacle avoidance. The students will be testing out the GPS and the additional programming they have done, as well as



SDSU robotics club members with robot during field trials.

other sensors.

The GPS guidance system was chosen over vision system guidance for its versatility. Natzel notes that it will allow the robot to be programmed for a particular route or driven on the route. Once a route has been recorded, the robot can repeat the path as needed.

Working with the students has been a real positive. He recommends others consider doing the same when taking on a robot-type project.

"We were able to give them a starting point with the grant, as well as end goals and some guidance," says Natzel. "However, there's nothing like 23 students with software backgrounds and electrical engineering training to tackle a project like this."

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A Better Beardless Triticale

Watley Seed Company claims the top producing beardless triticale for silage. However, their longtime breeder says even better ones are on the horizon and not just for silage.

"We have types producing extremely high tonnage for silage and shorter types for bread flour," says Ron Kershen, Watley Seed Company. "We have a new forage variety that's a week quicker to mature. We also have a variety with higher grain yields that has better bread baking quality."

Kershen is known as Mr. Triticale in the U.S. He's been breeding triticale since the crop was first created. A cross of wheat and rye, triticale was introduced in 1969 as a grazing forage but met with limited success. That began to change with the introduction of beardless triticale, bred to eliminate the long beard that hardened off and reduced triticale's value as a hay crop.

"In the 1990's, dairymen in the southern Plains States started using beardless triticale in place of wheat," says Kershen. "It had the same feed value but produced 20 to 30 percent more tonnage on the same amount of water. Today, triticale is grown from the southwest to the Carolinas and as far north as New York. Some varieties fit everywhere, from Mexico to Canada and other countries worldwide. Poland has a higher percentage of triticale acres than anyone."

Watley Seed Company began working with Kershen to develop new varieties to meet the growing demand. However, Andy Watley saw another advantage to focus on. Recognition that aquifer water levels were falling was on the rise, giving triticale an advantage over corn for silage as well.

"Because triticale grows over the winter months, there's less water lost to evaporation than with corn," says Kershen.

Watley focused breeding on varieties suited for dairies and feedlots from west-central Kansas into Texas and over to New Mexico. Introduced in 2005, their flagship SlickTrit line of triticale began winning forage production awards. It has dominated



A cross of wheat and rye, triticale was introduced in 1969 as a grazing forage but met with limited success.

silage trials held by New Mexico University and others since, plus offers up to 3 weeks more grazing than others.

"Dairies talk about pounds of milk produced per acre, and SlickTrit varieties produce more than any other winter forage," says Kershen. "SlickTrit II is now our biggest seller. It has stronger stalks than others for a better stand and more yield per acre."

The water advantage is getting even better. Pumping water is expensive. In a Texas A&M study, Watley's triticale produced 62 percent of the yield of corn at 42 percent of the cost. "We're able to make a crop of triticale with about 12 in. of irrigated water," says Kershen. "Most years it takes 20 to 30 in. of water for a crop of corn."

Kershen hopes a new grain variety developed for bread flour use will make triticale look better to grain producers as well. Not only does it yield more grain than other triticale varieties, but it's also better suited for bread baking.

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