SilageSnap Smart Phone App Update

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While farmers are gearing up for corn silage harvest, University of Wisconsin-Madison researchers, Brian Luck and Rebecca Willet, are gearing up for the release of SilageSnap. They have been working to develop this smartphone app capable of estimating Kernel Processing Score (KPS) in-field during harvest. While this will not replace laboratory tests, the goal is to allow farmers to make adjustments to kernel processors during harvest based on reliable, repeatable data. Finding the right settings is key in balancing cow nutrition and machinery performance.

Figure 1. Instructions, about, and get started from home screen.

How to Use the App. Using SilageSnap starts with getting a high-quality image of corn kernels in your forage sample. First get a representative sample from the harvester by gathering several handfuls from a single load, mixing them, and then take a single handful for inspection by the app. The more samples analyzed, the more accurate the results. The water separation method is suggested to separate kernels from stover:

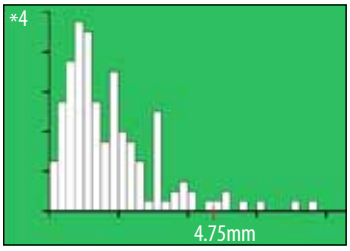
1) Fill a small bucket or dishpan half full of water.
2) Add the handful of forage to the water.
3) Stir with your hands for ~30 seconds.
4) Skim any material floating at top of bucket.
5) Slowly pour water out, taking care not to dump any kernels.
6) Use a cloth or paper towel to soak up excess moisture.

Figure 2. Image selection screen.

Once kernels have been separated, lay them in a single layer on a dark, matte background (i.e., construction paper). A soft-bristle paint brush can aid in spreading kernels. Finally, place any coin in the center of the image to act as a standardized size reference. The app's help section has detailed instructions about calibration and taking the best possible photograph. A few key tips are to hold the camera level with background, avoid taking images under bright lights, and clean background surface before laying out kernels.

To start analysis of the image, open SilageSnap on your smartphone or tablet. Select type of coin included in your image and tap "Get Started" (Figure 1). Next, select a photo from your saved images or take an image within the app (Figure 2). After selecting "Show Results," you will see a general page presenting a "Good" or "Bad" result based on typical KPS results. Selecting the details button on this screen will yield a histogram of particle sizes and an image of all kernel particles identified (Figure 3).

Figure 3. Sample results from the app showing distribution of particle sizes within the sample.



Interpreting KPS Results. This is a measure of the extent of kernel processing. Under laboratory settings, the sample is dried and passed through progressive sieves to determine the percentage that can pass through a 0.187" (4.75-mm) screen:

- Optimum: 70% of kernels pass through screen
- Adequate: 50-69% of kernels pass through screen
- Inadequate: <50% of kernels pass through screen

SilageSnap uses image processing techniques and algorithms to estimate laboratory-based KPS so you can interpret results just as you would laboratory results. If <70% of kernels are smaller than 0.187" in diameter, kernel processing roll gap should be reduced 1-3 mm (0.04-0.12"). Measure this using a dime, nickel, or pocketknife, which are all ~1-3 mm in thickness. The setting can then be spot-checked using visual inspection or water separation methods throughout the day. Keep in mind, processing kernels too finely can cause wear on equipment and increased fuel usage.

When/Where to Get the App. It will be available in the Google Play and App Store by late summer 2018. Look for updates on wimachineryextension.bse.wisc.edu or Luck's Twitter feed @BadgerLuck.