C-LOCK INC.

Standard Operating Procedure for Training Animals to GreenFeed

Written by Meredith Harrison | updated July 2025| SOP no. 3.1

BACKGROUND

To accurately quantify enteric emissions, it is important that animals sufficiently visit GreenFeed. Adequately acclimating animals to the GreenFeed system is important to ensure animals will visit at the start of your data collection period. Generally, the recommendation is that an animal should have at least 20 visits in a free-stall application (Manafiazar *et al.,* 2016), at least 38 visits in grazing systems (Dressler *et al.,* 2023) and 8 visits in controlled, tie-stall study (Hristov *et al.,* 2015).

Depending on your animals and the type of GreenFeed application, acclimation times vary with the average length of the training ranging from 7 to 21 days. Animals that are already adapted to automated feed bunks (*e.g.,* SmartFeed) generally adapt quicker. Typically, 25% of the herd will adapt autonomously with no human intervention, 50% of the herd will adapt easily with training, and 25% of animals will be more difficult to train. Shy animals can be bullied by aggressive animals if there are too many animals per GreenFeed unit.

When using GreenFeed in confinement the general recommendation is 20 to 40 animals per unit, and for grazing animals, 15 to 25 animals per GreenFeed is recommended. It Is not recommended to exceed 50 animals per unit. When the number of animals per GreenFeed unit increases, the average daily visitation per animal decreases. When using GreenFeed with larger mobs of cattle (*i.e.,* >100 animals) about 30 animals were able to be successfully measured.

With grazing animals, the recommended GreenFeed stocking rate is decreased to account for the grazing behavior of the herd. After the dominant animals use GreenFeed, they will often continue grazing in the pasture, moving away from the unit. The less dominant animals tend to follow, even if they have not yet had the opportunity to use GreenFeed. Thus, by decreasing the stocking rate for grazing animals, individual animal adoption rates are greater.

Before animal training begins it is important to choose a location for your GreenFeed that will encourage animal visitation and allow easy access for filling the feed hopper and to access the back compartment for regularly changing the air filter. Additionally, it is also important to choose bait feed that is palatable to encourage animals to use the GreenFeed system. The feeder settings should be configured to ensure the animal is in the GreenFeed for 3 to 5 minutes.

On average, GreenFeed users report an adoption rate of 75 to 85%, with pasture using reporting adoption rates at the lower end of the expected range (ICAR Wiki, 2025). Following the outlined training protocol will improve animal adoption rates. GreenFeed users following this protocol have achieved adoption rates of 100% in confinement and >90% in grazing systems (unpublished data).

SCOPE

This procedure details bait feed selection and recommended feeder settings for GreenFeed. Specific instructions for acclimating and training animals to use GreenFeed in free-stall, pasture, and tie-stall settings are outlined. This protocol can be applied to beef and dairy cattle, sheep, and goats. This document outlines the following specific procedures:

1. GREENFEED BAIT FEED SELECTION
2. FEEDER SETTINGS
3. HEAD PROXIMITY
4. GREENFEED CHIME AND LIGHTS
5. PROCEDURES FOR ANIMAL TRAINING

1. GREENFEED BAIT FEED SELECTION

GreenFeed dispenses a small amount of pelleted feed that is used to entice the animal to voluntarily use the system. To encourage animal visitation, the bait feed should be more palatable than the basal diet. To properly flow through the GreenFeed hopper, the pellet should be less than 7 mm diameter and less than 21 mm length. Additionally, avoid using feeds that are sticky, which can cause jams in the feed hopper, or dusty, which will cause the primary air filter to dirty faster. Some commonly used bait feeds include:

- Alfalfa pellets
- 12% sweet feed pellet
- Calf creep pellet
- Concentrate pellet

It is **not** recommended to feed a methane inhibitor or treatment through GreenFeed. Oftentimes the active compounds in these inhibitors are not shelf-stable, which can result in a loss in efficacy when stored in a GreenFeed hopper under varying climate conditions. Many inhibitors lack palatability, which may decrease animal visitation to the GreenFeed. Additionally, when the inhibitor is only consumed while animals are visiting the GreenFeed, emissions measurements will be less accurate, as methane measurement will not occur post-inhibitor feeding when methane reductions are usually the greatest.

During a research trial, it is recommended to keep the amount of feed from GreenFeed to less than 10% of the animal's total daily feed intake (Hristov *et al.,* 2015). This is to ensure that the animal's emissions accurately reflect the basal diet, rather than the pellets consumed from GreenFeed. However, depending on the basal diet and experiment protocol, feeding more than 10% of daily intake may be acceptable. For example, you can replace the concentrate supplement that is normally provided (*e.g.,* pellets with a partial mixed ration or range cake for grazing animals) with concentrate provided through the GreenFeed. This is a good approach, as feeding more feed (*i.e.,* drops) during a GreenFeed visit has been shown to increase GreenFeed visitation is grazing cattle (Parra *et al.,* 2023).

Regardless of the type of bait feed used, the amount of feed consumed from GreenFeed should always be accounted for in the animal's total daily dry matter intake (**DMI**). The amount of feed

consumed daily by each animal can be viewed and downloaded through the web-based user interface or accessed using the application programming interface (**API**) and the *greenfeedr* R-package (Martinez-Boggio *et al.,* 2024). If you are using C-Lock SmartFeed or SmartFeedPro to measure DMI, C-Lock will calculate combined daily DMI in the finalized Feed Efficiency Workbook.

2. FEEDER SETTINGS

The feeder settings on the GreenFeed will impact animal visitation. All these settings can be customized individually for animals, or they can easily be configured for an entire group. Through the user interface users can control:

- Number of feed cup drops per visit
- Interval between cup drops
- Interval between GreenFeed visits
- Maximum number of visits a day.
- Users with a dual hopper can configure the number of drops by feed type

On average the cup drop mass for the large ruminant GreenFeed is 35 g and 8 g for the small ruminant GreenFeed, however the average cup drop mass will vary depending on pellet shape and density. Determine YOUR cup drop mass by calculating the average weight from 10 drops. Input your average "Mass of food drop" in the Configure tab in the user interface (**Figure 1**). Update this value at beginning of each trial or whenever the type of bait feed is changed. This is the value that is used to calculate feed intake from GreenFeed.

The goal is to dispense feed slightly faster than it is consumed by the animal to keep the animal's head consistently in the machine for 3 to 5 minutes. This will ensure consistent head position and increase the Good Data Duration for the GreenFeed visit. As a rule of thumb, the number of feed drops per visit multiplied by the interval between cup drops should exceed at least 3 minutes (*e.g.,* 8 drops x 25 s interval = 200 s or 3.3 min). This will help generate a visit with at least 2 minutes of Good Data Duration, which is the minimum requirement for a valid GreenFeed visit.

Given the differences in daily feed intake between dairy and beef cattle, lactating dairy cows typically receive more feed per visit. Over the entire day, the amount of feed consumed from GreenFeed typically ranges from 0.75 to 2 kg per day. It is important to note that many animals won't visit the maximum number of allotted daily visits. For animals in confinement the number of average daily visits ranges from 2.5 to 5 (Ryan *et al.,* 2022; unpublished data) and for grazing animals the average number of visits ranges from 2 to 3.2 times per day (Hammond *et al.,* 2016; Lahart *et al.,* 2023).

Outlined below are general recommendations for feeder settings for dairy and beef cattle (**Table 1**). In the section on training animals to GreenFeed in a pasture setting there are specific feeder settings for pasture animals described. Depending on your specific animals and trial objectives, these recommended feeder settings may need to be adjusted. For example, if the amount of feed being consumed from GreenFeed is a concern, users should limit the maximum number of daily visits per animal, rather than decreasing the number of drops per GreenFeed visit. By decreasing the number of drops per visit, Good Data Duration may be negatively impacted which can decrease the number of valid GreenFeed visits in a day.

Table 1. Recommended GreenFeed feeder settings for beef and dairy animals

Setting	Lactating dairy	Feedlot beef
Number of cup drops per visit	8 to 16	6 to 12
Interval between cup drops (in sec)	15 to 25	20 to 30
Interval between machine visits (in sec)	10,800	10,800
Maximum number of daily visits	6	6

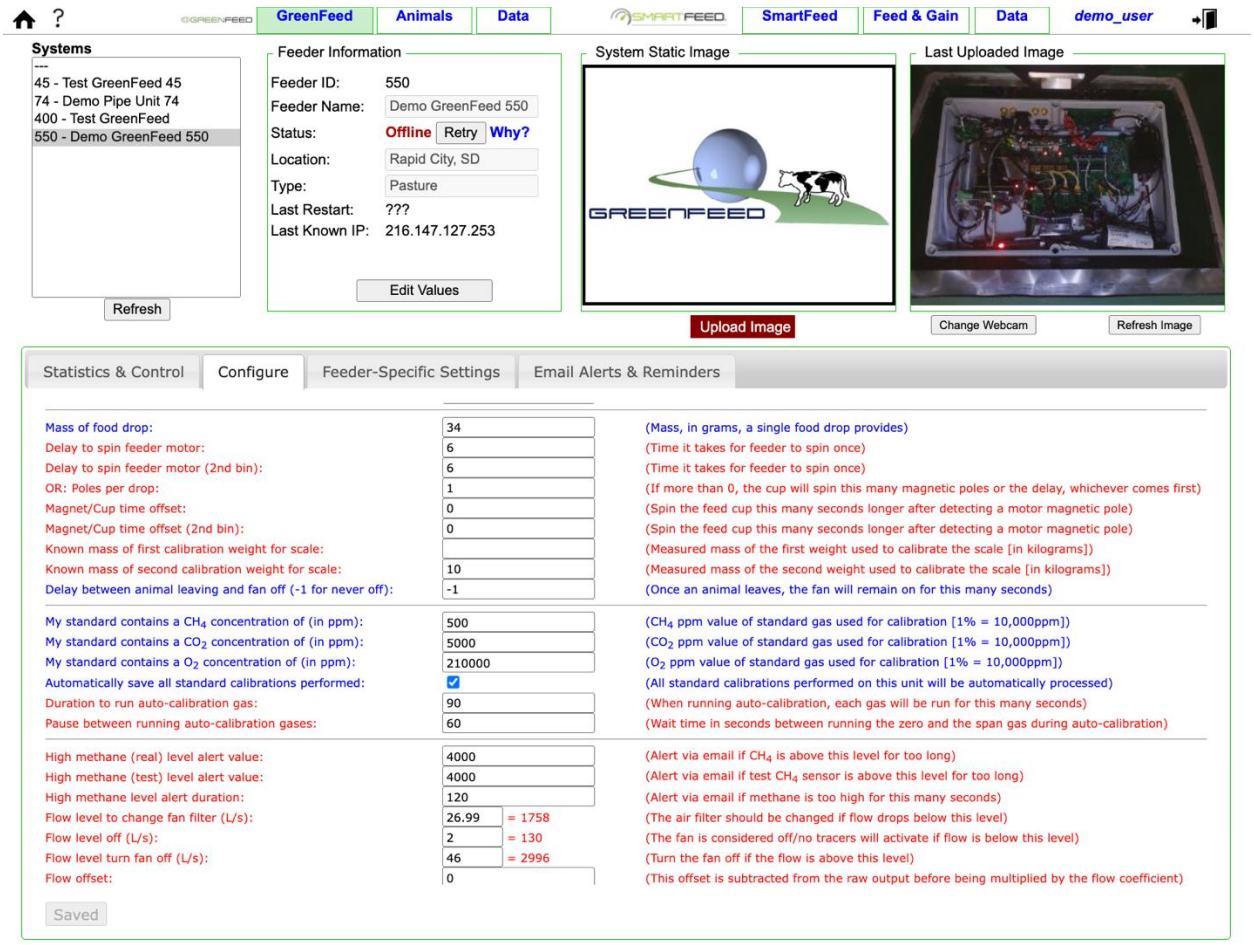

***Figure 1**. Screenshot of the GreenFeed user interface depicting where to enter the cup drop mass from the GreenFeed Configure tab*

3. HEAD PROXIMITY

When first acclimating animals to GreenFeed it is often helpful to adjust the head proximity (**HP**) in the user interface. The two requirements for GreenFeed to dispense feed are:

1. A radio frequency identification (**RFID**) tag is read
2. A minimum HP is met

The default HP setting for feed to dispense is 800. By decreasing this setting, it will result in feed dispensing when the animal's head is not fully inserted in the GreenFeed, which is helpful when training animals.

It is suggested to set the HP setting to 20, which will result in feed dropping as soon as an RFID tag is read. Similarly, you can decrease "the period the head must be in." This is helpful for nervous animals that do not want to keep their heads in the machine. Both settings can be configured from the Configure tab on the web-based user interface (**Figure 2**). Before the start of your trial, you need to change the setting, so it is within the range of 400 to 800. The timeline for adjusting HP settings during animal training is further described in the procedures below.

4. GREENFEED CHIME AND LIGHTS

The GreenFeed chime is designed to help train animals through recognition of the chime with food. After an animal's RFID tag is read, the chime will beep as the feed is dispensed. Sometimes the chime can startle animals, especially for beef cattle that may be more reactive. For other animals, the chime can be helpful to encourage animal visitation.

The chime can be configured on or off in the GreenFeed user interface (**Figure 2**). Before you begin training your animals it is recommended to decide whether you want to keep the chime on or off. The chime configuration settings should remain consistent (*i.e.,* either on or off) throughout the GreenFeed acclimation and data collection periods.

Similarly, the GreenFeed light can be controlled on and off in the user interface (**Figure 2**). The light can also be configured to turn on and off each GreenFeed visit. The user can control the number of seconds that the light will remain on after each visit. The light uses a very small amount of power, so generally it is recommended that the light is either configured on or off.

The light can be especially helpful when animals are using the machine in the dark. Alternatively, some users have reported that keeping the light on 24/7 attracts bugs, which can contribute to the primary air filter dirtying faster. It is important to note that even if the light is configured off, it will still flash once every minute. For questions and additional help configuring these settings contact support@c-lockinc.com.

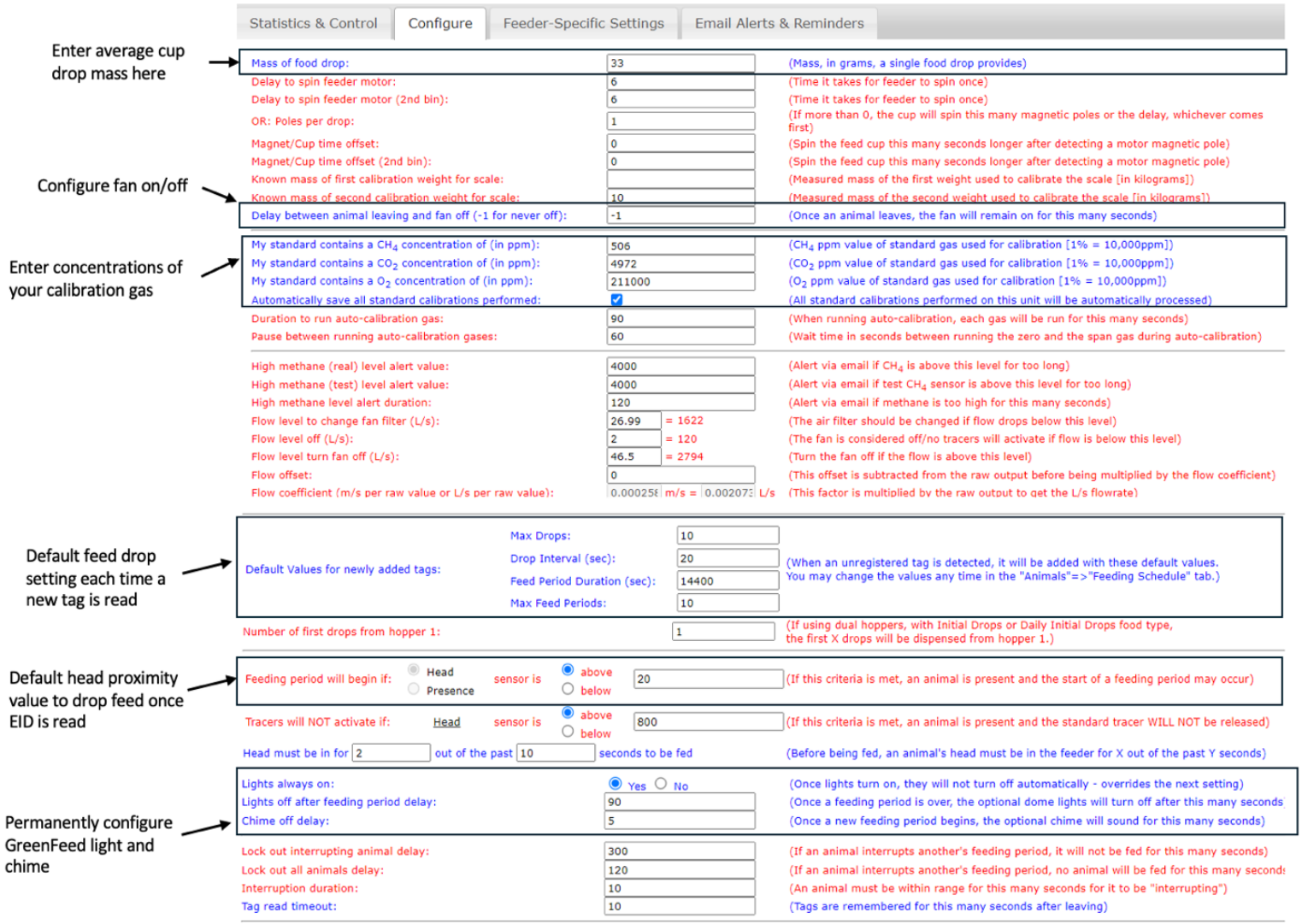

Figure 2. *Screenshot of the user interface showing default feeder configuration settings for a new tag scanned, setting a head proximity threshold for feed drops, and adjusting the chime and light settings from GreenFeed Configure tab*

5. PROCEDURES FOR ANIMAL TRAINING

Before beginning any animal training, ensure that GreenFeed is properly set-up using the procedures outlined in the GreenFeed Manual. Below are the initial steps to follow when training animals on GreenFeed. Subsequently, specific steps for training animals to use free-stall, pasture, and tie-stall systems are described.

1. Introduce animals to the bait feed by top dressing it on their basal diet or offering it free choice to grazing animals. It is important that the feed is palatable.

2. Always ensure that all animals have a properly working ISO 11784 or 11785-compatible RFID tag. This is critical, so that the GreenFeed system will dispense feed when an animal approaches the unit.

3. Adjust the feeder settings in the user interface. When first adapting animals to GreenFeed during the training period it is suggested to increase frequency of feed drops to help animals learn to visit the system. Adjust the new default tag settings from the GreenFeed Configure tab (**Figure 2**). This is the feeding schedule that GreenFeed will use whenever a new tag is recognized.

   Once animals are acclimated, before beginning your data collection, you can decrease the amount of feed to the above recommendations. Change feeding schedules for existing animals in the Animals Feeding Schedule Tab (**Figure 3**).

4. If adequate time is available, it is recommended to expose a larger group of animals (*i.e.,* more than needed for the trial) to GreenFeed. This enables you to pre-select animals that use GreenFeed, so animals that do not use the system can be removed before the start of the trial.

5. Throughout the entire training period and during the data collection, it is recommended to review animal visitation daily. These animal trends can be reviewed in the user interface or using the API and the *greenfeedr* R-package (see Data Analysis SOP).

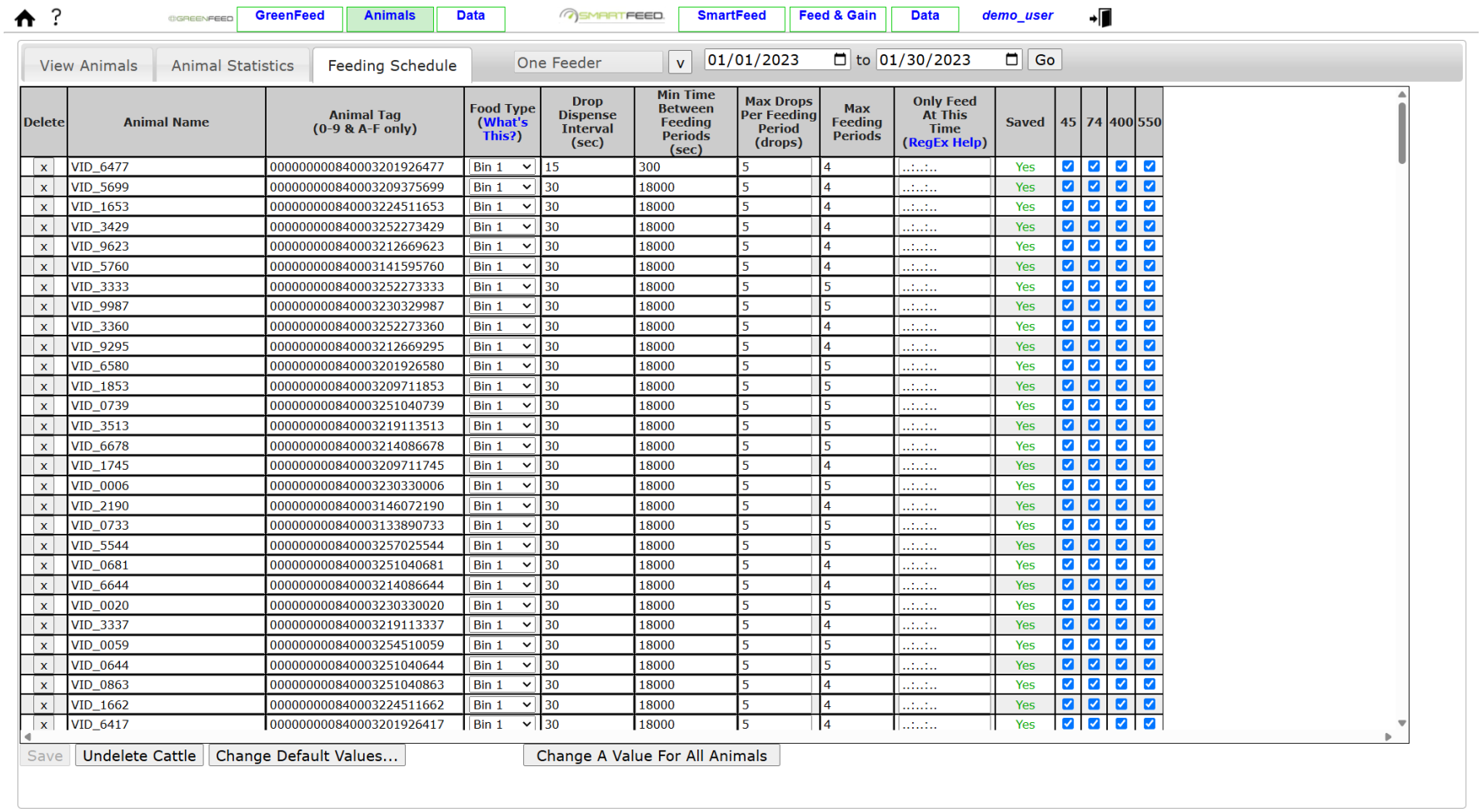

Figure 3. *Screenshot of the GreenFeed user interface showing where to assign feeder configuration settings for existing individual animals or the herd from the Animals Feeding Schedule tab*

5.1. FREE-STALL TRAINING

At least a 14-d training period is recommended to acclimate animals to GreenFeed in confinement. For more stubborn animals, a longer 21-day training period may be required.

1. Before beginning animal training, GreenFeed feeder settings should be adjusted, so new default tags scanned will receive 8 drops with 25 sec between each drop. Animals should be allowed to visit a maximum of 8 times per day with a 3-hr interval between each GreenFeed visit.

   At this time the visit duration and the distribution of visits within a day is unimportant. The goal is to just get animals to frequently approach the system to associate the GreenFeed with feed drops. The maximum number of daily visits can be adjusted before the start of the trial.

2. On the first day of training, secure the filled GreenFeed in the pen with the group of animals without an alley way (**Figure 4**). The alley way should remain off for the first 7 days.

3. On days 1 to 5, place hay and/or bait feed on the ground or in feed tubs around the GreenFeed unit to encourage animals to approach the system.

4. Observe the animals in the pen with the unit. As animals approach the system, use the mobile Control Feed App to trigger a feed drop. This will encourage the animal to approach the system. After their RFID tag is scanned by the system, GreenFeed will dispense more feed in accordance with the feed drop settings that are programmed in the user interface.

5. Review animal visitation in the user interface daily. Each day the number of animals visits should slightly increase. After 7 days of using the system, about 50% of the animals should be using GreenFeed.

6. On days 7 to 10, if animals have not yet used the system, encourage them to approach GreenFeed. This will require onsite training and getting into the pen.

7. As an additional step to help improve animal adoption, animals that are consistent GreenFeed users can be removed from the pen on day 5 to 7. These consistent GreenFeed users should be identified by trends in individual animal feed drops from the Animal Statistics in the user interface.

   These animals will have consistently visited GreenFeed multiple times a day for at least 3 days in a row. Remove these animals from the pen with GreenFeed. These animals will be added back before data collection begins. This step has been adapted from the pasture training protocol described below. This will allow time for the other animals to acclimate to the GreenFeed without the more dominant users present.

8. On day 10, add the alleyways positioned very wide. And, add back the frequent users that were removed from the GreenFeed pen.

9. On days 11 to 12, the alleyway should be closed slightly each day. And gradually increase the HP threshold daily. Also, gradually change the feeder settings to the desired settings for the trial.

10. On day 13, the threshold HP for feed drops should be set to 400 to 800 for the duration of the trial. And the alleyway should be narrowed to the position that it will be used throughout the duration of the trial.
11. On day 14, allow the animals to use the unit with the alleyway and feeder configurations that will be used throughout the duration of the data collection. On the following day data collection can begin.

If your animals are not adequately trained after 14 days, you may need to extend the training period an additional week.

***Figure 4**. Cow using a free-stall GreenFeed during animal training without the alley ways*

(Photo courtesy of Mallory Honan)

5.2. PASTURE TRAINING (developed by Queensland Animal Science Precinct in Australia)

It is always recommended to begin training animals to GreenFeed in a dry lot or a smaller paddock before deploying the system in an extensive pasture. This will drastically improve animal adoption rates (Hammond *et al.,* 2016). If you don't have access to a smaller pen, you can use electric fencing to make a smaller enclosure for the animals with the GreenFeed unit(s). It is recommended that the electric fence is up for at least a week. **At least a 21-d training period is recommended to acclimate animals to GreenFeed in grazing systems.**

1. Before beginning animal training, the GreenFeed feeder settings should be adjusted so new default tags scanned will receive 4 drops with 25 sec between each drop. Animals should be allowed to visit a maximum of 12 times per day with a 1-hr interval between each GreenFeed visit.

   At this time the visit duration and the distribution of visits within a day is unimportant. The goal is to just get animals to frequently approach the system to associate the GreenFeed with feed drops. Over the next 3 weeks of training, these settings will gradually change.

2. On the first day of training, leave the GreenFeed in the pasture with the group of animals without an alley way. The alleyway should remain open for at least the first 10 days.

3. Leave feed trays out on the ground with the pelleted bait feed. If feed trays are not available, the pelleted feed can be placed on the ground in front of GreenFeed.

   Place the trays in a wagon wheel design as shown in **Figure 5**. Given their natural feeding behavior, this will encourage animals to approach GreenFeed. With the troughs on the ground, try to offer enough feeding space to accommodate all the animals using the machines simultaneously.

4. Review animal visitation in the user interface daily. Each day the number of animals visits should slightly increase.

5. By day 7 to 10, about 25 to 30% of animals should be consistent GreenFeed users. These consistent GreenFeed users should be identified by trends in individual animal feed drops from the Animal Statistics in the online user interface.

   These animals will consistently have visited GreenFeed multiple times a day for at least 3 days in a row. Remove these animals from the pasture with GreenFeed. These animals will be added back before data collection begins. This critical step will allow time for the other animals to acclimate to the GreenFeed without the more dominant user present.

6. On day 11 to 14, begin to slightly decrease the amount of feed offered in the additional troughs each day. The goal is to acclimate them to the pellets and make them hungry to approach GreenFeed. On day 15, remove the feeders.

7. On days 14 to 17, after the frequent users have been removed, gradually change the feeder settings in the Animals Feeding Schedule Tab (**Figure 3**). Each day, increase the number drops per visit and decrease the number of visits per day (*e.g.,* Day 10: 5 drops per visit, 11

visits per day; Day 11: 6 drops per visit, 10 visits per day), so on day 13 animals receive 8 drops per visit and 8 visits per day.

Although this may seem like a large number of daily visits, this is important to help encourage animal visitation. Given animal grazing patterns and herd dynamics, it is unlikely that animals will visit the GreenFeed the maximal number of allotted times.

8. On day 14, increase the duration between visits to 2 hours.
9. On day 15, add the alleyways positioned very wide. And, add back the frequent users that were removed from the GreenFeed pasture.
10. On days 16 to 17, the alleyway should be closed slightly each day. On day 17, each alleyway panel should be at 45 degrees.
11. On days 18 to 20, continue to gradually narrow the alleyway. On day 20, the alleyway should be narrowed to the position that it will be used throughout the duration of the trial.
12. During days 16 to 20, gradually increase the HP threshold daily. On day 20, the threshold should be set to 400 to 800 for the duration of the trial.
13. On day 21, allow the animals to use the unit with the alleyway and feeder configurations that will be used throughout the duration of the data collection. On the following day, data collection can begin.

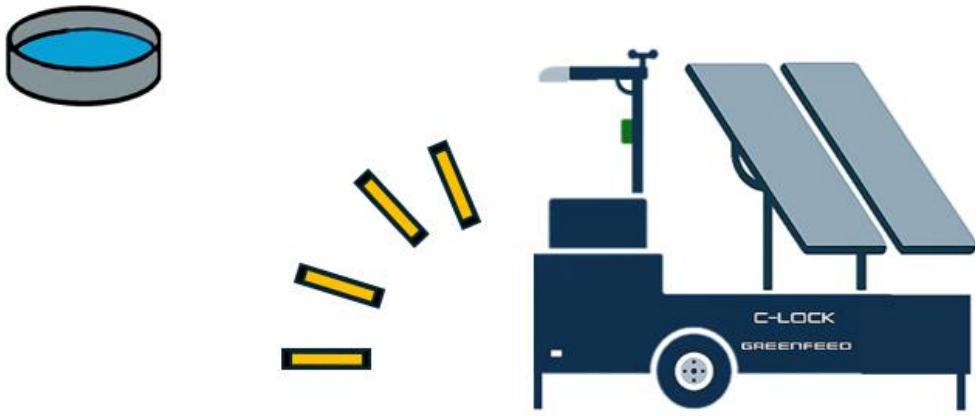

Figure 5. *Diagram showing the orientation of the feed trays during the animal training process*

5.3. TIE-STALL TRAINING (adapted from Hristov *et al.,* 2015)

Tie-stall requires the most intensive animal training. Since animals are individually housed, they are unable to train themselves on GreenFeed. Training will only occur with human intervention when the machine is physically brought to each of the animals. **The minimum amount of time for animal training is 14 days, but a longer training period will help improve adoption.**

1. Begin by placing GreenFeed in the barn with the animals. Even when not actively training the individuals cows with GreenFeed, the unit remains in the line of site of the cows, powered on so the cows can acclimate to the sound of the sample pump and fan.
2. Begin with GreenFeed about 1.5 m from animal.
3. Place bait feed in bucket and allow animals to smell/taste.
4. Move bait feed toward the unit, encouraging animals to stretch and reach toward the feed dish.
5. Add some bait feed to the dish and slowly move the unit to the animal.
6. If the cow becomes apprehensive/scared, move the unit away and try again another time.
7. Repeat the training over the next 14 days until the cows are familiar and comfortable entering/exiting and visiting the machine for 5 minutes. Repetition is critical when acclimating tie-stall animals.
8. This training procedure should be repeated at various times of day, as GreenFeed sampling will occur at varying times, it is important to practice at different times. Some timepoints (*e.g.,* midnight, when other animals are fed) may be more challenging, so extra training during these timepoints may be warranted. Ensure the barn is well-lit when sampling in the dark.

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