

Date:
March 2018

Estimating Forage Yields Yourself

"We need to have some system to predict what our yields will be and to compare fields.

With experience, we can improve this method and our ability to estimate yield."

*Bill Wilson,
March 2018*

Materials Needed:

- one hula hoop or m square
- one plastic or cloth bag
- one digital hanging scale that measure in 0.1 lbs or 0.1 kg intervals
- rotating grass clippers
- recording table
- yield estimate table, go to: www.peaceforage.bc.ca/rd_forage_productivity_profitability.html

Relevant Factsheets:

- Forage Fact #110:
Locating Field Benchmarks For Monitoring
- Forage Fact #111:
How Photogenic is Your Forage?
- Forage Fact #113:
Are You Happy with Your Forage Stand?

Contacts:

Julie Robinson
250 262 7576
Sandra Burton
250 789 6885

Published by
P.R.F.A. of BC

For more Forage Facts visit:
www.peaceforage.bc.ca

Context For This Factsheet

This forage fact is part of the project for Improving Productivity & Profitability of Forages. It will provide you with a step by step guide for estimating your forage yields yourself, before you graze or bale your field.

Procedure

Step 1: Decide where to take yield samples.

Consider the types of forage you are estimating the yield for and take a minimum of 3 samples for each type.

When locating your sampling points, remember that a change in species composition affects yield. A sample with 30% alfalfa yields differently than a sample with 80% alfalfa.

Species maturity will affect moisture and thus yield. Timothy that is heading out might mean moisture closer to 30%. Lush immature alfalfa, that froths when ground in your palm, may be more like 75% moisture.

Step 2: Clip and weigh samples.

After measuring your hula hoop, or m square, lay it out in the sample area and clip all the forage in the hoop. Place sample in a plastic or cloth bag.

When estimating yield remember that livestock may avoid some species and if this is a grazing scenario, especially with conventional grazing versus rotational grazing, utilization may vary.

Be consistent with clipping height. Mimic what you are estimating, i.e. for grazing situations you may leave 8"; for haying you may leave only 2".

From a grazing perspective, maturity of plant and expected livestock utilization may also affect the remaining stubble height and therefore your clipping height.

An example of a hand held scale (left) and clippers (right). Purchasing a pair of rotating clippers is best, as they allow you to cut in a convenient hand position and don't cost more.



Julie Robinson demonstrating how to estimate your forage yield using a hula hoop, Sept 2017.

Assumptions & Calculations:

Area of hula hoop = πr^2
 Our hoop radius = 13.5 inches
 $3.14 \times 13.5" \times 13.5" = 572 \text{ inches}^2$
 $1 \text{ ft}^2 = 144 \text{ inches}^2$
 $572 / 144 = 3.97 \text{ ft}^2$

Note:

If you use a plastic or cloth bag that has weight to it, remember to tare the scale. Hang the bag on the scale and press tare; and it will subtract the weight of the bag.



Peace River Forage Association
of British Columbia



Step 3: Estimate crop moisture.

Weigh and record the wet sample of the forage in the known area (hula hoop). Here are 3 examples of different moisture scenarios and predicting your yield.

Step 4: Estimate yield.

Use the table to estimate yield for these 3 scenarios.

Air drying or hay equivalent: To ensure good air circulation, hang sample bag on a line and use a cotton bag or old pillow case. After a few days of air drying, depending on sunshine and wind (just like with hay) and the sample is not losing any more moisture, use the hand method. Grab the forage in both hands and grind in a peddle bike motion. If the grass breaks in 4 turns its about **15% moisture**.

If the bag filled with the hula hoop sample weighs 0.62 lbs/hoop, find it in the table under the 15% moisture heading. Slide far left to the first column. This means there will be about 3.5 Ton/ac of hay equivalent yield.

See yellow circles below.

Examine type of forage. If 70% of the forage volume is headed out timothy and 30% is lush alfalfa, the sample will be closer to **30% moisture**

If the bag filled with the hula hoop sample weighs 0.62 lbs/hoop, find it in the table. Slide far left to the first column. This means there will be about 3 Ton/ac of hay equivalent yield.

See orange circles below.

Examine type of forage. If 30% of forage volume is headed out timothy and 70% is lush alfalfa the moisture will be closer to 75%. Note: lush forage that is actively growing is also about **75% moisture**.

If the bag filled with the hula hoop sample weighs 0.62 lbs/hoop, find it in the table. Slide far left to the first column. This means there will be about 1 Ton/ac of hay equivalent yield.

See green circles below.

Table 1: Yield Estimates Based on Forage Moisture

| 15% moisture (hay equivalent) | | 0% moisture (oven dry)* | | 30% | | 50% | | 75% | | | |
|----------------------------------|--------|----------------------------|----------|--------|----------|--------|----------|--------|----------|--------|----------|
| Ton/ac | lbs/ac | lbs/ft2 | lbs/hoop | Ton/ac | lbs/hoop | Ton/ac | lbs/hoop | Ton/ac | lbs/hoop | Ton/ac | lbs/hoop |
| 0.5 | 1000 | 0.02 | 0.09 | 0.43 | 0.08 | 0.57 | 0.10 | 0.85 | 0.15 | 1.70 | 0.31 |
| 1 | 2000 | 0.05 | 0.18 | 0.85 | 0.15 | 1.13 | 0.21 | 1.70 | 0.31 | 3.40 | 0.62 |
| 1.5 | 3000 | 0.07 | 0.27 | 1.28 | 0.23 | 1.70 | 0.31 | 2.55 | 0.46 | 5.10 | 0.93 |
| 2 | 4000 | 0.09 | 0.36 | 1.70 | 0.31 | 2.27 | 0.41 | 3.40 | 0.62 | 6.80 | 1.24 |
| 2.5 | 5000 | 0.11 | 0.46 | 2.13 | 0.39 | 2.83 | 0.52 | 4.25 | 0.77 | 8.50 | 1.55 |
| 3 | 6000 | 0.14 | 0.55 | 2.55 | 0.46 | 3.40 | 0.62 | 5.10 | 0.93 | 10.20 | 1.86 |
| 3.5 | 7000 | 0.16 | 0.64 | 2.98 | 0.54 | 3.97 | 0.72 | 5.95 | 1.08 | 11.90 | 2.17 |
| 4 | 8000 | 0.18 | 0.73 | 3.40 | 0.62 | 4.53 | 0.83 | 6.80 | 1.24 | 13.60 | 2.48 |

* Use 0% moisture columns when oven drying to calibrate and improve your field estimates.

Calculating % DM & Moisture.
 % Dry Matter = $\frac{\text{final weight}}{\text{initial wet weight}} \times 100$
 % Moisture = 100 - % Dry Matter

References:

Gay, Susan W. 2009. Determining Forage Moisture Concentration. Virginia Cooperative Extension Pub. 442-106. www.ext.vt.edu

Orioff, Steve B. & Shannon C. Mueller. Harvesting, Curing & Preservation of Alfalfa. Ch 14 in Irrigated Alfalfa Management. Univ of California.

In Summary

This hula hoop method of estimating forage yield is quick and easy to do. It is a great tool for predicting what to expect before you graze or cut your forage stand.

Compiled by: Julie Robinson, Sandra Burton & Carolyn Derfler in March 2018.

Funding Partners for Improving Productivity & Profitability of Forages Project



BC AGRI
Strategic Outreach Initiative

PRAD
Peace River Agriculture Development

