

Fodder beet (*Beta vulgaris*) for livestock feed

**Aberra Adie, Melkamu Bezabih, Kindu Mekonnen and
Peter Thorne**



Produced by

International Livestock Research Institute

Published by

International Livestock Research Institute

February 2018

www.africa-rising.net

The Africa Research In Sustainable Intensification for the Next Generation (Africa RISING) program comprises three research-for-development projects supported by the United States Agency for International Development as part of the U.S. government's Feed the Future initiative.

Through action research and development partnerships, Africa RISING will create opportunities for smallholder farm households to move out of hunger and poverty through sustainably intensified farming systems that improve food, nutrition, and income security, particularly for women and children, and conserve or enhance the natural resource base.

The three regional projects are led by the International Institute of Tropical Agriculture (in West Africa and East and Southern Africa) and the International Livestock Research Institute (in the Ethiopian Highlands). The International Food Policy Research Institute leads the program's monitoring, evaluation and impact assessment. <http://africa-rising.net/>



This document is licensed for use under the Creative Commons Attribution 4.0 International Licence.

This document was made possible with support from the American people delivered through the United States Agency for International Development (USAID) as part of the US Government's Feed the Future Initiative. The contents are the responsibility of the producing organization and do not necessarily reflect the opinion of USAID or the U.S. Government

Introduction

Grazing lands that have been serving as a source of natural pasture for livestock in the highlands of Ethiopia are continuously shrinking due to high population pressure, land degradation and conversion of grazing lands into arable lands. As a result, feed shortage has become a major constraint for livestock production, and crop residues have emerged as the main components of livestock diet. Crop residues are generally poor in their nutritive value, with low crude protein content (4%) and digestible organic matter (<50%). To compensate the deficit in protein and energy levels in traditional feed sources, livestock growers are often observed to use expensive feed sources like factory by-products or food grains competing with human food needs.

To address some of the problems of feed shortage and poor quality of available feeds in the mixed farming system, feed related research protocols have been implemented in the Africa RISING project action sites in Ethiopia. The action research aims to integrate production of multipurpose fodder legumes, root fodder crops and grasses in the farming system, thereby increasing the quantity and quality of available feeds for livestock. Growing fodder beets in the backyards of small scale farmers with minimal inputs proves to provide palatable and high energy feed for livestock with nutritive value equivalent to cereal grains.

Objective

To provide affordable options for improving the quality and quantity of feed resources with small scale crop-livestock farmers

Description

Fodder beet (*Beta vulgaris* subsp. *vulgaris* L.) is an annual/biennial plant with thick roots and is cultivated in a cooler climate. The roots are a rich energy source for livestock. Fodder beet needs a long growing season (6–7 months), and rich soil to perform well. It grows in the highlands of Ethiopia (1800–3000 masl) with 750 mm rain and above. The high sugar content makes fodder beet palatable and a valuable energy source for ruminants and to some extent for pigs.



Management

- Field preparation

A clean and well-prepared seed bed is required

- Establishment

Fodder beet does better on light or medium soils to avoid harvest problems. The recommended seed rate is 5–10 kg/ha or use raised seedlings from nursery. Seeds can be row planted in June at 2 cm sowing depth and in rows 50 cm apart. Thinning can be done to give 20–25 cm spacing between plants or seedlings can be transplanted from nurseries 1–2 months after planting.

- Fertilizer

Apply DAP at 100 kg/ha during establishment or about 10–15 t/ha of farm yard manure. Manure is very variable in quality and hence rates may vary depending upon soil types and previous cropping.

- Weeding and cultivation

Requires effective hand weeding especially during the early establishment period (the first one–two months). Hoeing and piling the soil around the roots is essential to facilitate increased root development and growth.

Performance

Fodder beet requires a lot of work but rewards are high in terms of yield and animal performance. Average tuber yield is in the range of 13–17 tons dry matter/ha. The leaves/tops will also contribute a further 3–4 tons dry matter/ha. Roots are high in energy (12-13+mj/kg DM) but low in protein with crude protein values of 6-10%. It is highly digestible (70-80%). Tops (leaves) are relatively better in nutrient levels than bulbs(roots).

Seed production

Fodder beet flowers and produces seeds in the second year and the root decreases in size. When seed of fodder beet is ready for harvest, stripping is used for seed collection. Seed yield is about 400–500 kg/ha.

Utilization

The roots can be harvested after about 6 months from planting when they are at their maximum size. The roots are harvested carefully by digging them out of the ground. They have to be washed and separated from any soil material. In general, washed roots can be used for intensive management systems in dairy or fattening farms by chopping before feeding. Tops may also be fed after wilting. The tops can also be grazed or ensiled. Roots can be stored in field (underground soil) or can be stored in stores after harvest for 4-5 months if not damaged during harvest.

Cows must be fed limited amount (maximum 1 kg) for the first week of adaptation period and gradually increase the offer to 2 kg/day in the second week and up to a maximum of 4-5 kg/day. However, intake should not exceed 0.8% of the animal's live weight to avoid risk of acidosis. Feeding the fodder beets in the afternoon after the cows have been fed to other feeds is advisable to reduce risk of potential toxicity if fed in the morning as a starter feed.

Limitations

- Porcupine damage can be a problem
- Not suited to water logging areas
- Declines in yield at low soil fertility
- It cannot withstand frost