



TONIC

FORAGE SYSTEMS

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Tonic Forage Systems

What is Tonic Plantain?

Plantain is a winter-dormant flat weed. **Tonic** plantain is a winter-active, upright forage species. It is a broad leaved, coarse rooted herb that can adapt to a range of soils, rainfalls and other climatic conditions. **Tonic** has seasonal drymatter (DM) production strengths in summer, autumn and winter. **Tonic** is an obvious upright cultivar in all seasons; this is not the case with the majority of commercially available plantain varieties.

Tonic is high in minerals such as copper (Cu), sulphur (S), phosphorus (P), sodium (Na), and calcium (Ca) relative to ryegrass. Further, **Tonic** has consistently increased liver concentrations of Cu, selenium (Se) and cobalt (Co) in both lambs and deer despite a similar plant content of Se or Co compared to ryegrass.

In many environments plantain produces similar amounts of forage to perennial ryegrass, although it differs in seasonal growth. A feature of plantain's productivity is its rapid response to moisture in autumn.

In Northland during the first year following establishment, paddocks sown with the inclusion of **Tonic** at 2 kg/ha in a pasture mix have shown **Tonic** contributing between 54-90% of drymatter production with total DM production ranging 18.5-22.3 t DM/ha (Moorhead & Piggot, Grasslands 2009).

Not all plantain varieties are the same. Animal performance on early cultivars are poor compared to **Tonic**. This is most likely to be a function of their poor winter growth and higher propensity to produce seed head relative to **Tonic**.

What is Tonic Plantain Forage System?

A **Tonic** forage system is the use of pure stands of **Tonic**, sown in big enough areas to provide feed systems for specific classes of stock, utilising specific grazing management that is associated with this broad-leaved active herb.

Uses of Tonic

1. MIXED WITH A GRASS/CLOVER PASTURE

This is the most common use of **Tonic** because it requires very little change to pasture establishment and management practices, and provides more dry matter of a high quality through the summer and early autumn period.

Seed is mixed at the rate of 1 to 3 kg/ha, depending on the content required. Establishment success can vary when mixed with high rates of perennial ryegrass, when sown in cold soils, or when planted too deep (>12 mm). Best results come from sowing with highly palatable grasses such as tetraploid ryegrass or tall fescue (the rate should be kept to 1kg or less when sown with tall fescue).

2. AS A SPECIAL-PURPOSE CROP

This is often the best way to realise the full benefits of herbs on a dairy farm, as it provides a large amount of high quality feed over summer. It also allows for selection of suitable soil types and grazing management that is specific for **Tonic**. Sowing rates are 8-14kg/ha, with or without white and red clover. A pure crop can also be useful for eradicating grass weeds (e.g. yellow bristle grass, couch) as grass specific herbicides can be used over the crop. **Tonic** without clover could also be beneficial in eliminating the food source for clover root weevil, with plantain crops also being a less favoured feed source for black beetle.

3. OVER-SOWN INTO PASTURE

Good establishment can be achieved by spreading seed just prior to grazing in spring. This suits grass pastures planted in autumn without plantain which require broadleaf weed control in the first winter. **Tonic** is also an effective way of extending the life of open or damaged pasture and boosting summer production and quality.

DairyNZ research has shown that the fastest feed and highest early production is achieved via spray drilling.

4. EFFLUENT CROP

Tonic is responsive to nutrients and can be extremely productive throughout the year. These characteristics make it an ideal forage for mining nutrients from effluent paddocks. Effluent paddocks provide a lot of high quality feed for grazing in summer, with effluent being able to be applied throughout the life of the crop due to its winter activity.

5. UNDERSOWING

Tonic can be successfully undersown or broadcast at 3-4kg/ha into thinning perennial pastures to extend pasture life or until the paddock returns to the cropping/regrassing phase.

Who Benefits from Using the Tonic Plantain Forage System?

1ST PHASE: AUGUST TO NOVEMBER - LACTATION TO WEANING

1. Triplet lactation forage - sheep farmers with high fecundity flocks and 200-300%+ scanned triplets.
2. Scanned twin-bearing hogget lactation forage – farmers with 200-300%+ scanned twin-bearing ewe hogget's.
3. Early market lambs in dryland environments – sheep farmers who are looking to market early lambs, especially those from twin/triplet-bearing ewes.

2ND PHASE: DECEMBER TO JUNE - POST WEANING

1. Specialist feed for ewe lamb replacement – particularly where hogget mating is being practiced.
2. Summer and autumn non endophyte, high mineral quality lamb finishing forage.
3. Summer non endophyte, high mineral quality ewe flushing forage.

Starting the Tonic Plantain Forage System

1. IDENTIFYING THE AREA REQUIRED

Identify the area required for your target group for the system. Example: 300 scanned triplet-bearing ewes. The number of animals at lambing means with a stocking rate of 12 ewes per hectare, this requires around 25 hectares to run the system.

2. PADDOCK CHOICE

The 25 hectares should be well sheltered; this is important for both triplet and hogget lambing. The paddocks should be in the same area (or adjoining) and if possible have the potential for multiple stock water points.

3. ESTABLISHMENT TECHNIQUES

Tonic plantain can be established using cultivation and drilling, roller drilling or broadcasting and can be successfully direct-drilled. The establishment of **Tonic** is often quick and easy however it is recommended to follow best management practice for establishing small seed (e.g. clover).

Establishing cultivated seed bed: After spraying (4-6 litres glyphosate/ha + 300 ml Lorsban/ha, + 40 g/ha Granstar if broad-leaf weeds are present) cultivation should aim to create a firm, fine seed bed which is rolled post-sowing.

Direct drilling: Check paddocks prior to sowing for signs of slugs or slug trails. If populations are high, consider baiting before sowing.

Spray 4-6 litres glyphosate/ha + 300 ml lorsban/ha + 40 g/ha Granstar if broad-leaf weeds are present. Hard graze with a heavy stocking rate to reduce pasture residue prior to drilling and aid in the control of slugs.

4. SOWING RATES

Tonic plantain should be sown at between 10-14 kg/ha. It is ideal to cross drill/diamond drill 5-7 kg/ha in each direction to maximise ground cover. High densities are important to get both high drymatter production and subsequent high carrying capacity.

5. FERTILISER

Paddocks should be soil tested and any fertility issues addressed.

A balanced fertiliser should be used at establishment that includes nitrogen, phosphate, potassium and sulphur.

Tonic plantain is not a legume and will need multiple applications of nitrogen throughout the year when extra growth is required, very similar to the requirements of Italian ryegrass.

The use of selenium (Se) is most suitable in a **Tonic** forage system as the plant is very effective in utilising this important micro nutrient. Rates of 0.5 kg Se/ha with any fertiliser will improve **Tonic's** ability to supply high levels of Se to ewes and lambs.

6. WEED CONTROL

There are no registered chemicals for plantain crops. Most weeds (including thistles) can be controlled in pure stand crops. Contact your local Agricom Representative to tailor a solution for the individual weed present.

Plantain is known to be readily controlled by Roundup® and in our experience and in literature there are reports of it being easily controlled by: 2, 4-D, MCPA, MCPB, Versatill, Grazon, Dypro and Duplosan. Plantain is resistant to Tordon Max.

You should always seek advice from your retailer or chemical representative for off label use.

7. PEST CONTROL

Grass grub, porina, and the carpet/plantain moth are three insects that can severely influence the persistence of pure stands of **Tonic**. Pure stands of **Tonic** can be extremely persistent in a wide range of environments however a fast collapse of the stand can occur if grass grub or porina build significant populations.

Monitor the crop in early summer when conditions are very dry like you would a brassica crop for insects. If insects are found, consideration should be made to using insecticide to prolong the life of the **Tonic** plantain stand.

Animal Production Trials

The animal productivity of **Tonic** monocultures has been the subject of a number of trials. These have specifically focused on benefits to the lactating ewe and the weaned lamb relative to ryegrass-fed animals.

In addition, **Tonic** plantain is currently under investigation in a cell-grazing beef system. The trials involving **Tonic** generally show an improvement in per-head productivity compared with ryegrass, particularly during spring and early summer. This is probably because increased intake improvements in per-head production do not always result in a per-hectare advantage. However where improvements in lamb weight are achieved earlier, this may represent a maximum financial return.

LACTATION

Results from a replicated study illustrated **Tonic** was able to increase the weaning weight of lambs by 7 kg and ewe weight at weaning by 16 kg compared with perennial ryegrass. Much of this difference in ewe liveweight was due to an increase in DM intake. Despite **Tonic** producing similar amounts of DM/ha, a lower stocking rate (ewes/ha) was the consequence of an increase in DM intake (kg DM/ewe/day). The increased weaning weight of lambs is likely to have been a result of increased milk production from the ewe and lambs consuming more forage at an earlier age. This suggests **Tonic** forage systems are appropriate for situations where high daily intake is more important than maximising the stocking rate.

Judson et al. (2009) evaluated **Tonic** plantain as a lactation feed for twin-bearing ewes lambing in August. The winter and early spring activity of **Tonic** provided sufficient feed to support twin-bearing lactating ewes in early spring. The ability to consume more plantain, probably as a result of its fast rumen degradation rates, improved the weaning weight of the lambs by between 10 and 34% over the four years of studies. Ewes were also heavier at weaning by up to 14 kg. In a farm system where the sale of cull ewes or last-lambing ewes is a valuable income stream, using a lactation forage that puts weight on the ewe by weaning is a real asset.

WEANED LAMBS

Grazing weaned lambs on **Tonic** through the December – April period generally provides similar or moderate liveweight gain advantages over ryegrass, depending on endophyte types. **Tonic** is capable of supporting lamb growth of 280 g/day in the weeks immediately following weaning and 220 g/day later into the summer and autumn. Where standard endophyte varieties were used, comparative lamb growth on ryegrass was 135 g/day. At this time **Tonic** plantain supports similar stocking rates to ryegrass.

CURRENT TRIALS

Beneficial effect for “flushing” ewes and a systems analysis of a beef finishing system are currently underway.

Practical Paddock Management

LACTATION

Ewes can be set stocked prior to lambing. Pasture covers of >1200 kg DM/ha are advised. **Tonic** is capable of supporting stocking rates of 10-12 twin-bearing ewes per-hectare.

Towards the conclusion of the lambing period if covers are low, a “rocking” system is strongly advised. This involves moving ewes and lambs backwards and forwards from one side of a paddock to the other or from one paddock to another, on a 7-10 day basis. This allows the plantain to regain leaf area from low grazing residuals.

WEANED LAMBS

A 21 day rotation length is suggested for **Tonic** systems stocked with weaned lambs. This involves splitting paddocks into three and spending a week in each, or rotating around three paddocks spending a week in each. Pre-grazing pasture masses of 1800-2000 kg would aim to be reduced to 800-1000 kg DM/ha after grazing.