

Designing Multispecies Mixes to Meet Desired Outcomes



The types and quantities of species used in a multi-species mix matter



Functional Diversity is Key

It is important to make sure there is reasonable representation from a range of family groups. While there is much variation even within species, it is the traits that define a family that are most significant. A multispecies mix is usually made up of grasses, legumes and other broadleaf forb species.. The diversity, critical mass and proximity between different types of plants and the microbe communities they support, determine the supply of goods and services shared via the underground network. This makes all the difference to the health, growth and resilience of a plant community.

Setting the Scene

It must be understood with this approach that there may initially be a trade-off between overall production and benefits, such as lower input costs, soil improvement and better stock health, that come with diverse pastures and establishing perennial species.

The goal is lower costs and increase grazing capacity and quality of production over a number of seasons.

Customised Blends

Different multispecies cover crop mixes can be designed to target desired outcomes. It is important to know beforehand what outcomes you are aiming for as this dictates the species and rates of each you use in a mix.



Autumn Cover Crop Mixes

Annual Green Manure Species

Grasses

- Oats
- Ryecorn

Legumes

- Field Peas
- White Lupins
- Vetch

Broadleaves

- Leafy Brassicas
- Linseed
- Sunflower
- Buckwheat

Attributes:

- Fast Growing
- Rapid Soil Building
- Produce biomass quickly

Limitations:

- Can't repeat graze
- Short lived

As a general rule of thumb, green manure type annual species perform exceptionally well early in the season but with each subsequent graze, will probably compare less favourably than the usual ryegrass/clover mixes.



Plant Partitioning of Carbohydrates at Different Stages of Growth

Seedling

50% plant biomass, 30% root biomass, 20% exudates

Entering framing

33% plant, 33% root, 33% exudates

Late framing

20% plant, 10% root, 70% exudates

Pollination

5% plant, 10% root, 15% fruit, 70% exudates

Fruit/seed fill

5% plant, 5% root, 90% fruit, 0% exudates

Annual/Biennial Pasture Species

Grasses

- Annual and Biennial Ryegrass
- Forage Barley and Oats

Legume

- Balansa, Persian, Sub Clovers
- Medics
- Seradella

Broadleaves

- Forage Brassicas
- Beets

Attributes:

- High biomass production
- Graze tolerant

Limitations:

- Lack diversity
- Not great soil builders

Perennial Pasture Species

Grasses

- Cocksfoot
- Phalaris
- Fescue
- Prairie Grass
- Perennial Ryegrass

Legumes

- Lucerne
- White, Red and Strawberry Clover

Broadleaves

- Chicory
- Plantain

Attributes:

- Hardy once established
- Provide year long feed
- Build soil at depth

Limitations:

- Slow establishment
- Challenging to establish
- Expensive

Most perennial species don't handle competition from other vigorous pasture species very well and cannot be grazed very hard during during establishment but will offer good biomass and extended season forage once established



Cool Season Species

Species	Seeding Rates
<u>Cereals</u>	
Cereal Rye/Oats/Barley	50-100 kg/ha
<u>Grasses</u>	
Annual Ryegrass	15-30 kg/ha
Perennial Ryegrass	25-30 kg/ha
Cocksfoot	2-3 kg/ha
Phalaris	4-6 kg/ha
Tall Fescue	10-20 kg/ha
<u>Legumes</u>	
Field Peas	80-120 kg/ha
Lupins	100-160 kg/ha
Vetch	40-45 kg/ha
Lentils	50-75 kg/ha
Faba Beans	100-150 kg/ha
Clovers	4-12 kg/ha
Serradella	5-20 kg/ha
Medics	10-15 kg/ha
<u>Broadleaves</u>	
Radish	5-8 kg/ha
Mustard	8-12 kg/ha
Turnip/Kale	4-6 kg/ha
Beets	6-9 kg/ha
Flaxseed	30-45 kg/ha
Chicory	3-5 kg/ha
Plantain	8-10 kg/ha

Warm Season Species

Species	Full Seeding Rates
<u>Cereal Grasses</u>	
Millet	20-25 kg/ha
Sorghum	10-15 kg/ha
Corn/Maize	20-30 kg/ha
Panic Grasses	1-2 kg/ha
<u>Legumes</u>	
Cowpeas/Lab Lab Bean	20-25kg/ha
Lucerne	5-20 kg/ha
Sunn Hemp	40-45 kg/ha
<u>Broadleaves</u>	
Sunflower	10-20 kg/ha
Safflower	15-20 kg/ha
Buckwheat	35-50 kg/ha
Brassicas	6-10 kg/ha
Phacelia	5-8 kg/ha

Autumn Green Manure Species Mix

Amount (kg)	Species	Price per kg	\$ Price per Ha
20	Field Peas	1.90	38
15	Oats	0.60	9
10	Ryecorn	2.20	22
10	Vetch	2.40	24
5	Linseed	3.30	16.5
5	Buckwheat	5.80	29
2.5	Sunflowers	6.00	12
2.5	Tillage Radish	8.60	21.5
Total			
70	6 Families, 8 Species		\$162

Hardy Grazing Mix

Amount (kg/Ha)	Species	Price \$/kg	Price \$/Ha
7.5	Forage Barley	1.50	11.25
7.5	Oats	0.60	4.50
7.5	Vetch	2.40	18.00
3	Buckwheat	5.80	17.40
3	Linseed	3.30	9.90
3	Annual Ryegrass	3.30	9.90
2	Italian Biennial Ryegrass	5.75	11.50
1.5	Plantain	16.50	24.75
1	Chicory	23.00	23.00
1	Lucerne	12.10	12.10
1	Balansa Clover	7.60	7.60
1	Persian Clover	6.60	6.60
1	Tillage Radish	8.60	8.60
1	Forage Rape	11.00	11.00
1	Serradella	5.50	5.50
1	Salt Beet	15.00	15.00
43kg	8 Families, 16 Species		\$196.60

Note:

The optimal amount and types of ryegrass and clover species for this mix can vary with different growing environments, seasonal grazing requirements and what seed is already present in the soil. Adjust the rates accordingly.

Dry Seeding



Dry Matter Cuts

Site	Treatment	cut#	dry wt (g)	DM yield (kg/ha)	Value (\$/ha) @\$200/t
Kate	Crop	5	110.6	2212	\$ 442.40
Kate	Pasture/ctl	3	58.6	1953	\$ 390.67
Brett	Crop	8	110.2	1378	\$ 275.50
Brett	Pasture/ctl	4	78.5	1963	\$ 392.50
Ecovillage	Crop	5	130.8	2616	\$ 523.20
Ecovillage	Pasture/ctl	5	36.8	736	\$ 147.20