



WESTERN
NOVEMBER 2017

 **GRDC™**
GROWNOTES™



GRDC™
GRAINS RESEARCH
& DEVELOPMENT
CORPORATION

FABA BEAN

CONTENTS

Contents

Introduction

A.1	Crop overview.....	xiv
A.1.1	The role of pulses in farming systems.....	xiv
A.1.2	About faba bean	xv
	<i>Growing faba beans.....</i>	<i>xv</i>
A.1.3	Suitable environments.....	xvii
A.2	Products and uses.....	xviii
A.3	Market.....	xviii
A.4	Faba bean research.....	xix

1 Planning/Paddock preparation

	<i>Key messages.....</i>	<i>1</i>
1.1	Paddock selection.....	1
1.2	Key requirements for faba beans.....	3
1.3	Benefits of faba beans as a rotation crop.....	4
	<i>Pulses and cereals</i>	<i>4</i>
	<i>Disease management.....</i>	<i>5</i>
	<i>Quantifying break crop yield increases.....</i>	<i>5</i>
	<i>Nitrogen fixation</i>	<i>6</i>
1.4	Disadvantages of faba bean as a rotation crop.....	8
1.5	Fallow management	8
1.5.1	Fallow chemical plant-back effects.....	9
1.6	Soil moisture.....	10
1.7	Yield and targets	11
	<i>Ratio of water use to evaporation.....</i>	<i>12</i>
	<i>Temperature.....</i>	<i>12</i>
1.8	Disease status of paddock	13
1.9	Nematode status of the paddock.....	14
1.10	Insect status of paddock.....	14

2 Pre-planting

	<i>Key messages.....</i>	<i>1</i>
2.1	Faba bean types	1
2.2	Choosing a variety	1
2.3	Faba bean varieties.....	2
	<i>Fiesta VF()</i>	<i>2</i>
	<i>Farah()</i>	<i>3</i>
	<i>Nura()</i>	<i>4</i>
	<i>PBA Rana()</i>	<i>4</i>
	<i>PBA Samira()</i>	<i>5</i>
2.3.1	Faba bean variety agronomic traits.....	5

2.4 Seed quality..... 6

2.5 Handling bulk seed 6

2.6 Seed testing7

 2.6.1 Germination testing 7

 2.6.2 Vigour testing..... 7

 2.6.3 Accelerated ageing vigour test..... 7

 2.6.4 Conductivity vigour test..... 7

 2.6.5 Weed contamination testing 8

 2.6.6 Disease testing and major pathogens identified in seed tests 8

3 Planting

Key messages 1

3.1 Inoculation 1

 3.1.1 Inoculant types 4

 3.1.2 Inoculant and chemical compatibility 9

 3.1.3 Assessing nodulation 10

 3.1.4 Storing inoculants 12

 3.1.5 Inoculum survival..... 12

 3.1.6 Applying peat-based inoculants 12

3.2 Crop establishment.....13

 3.2.1 Stubble retention.....13

 3.2.2 Time of sowing14

3.3 Seeding rates15

 3.3.1 Row spacing 16

 3.3.2 Sowing depth17

 3.3.3 Rolling..... 19

3.4 Pulses and herbicide damage.....19

3.5 Seeding equipment.....20

 3.5.1 Air seeders..... 20

 3.5.2 Combine seeders..... 21

4 Plant growth and physiology

Key messages 1

4.1 Faba bean growth stages 1

4.2 Growth and development 6

 4.2.1 Emergence..... 6

 4.2.2 Leaves 7

 4.2.3 Roots..... 7

Waterlogging and drainage 8

Soil nitrate and temperature effects on nodulation..... 8

Root mass and penetration 8

 4.2.4 Stem and branches..... 9

4.2.5	Flowering and fruit development.....	10
	<i>Pollination</i>	12
	<i>Pod development</i>	13
	<i>Seed development</i>	16
4.3	Crop development	17
4.3.1	Erectness.....	18
4.3.2	Maturity.....	19
5	Nutrition and fertiliser	
	<i>Key messages</i>	1
5.1	Crop removal rates	1
	<i>Balancing inputs</i>	1
5.2	Nutrition	2
	<i>Identifying nutrient deficiencies</i>	2
	<i>Nutrient types</i>	3
5.2.1	Detecting nutrient deficiencies	3
5.2.2	Diagnosing nutrient disorders	4
5.2.3	Nutrient toxicity.....	5
5.2.4	Boron toxicity	5
5.2.5	Manganese toxicity.....	5
	<i>Symptoms</i>	5
5.2.6	Aluminium toxicity	6
	<i>Visual symptoms</i>	6
5.3	Fertiliser	6
5.3.1	Overview	6
5.3.2	Pulses and fertiliser toxicity.....	7
5.3.3	Nitrogen.....	7
	<i>Deficiency symptoms</i>	7
5.3.4	Phosphorus.....	8
	<i>Deficiency symptoms</i>	8
5.3.5	Potassium.....	9
	<i>Deficiency symptoms</i>	9
5.3.6	Sulfur	11
	<i>Deficiency symptoms</i>	11
5.3.7	Zinc	11
	<i>Deficiency symptoms</i>	11
	<i>Pre-plant treatments</i>	11
5.3.8	Iron.....	13
	<i>Deficiency symptoms</i>	13
	<i>Occurrence</i>	13
5.3.9	Manganese	14
	<i>Deficiency symptoms</i>	14
5.3.10	Copper	14
	<i>Deficiency symptoms</i>	14

5.3.11 Molybdenum.....	15
<i>Deficiency symptoms</i>	15
5.3.12 Boron.....	15
<i>Deficiency symptoms</i>	15
5.4 Arbuscular mycorrhizae fungi.....	16
5.5 Nutrition effects on following crop	16
5.5.1 Nitrogen.....	16
<i>Benefits of nitrogen fixation</i>	17
6 Weed control	
<i>Key messages</i>	1
6.1 Specific weed issues for faba beans	1
6.2 Integrated weed management	2
6.2.1 In-crop weed control	2
<i>Herbicide resistance</i>	2
6.3 Herbicide damage in pulse crops	3
6.3.1 Spray drift.....	4
6.3.2 Tolerance of faba bean varieties to herbicides.....	11
6.3.3 APVMA.....	12
6.3.4 Always read the label.....	12
6.4 Weed management planning.....	13
<i>Pre-emergent herbicide options</i>	13
<i>Simazine</i>	14
6.4.1 Post-emergent herbicides	14
6.5 Other weed-control strategies.....	15
<i>Directed sprays in the crop</i>	15
<i>Crop-topping and desiccation</i>	16
7 Insect control	
<i>Key messages</i>	1
7.1 Insect control thresholds	1
7.2 <i>Helicoverpa</i> species	2
7.2.1 Native budworm	2
7.2.2 Life cycle and development	2
7.2.3 Budworm management.....	5
<i>Yield and quality thresholds</i>	8
<i>Always read the label</i>	9
7.3 Aphids.....	9
<i>Identification</i>	9
<i>Adult life cycle</i>	11
<i>Direct-feeding damage</i>	12
<i>Aphids as vectors of viruses</i>	13
<i>How aphids transmit viruses</i>	14
7.4 Other insect pests	15

7.4.1	Cutworms	15
	<i>Identification</i>	15
	<i>Damage</i>	15
	<i>Monitoring and thresholds</i>	15
	<i>Management</i>	15
7.4.2	Thrips.....	16
	<i>Thrips damage</i>	17
	<i>Monitoring and thresholds</i>	17
7.4.3	Snails	17
	<i>White snails</i>	18
	<i>Pointed or conical snails</i>	19
	<i>Damage</i>	20
	<i>Life cycle</i>	20
	<i>Monitoring</i>	20
	<i>Control</i>	21
7.4.4	Slugs	21
	<i>Life cycle</i>	22
	<i>Damage</i>	22
	<i>Monitoring and thresholds</i>	22
	<i>Management</i>	22
7.5	Mites	23
7.5.1	Redlegged earth mite	23
	<i>Life cycle</i>	23
	<i>Monitoring</i>	24
	<i>Control</i>	24
	<i>Chemical control</i>	24
	<i>Autumn sprays</i>	25
	<i>Spring sprays</i>	25
	<i>Other controls</i>	25
7.5.2	Lucerne flea	25
	<i>Life cycle</i>	25
	<i>Monitoring</i>	26
	<i>Chemical control</i>	26
	<i>Biological and cultural control</i>	26
7.6	Monitoring faba bean for insect pests	27
	<i>How to use a beat sheet to sample faba beans</i>	27
	<i>How to use a sweep net to sample faba beans</i>	28
8	Nematode management	
	<i>Key messages</i>	1
8.1	Background	1
8.1.1	The life cycle of RLN	2
8.2	Symptoms and detection	3
8.3	Varietal resistance or tolerance.....	4
	<i>Resistance: nematode multiplication</i>	4
	<i>Tolerance: crop response</i>	4

8.4	RLN damage	4
8.5	Management of nematodes	5
	<i>Testing for RLN</i>	5
9	Diseases	
	<i>Key messages</i>	1
9.1	Fungal disease management strategies	1
	<i>Variety selection</i>	2
	<i>Distance</i>	3
	<i>Paddock history and rotation</i>	3
	<i>Paddock selection</i>	3
	<i>Hygiene</i>	4
	<i>Seed quality and dressings</i>	4
	<i>Sowing date</i>	5
	<i>Sowing rate</i>	5
	<i>Sowing depth</i>	5
	<i>Foliar fungicide applications</i>	5
	<i>Mechanical damage</i>	6
	<i>Controlling aphids</i>	6
	<i>Harvest management</i>	6
9.1.1	Risk assessment	6
9.1.2	Regular crop monitoring	9
	<i>Chocolate spot</i>	9
	<i>Ascochyta blight</i>	9
9.2	Symptom sorter	11
9.3	Chocolate spot	14
9.3.1	Symptoms	14
9.3.2	Economic Importance	17
9.3.3	Disease cycle	17
9.3.4	Control	17
9.3.5	Variety choice	18
	<i>Moderately resistant (MR)</i>	18
	<i>Moderately susceptible (MS)</i>	18
	<i>Susceptible (S)</i>	18
9.4	Ascochyta blight	19
9.4.1	Symptoms	19
9.4.2	Disease cycle	23
9.4.3	Control	23
9.4.4	Variety choice	24
	<i>Resistant (R)</i>	24
	<i>Susceptible (S)</i>	24
9.5	Sclerotinia stem rot	24
9.5.1	Symptoms	24
9.5.2	Disease cycle	25

9.5.3 Control	25
9.6 Botrytis grey mould.....	25
9.6.1 Background	25
9.6.2 Economic importance	25
9.6.3 Biology and epidemiology.....	25
9.7 Root rots.....	26
9.7.1 Symptoms	26
9.7.2 Economic importance	26
9.7.3 Disease cycle	26
9.7.4 Control	26
9.8 Rust	27
9.8.1 Symptoms	27
9.8.2 Disease cycle	29
9.8.3 Control	29
9.9 Rhizoctonia bare patch	29
<i>Description</i>	29
<i>Management strategies</i>	30
9.10 Viruses.....	30
9.10.1 Control	37
9.11 Sample preparation for diseased plant specimens	38
10 Plant growth regulators and canopy management	
11 Crop desiccation/spray out	
<i>Key messages</i>	1
11.1 Desiccation	1
11.1.1 Timing of desiccation.....	2
11.1.2 Effect of desiccants on green, immature seeds	2
11.1.3 Products registered for the desiccation of faba bean.....	3
11.2 Crop-topping	3
11.2.1 Glyphosate and paraquat	5
11.3 Seed and pod development.....	5
11.4 Windrowing	6
12 Harvest	
<i>Key messages</i>	1
12.1 Timing the harvest	1
12.1.1 Yield losses.....	1
12.1.2 Deterioration in grain quality.....	2
12.1.3 Missed marketing opportunities.....	3
12.2 Implementing early-harvest management	3
12.3 Harvesting and header settings	4
12.4 Modifications and harvest aids.....	5

12.5	Achieving a clean sample.....	8
12.6	Lodged crops	9
12.7	Grower-kept sowing seed.....	9
12.7.1	Safe storage of seed.....	10
13	Storage	
	<i>Key messages</i>	1
13.1	Handling faba and broad bean.....	1
13.2	Grain cleaning.....	1
13.3	Grain quality.....	2
13.3.1	Storage life.....	2
13.3.2	Moisture.....	3
	<i>Moisture sources</i>	3
13.3.3	Temperature	3
13.3.4	Silo capacity	3
13.3.5	Cooling grain and aeration cooling	4
	<i>Aeration systems</i>	4
13.3.6	Drying grain and aeration drying.....	5
13.4	Insect pests in storage	5
13.5	Farm and grain hygiene	6
13.5.1	Controlling insects in storage with phosphine.....	7
	<i>Use phosphine carefully</i>	7
13.6	Silo or grain bags	7
13.6.1	Pulse quality risks and grain bags.....	8
14	Environmental issues	
	<i>Key messages</i>	1
14.1	Temperature	1
	<i>High temperatures</i>	1
	<i>Temperature and sowing time</i>	1
14.2	Frost	2
	<i>Tolerance to low temperature</i>	2
14.2.1	Managing frost damage	4
	<i>Use of the frost zone</i>	4
	<i>Modify soil heat bank</i>	4
	<i>Manipulate flowering times</i>	5
14.3	Waterlogging and flooding	5
14.4	Drought	5
15	Marketing	
15.1	Selling principles	2
15.1.1	Be prepared.....	2
	<i>When to sell</i>	2
	<i>How to sell</i>	2

TABLE OF CONTENTS

FEEDBACK

- 15.1.2 Establish the business risk profile 3
 - Production risk profile of the farm* 4
 - Establishing a target price* 5
 - Income requirements* 6
- 15.1.3 Managing your price 7
 - Methods of price management* 8
- 15.1.4 Ensuring access to markets 10
 - Storage and logistics* 11
 - Cost of carrying grain* 12
- 15.1.5 Converting tonnes into cash 13
 - Set up the toolbox* 13
 - How to sell for cash* 14
 - Counterparty risk* 17
 - Relative values* 17
 - Contract allocation* 19
 - Read market signals* 19
- 15.2 Western faba beans: market dynamics and execution 20**
 - 15.2.1 Price determinants for western faba beans 20
 - 15.2.2 Converting tonnes into cash for western faba beans 22