



# Spring Barley Agronomy

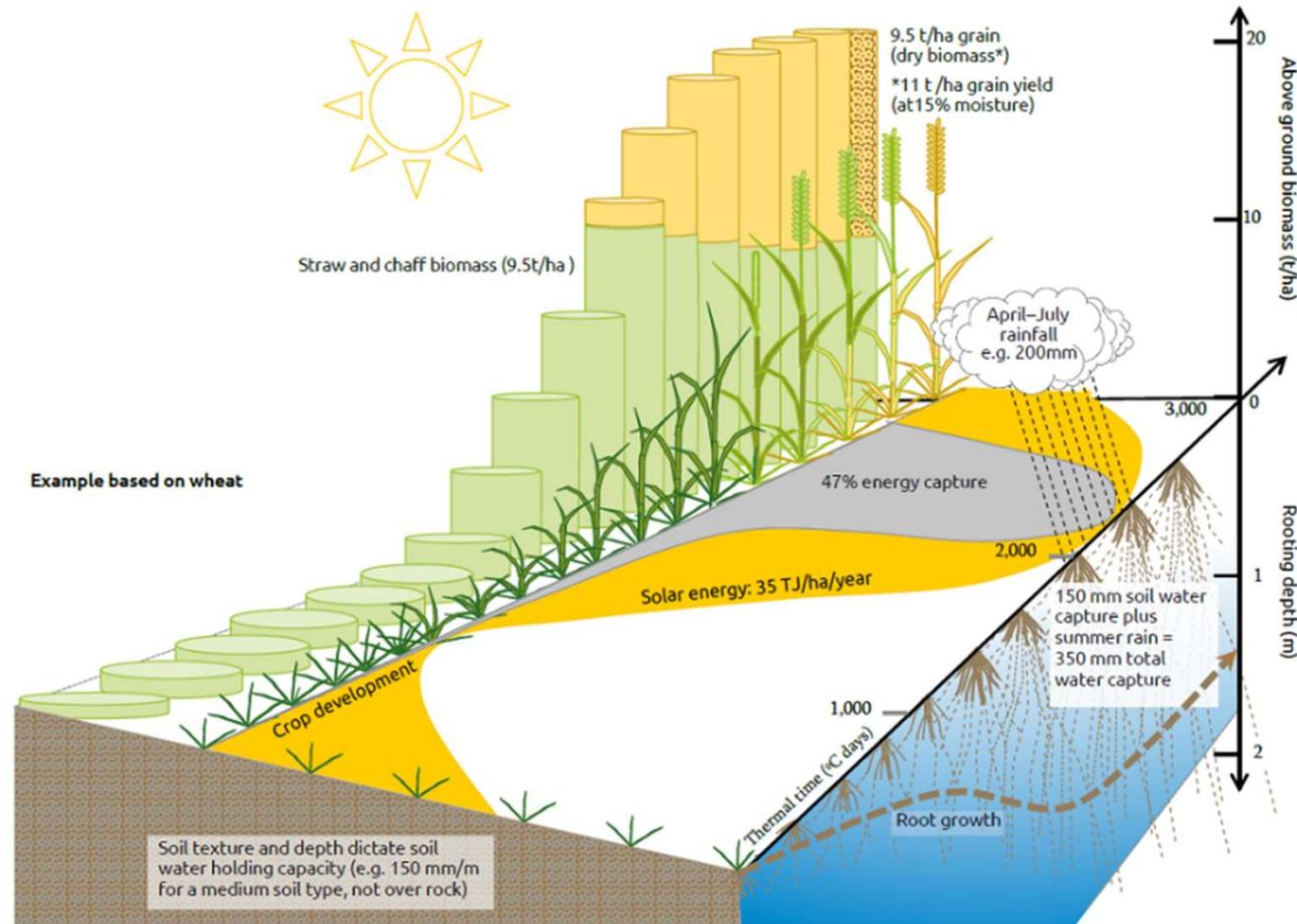
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grounded  
agronomy ltd  
 *connected solutions for complex farming*

# Components of yield

## Yield Enhancement Network

- 60% capture of annual light energy
  - ITJ=1.4T biomass
- Capture 75% available water to 1.5m depth
  - 18mm=1T biomass/ha
- 60% of the lower biomass amount can be converted to grain



# Islay SB potential

SB yield potential limited by either sunlight or rainfall between March – September (long growing season)

- Average rainfall 631mm + Craigens AWC 52.6mm
  - Total water 683.6mm,
  - 75% capture = 512mm = 28T biomass = 60% for grain = **17.09T/ha**
- Average sunlight = 1050kwh/m<sup>2</sup>
  - = 37.8TJ/ha = 52.92T biomass = **31.75T/ha**

# Why does soil health matter?



# Variety

	Belter	Firefoxx	Laureate	Skyway	SY Tennyson	LG Diablo	RGT Planet	KWS Sassy
								
End-use group	Approved							
Scope of recommendation	UK	UK	UK	UK	UK	UK	UK	UK
Variety status		C	C	C		C	C	
<b>Fungicide-treated grain yield (% treated control)</b>								
United Kingdom (7.8 t/ha)	104	102	102	102	101	98	96	94
North region (8.0 t/ha)	104	102	102	101	101	99	97	95
<b>Untreated grain yield (% treated control)</b>								
United Kingdom (7.8 t/ha)	89	86	88	85	82	82	82	80
<b>Disease resistance</b>								
Mildew (1–9)	8	8	9	8	8	8	9	8
Brown rust (1–9)	5	4	5	4	4	4	4	5
Rhynchosporium (1–9)	6	6	6	5	5	5	6	6
Net blotch (1–9)	7	7	8	6	5	7	5	[5]
<b>Agronomic features</b>								
Resistance to lodging without PGR (1–9)	7	7	6	7	7	6	7	[6]
Straw length without PGR (cm)	68	69	69	74	70	71	72	78
Ripening (days +/- RGT Planet)	+2	0	+1	+1	+2	+2	0	+2
Resistance to brackling (1–9)	8	7	7	7	7	7	7	6
<b>Main market options</b>								
MBC malting approval for brewing use	F	-	F	F	F	F	F	Nt
MBC malting approval for malt distilling use	P	F	F	-	F	F	Nt	F
<b>Grain quality</b>								
Specific weight (kg/hl)	68.4	67.9	68.0	70.0	67.1	68.4	69.5	69.6
Screenings (% through 2.25 mm)	0.9	1.4	1.2	0.9	1.3	1.4	1.2	1.0
Screenings (% through 2.5 mm)	2.2	3.5	3.0	2.2	2.9	3.3	3.3	2.2
Nitrogen content (%)	1.48	-	1.45	[1.48]	1.40	1.44	1.48	-

# Seed

- Grain yield is the product of three components: ears/m<sup>2</sup>, grains/ear and individual grain weight.
- How many plants / tillers / ears do we need?
- **Benchmark:** 8.8 t/ha at 15% moisture
  - 775 ears/sqm, 25 grains/ear, 46 mg/grain
- To achieve 775ears/sqm, we need:
  - 350 plants
  - 1,050 stems/sqm (a main stem + 2 tillers per plant)
  - Over 70% stem survival

# Seed

- Aim for viable seeds / sqm = 325 - 375
- Sowing rate =  $(\text{TGW}/100) \times \text{Total seeds/sqm}$

## Example

- $(350 \text{ viable seeds} / 95\% \text{ germination}) \times 100 = 368 \text{ seeds/sqm}$
  - Sowing rate =  $(\text{TGW } 55/100) \times 368 = \mathbf{202.4\text{kg/ha}}$  (82kg/ac)
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- Increase seed rate for later sowing date (less ability to tiller)

# Fertiliser

	Offtake (kg/t)		7.5t/ha offtake (kg/ha)	
	With straw	Without straw	With straw	Without straw
P <sub>2</sub> O <sub>5</sub>	8.5	8.0	<b>63.75</b>	60.00
K <sub>2</sub> O	12.0	5.5	<b>90</b>	41.25

- If straw removed:
  - 430kg/ha of 14.14.21+S in seedbed = 60kg/ha P + 90kg/ha K
  - Then top up with 70kg/ha N + S

**Soil test, calculate nutrient applied from manures, adjust N for residue group**

# Plant protection

- In spring barley, grain carbohydrate comes from:
  - 30–35% from the flag leaf and peduncle
  - 25–45% from the ear
  - 20–45% from the rest of the plant.
- Maintaining green leaf area is essential
- Spring barley has a harvest index of around 54%

# Plant protection - example

Timing	Product Name	Rate	Price (£/ha)	Rationale
Pre-emergence	Firestarter (generic Liberator)	0.3 l/ha	£4.79	<i>Pre-emergence weed control to for annual meadow grass</i>
T1	Paramount Max	25 g/ha	£15.00	<i>Weed control</i>
	Zypar	0.6 l/ha	£15.93	<i>Weed control</i>
	Maple DF	2.0kg/ha	£5.10	<i>Manganese application</i>
	+/-Coptrel 500	0.5 l/ha	£6.76	<i>Copper application</i>
	Soratel	0.5 l/ha	£4.38	<i>General purpose fungicide</i>
	Moddus	0.1 l/ha	£1.70	<i>Growth regulator</i>
Wild Oats	+/- Axial Pro	0.45 l/ha	£29.42	<i>Wild oat control (separate pass)</i>
T2	Soratel	0.6 l/ha	£6.57	<i>General purpose fungicide</i>
	Arizona	1.0 l/ha	£6.10	<i>Multi-site fungicide</i>
		<b>Total</b>	<b>£95.75</b>	<i>Inc wild oat spray</i>

# Paramount Max

Label weeds	Weed species	20 g/ha	25 g/ha	Weed size controlled
	Black Bindweed*	-	-	MS
Charlock	S	S	S	Up to 15 cm across/high
Cleavers	-	-	S	200 mm
Chickweed (non-ALS resistant)	S	S	S	Flowering
Field Speedwell	-	-	R	Up to 2 true leaves
Cornflower	-	-	S	Up to 6 true leaves
<b>Fat hen*</b>	-	-	MS	Up to 6 true leaves
<b>Field pansy*</b>	-	-	MS	Up to 2 true leaves
Field penny cress	S	S	S	Up to 15 cm across/high
<b>Foals parsley*</b>	-	-	S	Up to 3 true leaves
<b>Forget me not*</b>	-	-	S	Up to 6 true leaves
<b>Fumitory*</b>	-	-	R	Up to 2 true leaves
Hairy cress	-	-	MS	Up to 6 true leaves
<b>Hemp nettle*</b>	-	-	S	Up to 6 true leaves
Henbit Dead Nettle	-	-	MR	Up to 6 true leaves
Ivy leaf speedwell	-	-	R	Up to 2 true leaves
<b>Knotgrass*</b>	-	-	S	Up to 6 true leaves
Pineapple mayweed	S	S	S	Flower buds visible
Red dead nettle	-	-	MR	Up to 6 true leaves
<b>Redshank*</b>	-	-	MS	Up to 6 true leaves
Scentless Mayweed	S	S	S	Flower buds visible
Shepherds purse	S	S	S	100 mm
Vol. oilseed rape	S	S	S	Flower buds visible

S = Susceptible, MS = Moderately Susceptible, MR = Moderately Resistant, R = Resistant  
**\* Weed control improved with the use of an adjuvant – DO NOT USE ADJUVANT ON OATS**

Additional known activity	Weed Species	Up to 2TL	Up to 6TL	Up to 15 cm across/high
	Corn Marigold	S	S	MS
Cranesbill spp	S	MS	MR	
Dock spp	MS	MS	MR	
Groundsel	S	S	S	
Mouse ear chickweed	S	S	S	
Small Nettle	S	S	S	
Nipplewort	S	S	-	
Orache Common	S	S	R	
Pale persicaria	S	S	S	
Parsley piert	S	S	MS	
Pimpernel Scarlet	S	S	S	
Poppy Common	S	S	MS	
Radish Wild	S	S	S	
Sowthistle Annual	S	S	MS	
Spurrey Corn	S	S	MS	
Thistle Creeping	S	S	MS	
Venus looking glass	S	S	MS	
Vol. Sugar beet	S	S	MS	
Vol. Fodder beet	S	S	MS	

**Notes** Known ALS resistant strains in UK: chickweed, mayweed, poppy

# Key take aways

- Yield is built by tiller number / sqm
- P availability crucial in cold/heavy/acidic soil
- *'The solution to pollution is dilution'*
  - high yielding crops = lower grain N
- Plant protection budget - £60/ha + wild oats