Water & nitrogen use efficiency in plants and crops

Olde Barn Hotel, Marston, Lincs, UK

15-16 December 2010

Produced by the Association of Applied Biologists

Copies available from: The AAB Office
The Warwick Enterprise Park, Wellesbourne,
Warwick CV35 9EF, UK
CONTENTS

Increasing the efficiency of water use of crops by exploitation of novel plant biology
W J DAVIES & SALLY WILKINSON 1–6

Dissecting drought adaptation into its phenotypic and genetic components in wheat
M S LOPES & M P REYNOLDS 7–11

Traits related to genotypic differences in effective water use and drought tolerance in UK winter wheat
E S OBER, C J A CLARK & A PERRY 13–22

Connecting developmental and process physiology to improve yield of droughted wheat with a film antitranspirant
P S KETTLEWELL & J R HOLLOWAY 23–24

Physiological mechanisms underlying the yield increase of droughted wheat from film antitranspirant application
MINUKA WEERASINGHE, PETER KETTLEWELL, IVAN GROVE & MARTIN HARE 25–29

Rhizobacterial impacts on plant water use efficiency
IAN C DODD & ANDREY A BELIMOV 31–37

The effect of temperature and drought stress on water use efficiency of bambara groundnut (Vigna subterranea (L.) Verde) landraces
IBRAHEEM ALSHAREEF, SAYED AZAM-ALI & DEBBIE SPARKES 39–46

Water Use Efficiency improvement in grapevines under Mediterranean conditions
H MEDRANO, A POU, M TOMÁS, S MARTORELL, J M ESCALONA, J FLEXAS, J GERMÉS, M RIBAS-CARBÓ & J GULIÁS 47–55

Exploiting resource use efficiency in ancient wheat species
A PARMAR, D L SPARKES & S MAYES 57–63

Nitrogen recommendations for UK cereal crops: a review
J H ORSON 65–72

A comparative effect of salinity and drought on growth, ion concentration and δ¹³C and δ¹⁵N in barley
SALIMA YOUSFI, MARIA DOLORES SERRET & JOSÉ LUIS ARAUS 73–81

Nitrogen requirements of biomass crops
A B RICHE, K W T GOULDING, N E YATES, I F SHIELD & D G CHRISTIAN 83–88

Impact of plant traits on nitrogen-efficiency and compartmentation in arable systems
A KARLEY, P IANNETTA, T VALENTINE, I BINGHAM, S HOAD, M YOUNG & G SQUIRE 89–96

Routes to reducing the N requirements of high yielding wheat crops
D R KINDRED & R SYLVESTER-BRADLEY 97–106
Targets, traits and technologies to achieve sustainable productivity with arable crops in the UK
R SYLVESTER-BRADLEY 107–114

A comparison of semi-dwarf and standard height oilseed rape varieties on N use efficiency and its components
S M CLARKE, P M BERRY & S ROQUES 115–123

Nitrogen use and profits of Chinese farmers
HOLGER BERGMANN & DANIELA WEBER 125–133

Nitrogen use efficiency of selected winter oat lines grown in flowing solution culture
A A COWAN, A H MARSHALL & J H MACDUFF 135–141

Optimising root traits to improve nitrogen-use efficiency in oilseed rape varieties
P CARVALHO, J FOULKES, P BERRY & J SPINK 143–149

Genetic improvement for increased nitrogen use efficiency in wheat
J LE GOUIS, O GAJU, S HUBBART, V ALLARD, S ORFORD, H HEUMEZ, M BOGARD, S GRIFFITHS, L U WINGEN, M SEMENOV, P MARTRE, J SNAPE & J FOULKES 151–158

Improving nutrient use efficiency through crop breeding: preliminary results from the NUE-CROPS project
J M COOPER, C TETARD-JONES, L REMPELOS, M ALMUAIRFI, A M R GATEHOUSE & C LEIFERT 159–165

The effects of agronomic management on winter wheat performance
C TETARD-JONES, A M R GATEHOUSE, J M COOPER & C LEIFERT 167–171

Genetic variation in wheat root penetration through strong soil
W R WHALLEY, I C DODD, C W WATTS, C P WEBSTER, M A J PARRY & W J DAVIES 173–174

Understanding how nitrogen regulates developmental mechanisms using systems biology
A CARTER & M GIFFORD 175–182

Effect of climate change on soil N cycling and N use pattern in winter wheat
R H PATIL, M LAEGDSMAND, J E OLESEN & J R PORTER 183–193

Conceptual framework for integrating aspects of nitrogen use efficiency in cereals
M WEIH, L ASPLUND & G BERGKVIST 195–200

Variety responses to nitrogen application rates in oilseed rape
S P J KIGHTLEY 201–206

Dissecting nitrogen use efficiency of cereals using an association genetics approach
G BARRAL BARON, A BOOTH, L RAMSAY, J RUSSELL, R WAUGH, W THOMAS & P WERNER 207–212
Water dynamics in the soil-plant continuum: which features regulate the uptake? GUILLAUME LOBET, MATHIEU JAVAUX, LOÏC PAGÈS & XAVIER DRAYE 213–214

The effects of organic and conventional fertility management and crop protection on polyphenols in winter wheat leaves M S ALMUAIRFI, K BRANDT, G LIETZ, J M COOPER & C LEIFERT 215–218

Effects of agricultural production systems on potato yield parameters and the leaf proteome LEONIDAS REMPELOS, CATHERINE TÉTARD-JONES, JULIA COOPER, STEVEN WILCOCKSON, MICK EYRE, ANGĦARAD GATEHOUSE & CARLO LEIFERT 219–225

Fertigation of Glasshouse-grown Bell Pepper (Capsicum annuum L.) grown in a Hydroponic system with a Rockwool substrate H M Z SABLI, J W GOWING & S J WILCOCKSON 227–232

Variation in leaf senescence, nitrogen remobilisation and harvest index in two lines of wheat A P DERKX, M J FOULKES & M J HAWKESFORD 233–237

Water-use efficiency and relative growth rate in two Mediterranean shrubs: Rhamnus ludovici-salvatoris and Rhamnus alaternus HANAN ELAOUOUAD, IGOR FLOREZ-SARASA, HIPÓLITO MEDRANO, AHMED LAMARTI & JAVIER GULÍAS 239–242

Sustainable use of water in baby leaf cropping systems HAZEL SMITH, MARIA TRUCO, RICHARD MICHELMORE, GRAHAM CLARKSON & GAIL TAYLOR 243–250

The effect of wheat dwarfing alleles on nitrogen use efficiency in contrasting tillage systems R K UPPAL and M J GOODING 251–255


Effect of Nitrogen on mildew and Fusarium infection in barley A A MUHAMMED, K THOMAS, C RIDOUT & M ANDREWS 261–266

Investigation into the economics of spent brewery grain uses U BEN-HAMED, H SEDDIGHI & K THOMAS 267–273