John Innes Centre

JIC WGIN Nov 2005

- Part 1-

Germplasm development and assessment

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Germplasm development and assessment

- Paragon EMS mutated population
- Watkins collection
- Straw wall thickness studies

EMS Mutated Paragon Population

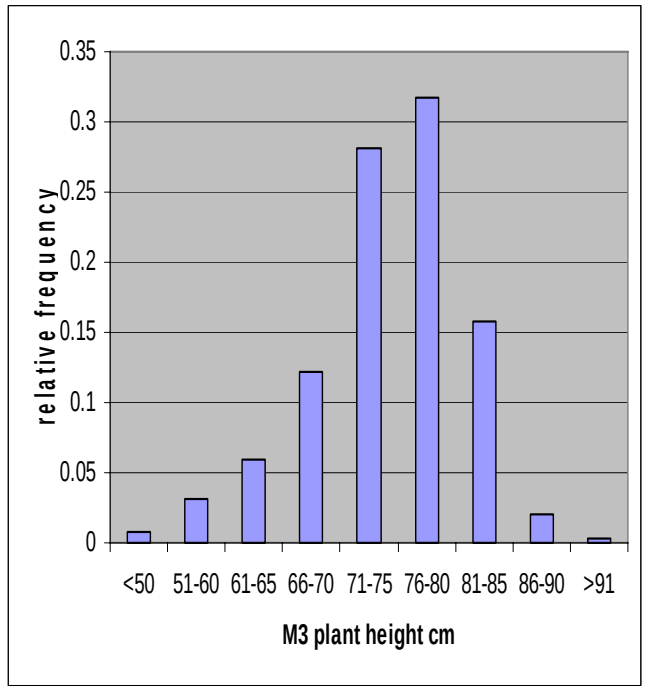
- M0/M1 plants...Mar 04
- M2 seed…….....Aug 04
- M2 plants……..Sep 04
- M3 seed…….....Jan 05
- M3 plants……..Feb 05
- M4 seed…….....Aug 05
- M4 plants……..Sep 05
- M5 seed…….....Jan 06

Current totals

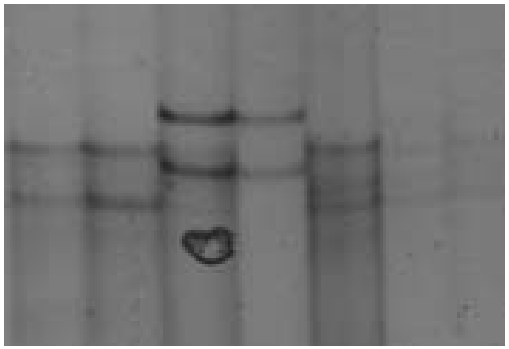
- Original 3500 mutated seeds
- Two seeds from each line taken through selfed (bagged) generations to M_6.
- 6500 lines remain, scored for a variety of mutations
- Height, ear emergence, time to germinate, ear morphology (awns, scurs, club, speltoid etc), stem colour, diseases, vernalisation requirement?

Dwarf mutants

- Height data recorded on all mutants Aug 2005
- Extremes of interest lie less than 60cm and more than 80cm
- PhD work using SSAP to investigate

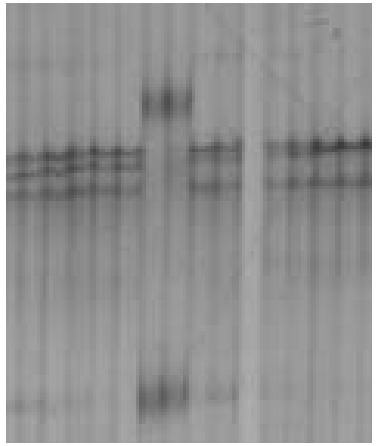


SSCP screening for mutant sequence at *Rht-B1* amplicon

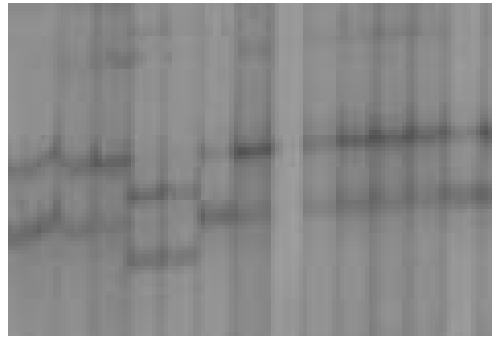


#2.1

C to T substitution
Proline→Serine



#2.2



#2.3

C to T substitution
Proline→Serine

```
                                  *         370         *         390         *         410         *
#2.1 13-G1_1BF-  :  ---caacgcgccgccgccgcccctcccgcccgcccccgcagctcaacgcctccacctcctccaccgtcaccgg  :  69
#2.1 13-H1_1BF-  :  ---caacgcgccgccgccgcccctcccgcccgcccccgcagctcaacgcctccacctcctccaccgtcaccgg  :  69
#2.2 16-C4_1BF-  :  ---caacgcgccgccgccgcccctcccgttccgcccccgcagctcaacgcctccacctcctccaccgtcaccgg  :  69
#2.2 16-D4_1BF-  :  ---caacgcgccgccgccgcccctcccgttccgcccccgcagctcaacgcctccacctcctccaccgtcaccgg  :  69
#2.3 21-E6_1BF-  :  ---caacgcgccgttcgccgcccctcccgcccgcccccgcagctcaacgcctccacctcctccaccgtcaccgg  :  69
#2.3 21-F6_1BF-  :  ---caacgcgccgttcgccgcccctcccgcccgcccccgcagctcaacgcctccacctcctccaccgtcaccgg  :  69
                   ---CAACGCGCCGCCGCCGCCCCTCCCGCCCGCCCCCGCAGCTCAACGCCTCCACCTCCTCCACCGTCACCGG

                            430         *         450         *
#2.1 13-G1_1BF-  :  cggcgggtacttcgatctcccgccctccatcgactcctc---  :  108
#2.1 13-H1_1BF-  :  cggcgggtacttcgatctcccgccctccatcgactcctc---  :  108
#2.2 16-C4_1BF-  :  cggcgggtacttcgatctcccgccctccgtcgactcctc---  :  108
#2.2 16-D4_1BF-  :  cggcgggtacttcgatctcccgccctccgtcgactcctc---  :  108
#2.3 21-E6_1BF-  :  cggcgggtacttcgatctcccgcccccgtcgactcctc---  :  108
#2.3 21-F6_1BF-  :  cggcgggtacttcgatctcccgcccccgtcgactcctc---  :  108
                   CGGCGGGTACTTCGATCTCCCGCCCTCCGTCGACTCCTC---
```

G to A substitution
Valine→Isoleucine

Watkins collection screening

- Continuing uniformity testing on 900 x 4 lines
- Approx 400 x 4 lines covered with 10 SSR primers
- 10% showing heterogeneity (will increase)
- Regeneration failures in 2004 were repeated successfully in 2005

Straw wall thickness studies

- Following EU study on diversity discovery that most cultivars have thin wall stem (85%)
- Others thick wall or solid stem
- Carried out using UPOV scoring

Avalon x Cadenza stem thickness

- Use of mapping population to study genetics of stem wall thickness
- 1:1 ratio of thin to thick / solid mapped (*Xgwm547*) to chromosome 3B
- Variations within lines of thick / solid have been measured (60% – 99% stem fill)
- Data to be used to study QTL effect

Avalon / Cadenza Line 99

Future work

- Paragon EMS population to field trial (Spring 2006) and extended trait analysis
- Continue with Watkins uniformity assessment
- QTL analysis on straw wall thickness data