

METHODS USED FOR DUS DATA ANALYSIS

An overview of Combined-Over-Years Distinctness testing (COYD) and Combined-Over-Years Uniformity testing (COYU)

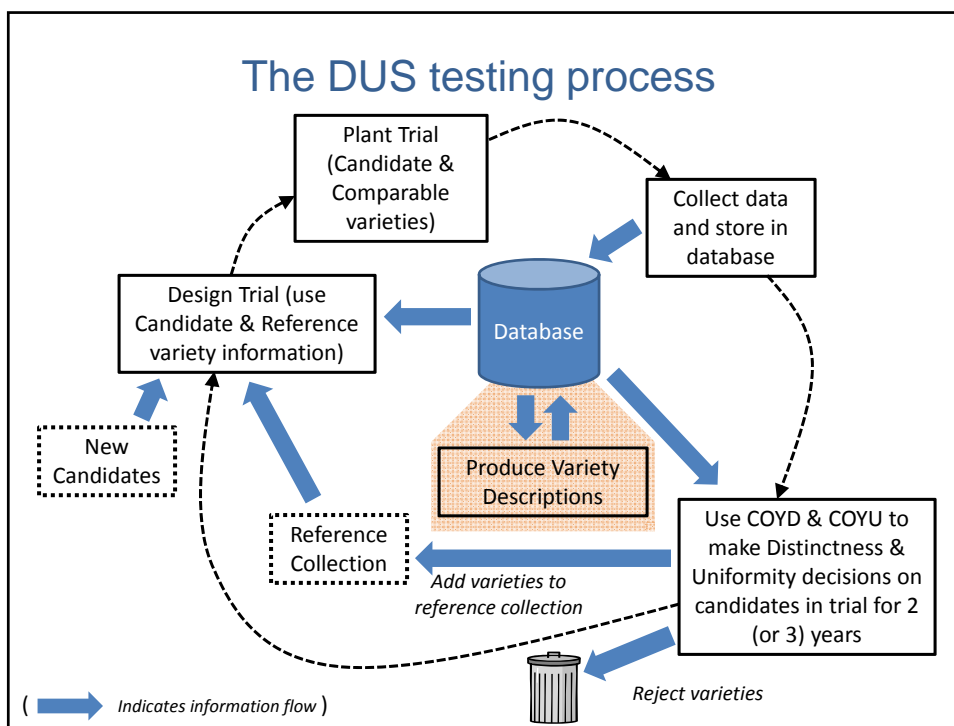
Sally Watson, Agri-Food and Biosciences Institute, UK



Combined-Over-Years Distinctness (COYD)
and
Combined-Over-Years Uniformity (COYU)
are...

- methods used to test Distinctness and Uniformity in DUS spaced plant trials
- used with data observed on quantitative* characteristics for cross-pollinated crops and some self-pollinated crops

*see TG 1, General Introduction to DUS



For COYD & COYU on a characteristic you need:-

- Data on each plant x variety x replicate x 2 (or 3) years (independent growing cycles)
- The data is used to calculate for each variety x year :-
 - a mean – for COYD and COYU
 - an average within-plot standard deviation (SD) (a measure of lack of uniformity within the plot) – for COYU

		Year 2	
Year 1	Variety name	Mean	SD
Comparable varieties	A	-	-
	B	-	-
	C	-	-
	D	-	-
	E	-	-
	F	-	-
	G	-	-
	H	-	-
Candidate varieties	J	-	-
	K	-	-
	L	-	-

Mean of all variety A plants in plot averaged over replicates

Standard deviation of all variety A plants in plot averaged over replicates

For COYD & COYU you need (ctd) :-

- to be *Distinct*, a candidate must be different (by COYD criterion) in at least one characteristic from every other variety in trial
- to be *Uniform* a candidate must be uniform (by COYU criterion) in every characteristic
- Here we will look at COYD & COYU for one characteristic, but in practice we use COYD & COYU on all (QN) characteristics
- Will introduce method and issues of COYD & COYU via example. For detail see TGP/8

COYD illustrated

Days to ear emergence
in perennial ryegrass

Variety	Year			Over -year Mean
	1	2	3	
<i>Comparable</i>				
R1	38	41	35	38
R2	63	68	61	64
R3	69	71	64	68
R4	71	75	67	71
R5	69	78	69	72
R6	74	77	71	74
R7	76	79	70	75
R8	75	80	73	76
R9	78	81	75	78
R10	79	80	75	78
R11	76	85	79	80
<i>Candidate</i>				
C1	52	56	48	52
C2	72	79	68	73
C3	85	88	85	86

- Use variety x year means to get an over-year mean for each variety
- Do analysis of variance to get variety x year mean square

Source	df	MS
Years	2	174.93
Variety	13	452.59
Variety x years	26	2.54
Total	41	

- Calculate COYD Criterion

$$LSD_{p\%} = t_p \times \sqrt{2} \times SE(\bar{x})$$

$$LSD_{1\%} = 2.779 \times 1.414 \times \sqrt{\frac{2.54}{3}} = 3.6$$

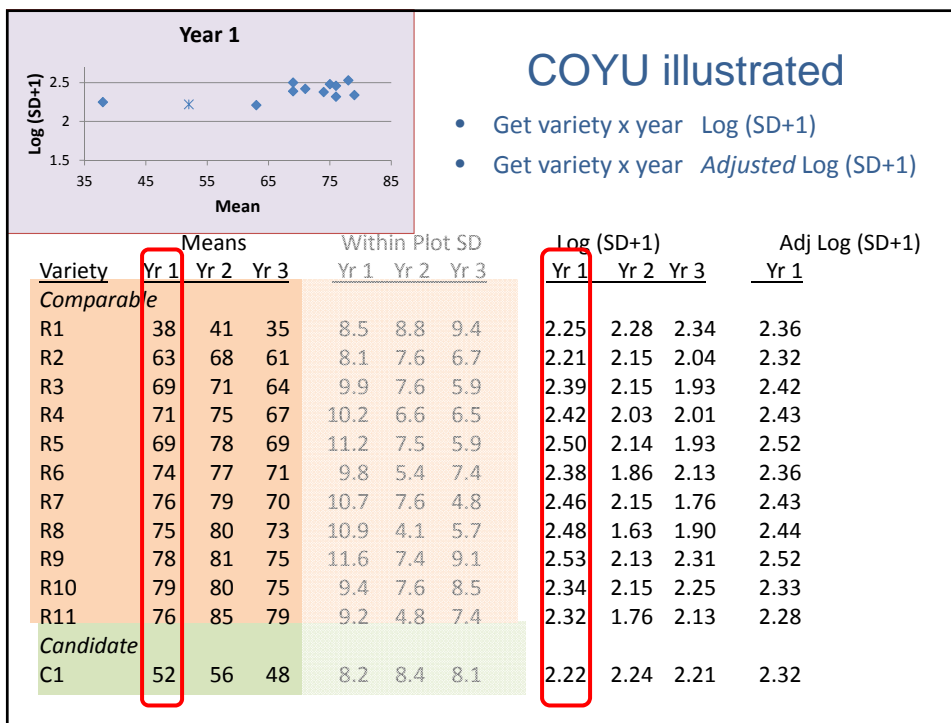
- Is the smallest difference for distinctness → C2 is *Not Distinct* from R4, R5, R6, R7, R8

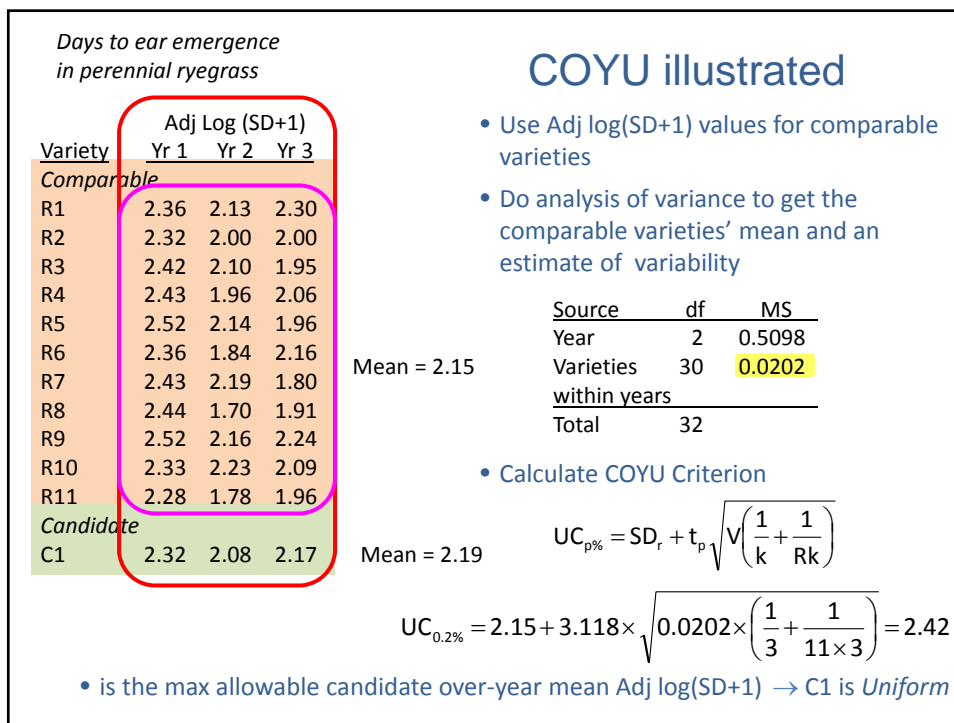
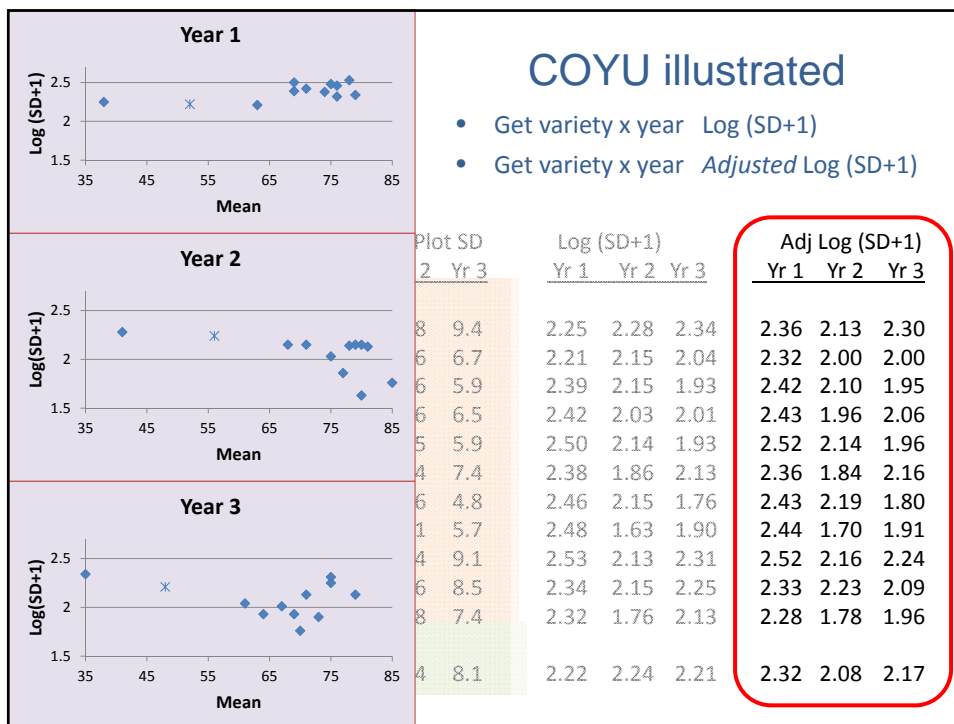
COYD issues

- Need at least 10 df, and preferably at least 20 df for the varieties x years mean square ...

If not enough df, then in some circumstances can use Long-Term COYD

- Use MJRA when there are differences between years in the range of expression of a characteristic
- Use (grouping) adjustment to COYD when varieties are grouped in trial - see TWC/30/20 (& TGP/8/2)





Any questions?

Thank you for your attention