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Sugar beet varieties for

2024

Two new varieties, Osprey from SESVanderHave UK and Smart Vesnica KWS from KWS UK have been added to the list whilst five were withdrawn leaving 19 on the 2024 RL.

This article includes an overview of the 2022 trials, comments on each trait and the main Recommended List (RL) tables.

The 2022 trials

Unfortunately, the 2022 season presented a number of challenges to the RL trials and to sugar beet growers in general. The dry season affected germination at some sites whilst virus yellows were generally kept at low levels by carefully timed foliar spray programmes applied by the host growers. Beet moth infected some of the more southerly trials but the main RL trials were lifted well before the severe December frosts.

Until 2020 the RL and NL trials were combined and contained over 100 varieties (as they also included NL1, NL2 and RL Candidates). Since the separation BBRO have run the RL trial series (which contain RL varieties and the RL candidates) and BSPB run the NL series (NL1, NL2 varieties and some RL varieties to link the two series over years). All NL and RL trials used four replications. In 2022 each RL trial contained 37 varieties, the 22 on the 2023 RL and 15 RL candidates. Data from the NL series is combined with the data from the RL series to produce the recommended list. The RL also sowed three untreated trials to which no foliar fungicides were applied.

The seed for 2022 trials was supplied by the breeders as one bulk to cover both the NL and RL trials. The seed was not primed but did receive a standard Force ST and Tachigaren 70 WP seed treatment. Whilst there was a derogation for the use of Cruiser in place for the commercial crop, it was not used on the trial seed because such derogations arrive too late to treat the seed samples.

Because of the risks of poor establishment associated with the early season weather the eight main RL trials were sown at 8 to 9 cm spacing and then gapped, which achieved an overall population of 99,000 plants/hectare. Six of the eight trials were taken to harvest and five were used in the final results. (Four of the six NL trials drilled in 2022 were taken to yield; three of these were co-located with RL trials: five of the six NL sites were sown to a stand).

Two early sown bolter (ESB) trials were drilled but owing to low bolting levels at one site (drilled 8th March) only the results from the second location (at Saxham) were used (sown 23rd and 28th February).

Drilling of the main RL trials began on the 22nd of March at Swaffham Prior (a chalky loam) and the last on 12th April at Morley (a sandy loam). This date range is almost identical to 2021 but later than the long-term average. The NL trials were also sown within this time period. Seedbeds were drying fast during the drilling period.

During the season, all the trials were closely monitored for aphids and diseases. In general pests and diseases were at low levels in the trials; it was poor establishment that caused two of the RL trials to be abandoned.

Once again harvest was difficult to manage because dry soil conditions delayed start of the RL harvest until 11th October when the Rougham RL site was harvested. The National List trials were all harvested before 15th October. Periods of heavy rain meant conditions were not always ideal. However, the harvest team managed to get all the acceptable trials into the trials tarehouse at Wissington by 11th November. One of the aims of completing harvest by the end of November is to provide summary information to those growers trying a sample of the new varieties in 2023. The National List trials were harvested between the 28th September and 17th October.

Two of the three untreated trials were taken to harvest in November and the third in January 2023. We have not included the untreated results in this article but they are available on the RL section of the BBRO website (https// bbro.co.uk).

Whilst the reduced number of new varieties compared to previous years might appear a little worrying,

breeding for improved yield is still a target for breeders but new and stacked traits to provide improved resilience in the crop are increasing in importance. Watch this space.

The 2024 Recommended List

The tables are in the same format as last year (see Ref. 1). The first is the official RL whilst the supplementary three-year data table shows the stability or variability over the three years of the trials.

Because of the large variation in yield potential between the control varieties, the statistical analysis for adjusted yield used median instead of mean to provide a more equitable comparison between varieties. Statistical analysis of other traits continued to use means.

The yield data is presented as a mean from 24 RL and NL trials in total (five in 2020, ten in 2021 and nine in 2022). The yield ratings are presented in comparison to the mean of the five control varieties of the latest trial year; in 2022 these were Daphna, Evalotta KWS, BTS1915, BTS1140 and Kortessa KWS. Differences in yield of less than 3.8% (as % of control) are not statistically significant and should be treated with caution. Adjusted yields in 2022 were 93.0 t/ha and reflect the drier season than 2021 (113.5), they were also lower than 2020 (102.9). The average plant population was 99,040 plants per hectare (100,900 last year)

Adjusted tonnes. The top three varieties were BTS1915, Harryetta KWS and Katjana KWS. Differences of less than 3.8% (as % of controls) between adjusted yields of varieties are not statistically significant and should be treated with caution.

Sugar contents. These were similar to last year and ranged between 16.7 and 17.5% with BTS3020 the highest, but it should be noted that differences of 0.2% or less in sugar concentration between varieties are not statistically significant.

Bolting. This data is calculated assuming a final plant population of 100,000 beet per hectare. The ESB data is derived from the special trials

sown between 21st February and 4th March (over the three years) and should be used when considering varieties for sowing before 15th March or in cold conditions. The five varieties marked with **X** are considered unsuitable for sowing before mid March. Osprey was only included in the BBRO ESB in 2020 and 2022 but the breeder's own data confirmed that bolting levels were not high enough to warrant a red **X**. There were differences between years for some varieties and the three-year table should be consulted when determining bolting risk. The mean number of vernalisation days experienced in the 2022 ESB trials was 26.1. This was much warmer than the previous two years (40.1 in 2021 and 31.5 in 2020): details can be found on the BBRO website. The variety with lowest ESB counts was BTS3020, but this was not significantly lower than a number of other varieties.

Normal sown bolting is recorded in the main trials. Two of the varieties have recorded no bolters in the last three years' main RL trials, these were Harryetta KWS and BTS3610.

Establishment. The aim of the RL trials is to establish an even population of 100,000 plants per hectare to allow the genetic yield potential of varieties to be compared. Differences of 4.2% or less are not statistically significant. Where the trials are not sown to a stand establishment is recorded prior to gapping.

Foliar disease observations. Infection is recorded in both main RL trials and the untreated trials. The data for foliar disease does not indicate whether a variety is resistant or tolerant to the disease, but simply the % leaf infection recorded on the foliage. No cercospora and very low levels (mean 1%) of powdery mildew were recorded in the 2022 trials. The levels of rust infection ranged from 2 to 26% giving rust ratings between 2.5 and 8.1 (where 9 = no disease and 1 = high levels).

Untreated yields. The untreated trials provide yield performance data in the absence of foliar fungicides and as such they give an indication of tolerance. This data is available on the BBRO website.

Beet Cyst Nematode (BCN). Four varieties have tolerance to BCN (Daphna, Katjana KWS, Harryetta KWS and Button. The tolerance is

determined by breeder's own tests. The RL trials are not conducted on sites infected with BCN.

AYPR rhizomania. The new variety Osprey has AYPR tolerance and joins Philina KWS on the list. Information on the use of these varieties in AYPR infected fields is available from BBRO and the breeders. The RL trials are not conducted on sites infected with AYPR.

Virus tolerance. Maruscha KWS has partial tolerance to beet mild yellowing virus. The data was produced by the breeder (KWS UK Ltd), who will have more information regarding its use and effect on the different yellowing viruses. It is lower yielding than conventional varieties, which is normal for a variety with a new trait. It should not be sown until after mid-March. It is important to remember that there are at least three viruses that affect sugar beet, and this trait is only partially tolerant against one of these, highlighting the challenge of breeding for virus resistance.

ALS herbicide tolerance. Smart Vesnica KWS joins BTS Smart 9485 on the list for those wanting to use ALS tolerance technology. RL trials are treated with conventional herbicides but ALS tolerant varieties can produce higher yields when used with their partner ALS herbicides than with conventional products. The RL has not tested this possibility but details of how to use these varieties are available from the breeders KWS and Limagrain.

Impurities. Levels are measured in the Wissington tarehouse as part of juice quality assessments. At present there is no significant difference between varieties and so the values are not presented in these tables but are available from BBRO. Figures can increase in the presence of virus yellows, but also will reduce as nitrogen applications are reduced.

Top size and leaf habit. This is not assessed in the RL trials but information is available from the breeder.

Withdrawn varieties for 2024. These are KWS Evalotta, BTS5770, KWS Kortessa, Lacewing and KWS Smart Rixta

New varieties for 2024

Osprey from SESVANDERHAVE UK Ltd produced 99.2% adjusted tonnes at 16.9% sugar content. It is AYPR tolerant. It had the highest establishment (102.8%).

Smart Vesnica KWS from KWS UK Ltd is an ALS tolerant variety. Its yield in the RL trials (treated with non-ALS herbicides) was 94.0 adjusted tonnes with 17.4% sugar content. ALS tolerant varieties are likely to produce higher yields when used with their partner ALS herbicides than with conventional products.

Four steps to variety selection ahead of 2024

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References

1 Mike May & Simon Bowen (2022). Sugar beet varieties for 2023. British Sugar Beet Review, 90 (2), 12-17.

More information on how the RL is run is available on the website www.bbro.co.uk

Step 1 - Monitor variety performance on your farm this season.

Make sure you know where your different varieties are drilled this season. Whilst the RL information provides an essential guide to genetic potential, assessing how they perform in your farm environment is key. What grew well on your soil types, the incidence of foliage disease, and early and later sugar content and yield? Canopy characteristics tend to be strongly influenced by soil type and seasonal factors, so this is well worth recording too. Take a look at the variety strips on your nearest BBRO demonstration farm.

Step 2 - Do you want to select for a specialist trait?

Four varieties have **BCN tolerance** and play a key role in the integrated control of BCN. Check roots in the early summer for cysts or consider soil testing.

CONVISO SMART (ALS herbicide tolerance) Novel approach for both weed beet control and as an alternative to conventional herbicides. Two new SMART varieties available for 2024.

Enhanced AYPR resistance. Two options for the few localised sites where specific aggressive strains of AYPR exist. All other varieties carry resistance.

Partial tolerance to **Beet Mild Yellowing Virus.** First of a new generation. Remember this is partial resistance to just one of the viruses that can cause yellowing.

Step 3 – Select for drilling date

EARLY Drilling - Before 5th March

NORMAL Drilling - After mid-March

Remember it can be useful to have a variety suitable for early drilling when soil conditions allow. Check there is no red cross X against the variety. If unsure, check the 3-year data set for normal sown bolters for consistency across seasons. BTS1140 has some variable performance and so is probably best left for drilling after mid-March, the same is recommended for SMART varieties to reduce bolting risk.

Step 4 - Refine your selection according to specific field conditions. Disease risk and harvest date

Establishment – Few differences noted between varieties. Checking the 3-year data set for consistency may indicate an advantage in challenging soil types and conditions such as cloddy seedbeds in dry springs.

Sugar content – averages range across the RL between 16.7% & 17.5%. Target a higher sugar content for early harvest dates or on land prone to drought/wilting to optimise adjusted tonnage returns.

Disease resistance – important for managing foliar diseases, particularly in later harvested crops. Look at the 3-year data sets for seasonal differences.

Growth habit – this is not measured in the RL trials and is strongly influenced by soil type and seasonal factors. Assess this on your farm. A lower growing, prostrate canopy can help with weed suppression whereas a vigorous upright canopy will improve autumn yield increase and of course provide greater frost protection.

RECOMMENDED LIST OF SUGAR BEET VARIETIES 2024 (Based on trials from 2020-2022)

Rz1 rhizomania varieties

	MEAN	95% lsd	BTS1915	Daphna	BTS1140	Harryetta KWS	Katjana KWS	Annatina KWS	Wren	Osprey	BTS3610	Morgan	Button	BTS3020	Adder	Tawny	Stewart	Philina KWS	BTS Smart 9485	Smart Venica KWS	Maruscha KWS
Status: (C) = control variety[1]			Y4(C)	Y7(C)	Y6(C)	Y2	Y3	Y2	Y3	Y1	Y2	Y2	Y2	Y3	Y2	Y2	Y2	SY6	SY2	SY1	SY3
AYPR/BCN/ALS/IVY as claimed by the Breeder			-	BCN	-	BCN	BCN	-	-	AYPR	-	-	BCN	-	-	-	-	AYPR	ALS	ALS	V
CROP YIELDS																					
Adjusted tonnes % of C=100%[2]	103.3 t/ha	3.8	103.9	101.5	99.1	102.9	101.6	100.4	99.2	99.2	98.9	98.8	98.2	98.0	98.0	97.6	97.2	97.5	94.3	94.0	89.9
Sugar yield % of C=100%[2]	16.53 t/ha	3.8	103.9	101.5	99.1	102.9	101.6	100.4	99.2	99.2	98.9	98.8	98.2	98.0	98.0	97.6	97.2	97.5	94.3	94.0	89.9
Root yield % of C=100%[2]	95.4 t/ha	3.5	104.5	101.8	99.5	103.8	101.2	99.3	102.4	100.6	98.1	98.5	99.4	96.3	100.7	99.1	96.7	98.4	96.4	92.6	88.6
Sugar content %	17.2%	0.22	17.1	17.2	17.2	17.1	17.3	17.4	16.7	16.9	17.4	17.2	17.0	17.5	16.8	17.0	17.3	17.1	16.9	17.4	17.4
BOLTERS per 100,000 plants/ha	MEAN	99.9% lsd																			
"X" Unsuitable for sowing BEFORE Mid March for new (2024) list			X									X			X			X			X
Early sowing, before 5 March[3]	2,990	4,157	4,117	1,729	1,564	1,344	1,118	1,748	1,904	[2020]	2,170	3,385	1,547	1,023	3,169	2,802	1,871	3,375	1,489	1,972	4,200
Normal sowing	26 /ha	152	21	7	64	0	9	9	72	26	0	28	9	21	9	47	16	47	21	12	76
PRE-GAPPING ESTABLISHMENT[4]	MEAN	95% lsd																			
Control	100%	4.2	100.6	100.8	100.5	99.1	101.3	97.1	102.9	102.8	99.3	100.3	101.9	100.8	102.0	101.7	99.0	102.4	97.5	101.3	97.1
DISEASE (1 = high leaf infection 9 = very low leaf infection)[5]																					
Rust	5.7		6.8	4.8	6.5	3.5	2.8	5.5	5.7	[4.7]	6.2	4.1	4.5	8.1	5.7	6.8	2.8	2.5	5.9	[7.2]	6.7
Powdery mildew	5.0		5.1	4.9	4.5	4.6	4.9	4.8	4.8	[4.2]	5.2	4.0	4.7	5.2	5.0	5.1	4.0	4.6	5.7	[3.9]	2.4
Cercospora	6.5		[6.6]	[6.8]	[6.1]	[6.3]	[6.4]	[5.9]	[6.5]	[7.6]	[6.9]	[6.0]	[6.3]	[7.2]	[6.5]	[7.3]	[5.5]	[6.7]	[6.0]	[7.0]	[8.5]
OTHER CLAIMS																					
AYPR (Aggressive rhizomania)			-	-	-	-	-	-	-	Y	-	-	-	-	-	-	-	Y	-	-	-
ALS (Herbicide Tolerant)			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y	Y	-
BCN (as claimed by the Breeder)			-	Y	-	Y	Y	-	-	-	-	-	Y	-	-	-	-	-	-	-	-
V (as claimed by the Breeder)[6]			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	V
RL SYSTEM																					
Year first listed			2020	2017	2018	2022	2021	2022	2021	2023	2022	2022	2022	2021	2022	2022	2022	2018	2022	2023	2021
BREEDER/UK CONTACT[7]																					
Breeder			BTS	KWS	BTS	KWS	KWS	KWS	SV	SV	BTS	STR	STR	BTS	SV	SV	STR	KWS	BTS	KWS	KWS
UK Agent			LG	KWS	LG	KWS	KWS	KWS	SV	SV	LG	STR	STR	LG	SV	SV	STR	KWS	LG	KWS	KWS

Mean of controls includes Kortessa KWS and Evalotta KWS which are no longer listed.
1 Newly listed varieties (Y1/SY1) have results from three years using approximately 2 kgs breeders' seed. Thereafter commercial seed should be used in RL trials.
2 Yields based on an average plant population of 99,000 plants/ha in these trials. Differences in adjusted tonnes/ha in these trials. Differences in adjusted tonnes of less than 3.8% should be treated with reserve.
3 The ratings from normal sowings are applicable for sowing after mid-March in most seasons.
4 Differences in establishment of less than 4.2% should be treated with reserve.
5 Cercospora ratings should be treated with caution as infections were low and are based on 2020 and 2021 data only.
6 Breeders claims are for tolerance to some of the yellowing viruses
7 BTS = Betaseed, KWS = KWS UK Ltd, LG = Limagrain UK Ltd, STR = Strube Sugar Beet UK Ltd, SV = SESVanderHave UK Ltd
8. [ ] - limited data

RECOMMENDED LIST OF SUGAR BEET VARIETIES 2024 (Based on trials from 2020-2022)

Rz1 rhizomania varieties 3-year data					BTS1915	Daphna	BTS1140	Harryetta KWS	Katjana KWS	Annatina KWS	Wren
STATUS (C) = control variety					Y4(C)	Y7(C)	Y6(C)	Y2	Y3	Y2	Y3
AYPR/BCN/ALS/VY as claimed by the Breeder					-	BCN	-	BCN	BCN	-	-
ADJUSTED TONNES (Gapped Trials)		T's per ha	Control	95% lsd							
	Mean	103.3	100.0	3.8	103.9	101.5	99.1	102.9	101.6	100.4	99.2
	2022	93.0			102.0	102.9	99.5	104.7	102.7	101.7	98.6
% Mean of (C)	2021	113.5			104.2	101.8	99.0	102.1	101.3	99.9	99.5
	2020	102.9			105.9	99.0	98.7	102.0	100.7	99.8	99.6
SUGAR YIELD (Gapped Trials)											
	Mean	16.5		3.8	103.9	101.5	99.1	102.9	101.6	100.4	99.2
	2022	14.9			102.0	102.9	99.5	104.7	102.7	101.7	98.6
% Mean of (C)	2021	18.2			104.2	101.8	99.0	102.1	101.3	99.9	99.5
	2020	16.5			105.9	99.0	98.7	102.0	100.7	99.8	99.6
ROOT YIELD (Gapped Trials)											
	Mean	95.4		3.5	104.5	101.8	99.5	103.8	101.2	99.3	102.4
% Mean of (C)	2022	86.9			103.0	103.1	100.5	105.2	101.7	100.4	101.9
	2021	100.9			104.5	101.9	99.2	102.9	101.1	98.9	102.1
	2020	99.0			106.2	99.9	99.0	103.4	100.7	98.5	104.0
SUGAR CONTENT (Gapped Trials)											
	Mean	17.2		0.22	17.1	17.2	17.2	17.1	17.3	17.4	16.7
	2022	17.0			16.8	17.0	16.9	17.0	17.2	17.2	16.5
Sugar %	2021	17.9			17.8	17.9	17.9	17.8	18.0	18.1	17.5
	2020	16.6			16.6	16.4	16.6	16.4	16.6	16.9	16.0
EARLY SOWN BOLTERS	Mean of (C) (excluding X)		95% lsd	99.9% lsd							
"X" Unsuitable for sowing BEFORE Mid March					X						
	Mean	1,735 /ha	2,990	4,157	4,117	1,729	1,564	1,344	1,118	1,748	1,904
Bolters/ha (per 100,000 plants) Sown on or before 5th March	2022	496	1,673	2,964	2,236	291	1,000	247	153	291	153
	2021	4,458	8,683	13,292	11,303	4,188	3,416	2,639	2,606	4,610	5,934
	2020	1,004	2,020	2,989	2,041	1,203	832	1,128	766	1,104	1,094
NORMAL SOWN BOLTERS	Mean of (C)		95% lsd	99.9% lsd							
	Mean	26	-	152	21	7	64	0	9	9	72
Bolters/ha (per 100,000 plants)	2022	16	-	102	0	0	52	0	26	23	112
	2021	19	-	180	16	19	45	0	0	0	40
	2020	64	-	276	74	0	138	0	0	0	64
PRE-GAPPING ESTABLISHMENT	Mean of (C)										
	Mean	124		4.2	100.6	100.8	100.5	99.1	101.3	97.1	102.9
Plant population as % mean of (C) 7 sites in 2022 sown at 9cm spacing 3 sites in 2021 sown at 9cm spacing 0 sites in 2020 sown at 9cm spacing	2022	148			101.2	100.5	100.6	100.8	101.6	98.6	103.8
	2021	121			99.4	100.8	100.8	96.9	102.6	94.5	101.9
	2020	97			101.4	101.6	99.6	99.3	98.4	98.4	102.8
RUST	Mean of (C)										
	Mean	11			10	12	10	14	15	12	12
% leaf infection Natural infected trials	2022	11			8	16	11	18	17	10	12
	2021	5			3	4	3	4	6	5	5
	2020	18			19	18	15	22	26	21	17
POWDERY MILDEW	Mean of (C)										
	Mean	1			1	1	1	1	1	1	1
% leaf infection Natural infected trials	2022	1			0	2	1	3	2	1	3
	2021	3			3	1	5	0	3	9	1
	2020	1			0	0	2	1	0	1	0
CERCOSPORA											
	Mean	4			3	3	4	4	4	5	3
% leaf infection Natural infected trials (mean data re-transformed)	2022	-			-	-	-	-	-	-	-
	2021	5			4	4	4	4	4	6	4
	2020	3			3	2	5	5	4	4	3

[ ] - limited data

Osprey	BTS3610	Morgan	Button	BTS3020	Adder	Tawny	Stewart	Philina KWS	BTS Smart 9485	Smart esnica KWS	Maruscha KWS
Y1	Y2	Y2	Y2	Y3	Y2	Y2	Y2	SY6	SY2	SY1	SY3
AYPR	-	-	BCN	-	-	-	-	AYPR	ALS	ALS	V
99.2	98.9	98.8	98.2	98.0	98.0	97.6	97.2	97.5	94.3	94.0	89.9
98.4	99.9	97.7	98.2	96.3	94.9	94.6	94.4	94.8	94.1	90.4	89.0
102.0	97.1	99.4	100.1	96.5	100.1	99.6	100.0	99.8	95.0	97.7	89.3
97.5	100.6	99.1	95.1	104.3	98.7	98.3	96.3	97.5	93.5	94.4	91.9
99.2	98.9	98.8	98.2	98.0	98.0	97.6	97.2	97.5	94.3	94.0	89.9
98.4	99.9	97.7	98.2	96.3	94.9	94.6	94.4	94.8	94.1	90.4	89.0
102.0	97.1	99.4	100.1	96.5	100.1	99.6	100.0	99.8	95.0	97.7	89.3
97.5	100.6	99.1	95.1	104.3	98.7	98.3	96.3	97.5	93.5	94.4	91.9
100.6	98.1	98.5	99.4	96.3	100.7	99.1	96.7	98.4	96.4	92.6	88.6
100.6	98.1	97.4	99.0	94.4	97.7	96.2	94.0	94.8	95.8	88.6	87.8
102.7	97.5	99.6	102.0	95.3	102.6	101.2	99.3	101.3	97.2	96.5	88.5
98.6	99.1	98.1	96.3	101.9	101.7	99.5	96.1	98.4	96.1	93.3	89.7
16.9	17.4	17.2	17.0	17.5	16.8	17.0	17.3	17.1	16.9	17.4	17.4
16.6	17.4	17.0	16.9	17.3	16.6	16.7	17.0	16.9	16.8	17.2	17.1
17.8	17.9	17.9	17.6	18.1	17.5	17.6	18.1	17.7	17.5	18.1	18.0
16.5	16.9	16.8	16.5	17.0	16.1	16.5	16.7	16.5	16.1	16.8	17.0
		X			X			X			X
[2020]	2,170	3,385	1,547	1,023	3,169	2,802	1,871	3,375	1,489	1,972	4,200
698	355	396	824	648	291	413	413	153	762	633	1,296
-	5,546	15,069	3,256	3,159	8,772	7,974	5,998	10,143	2,733	4,875	12,213
1,208	1,495	1,455	936	230	2,373	1,838	871	2,540	1,070	1,188	2,412
26	0	28	9	21	9	47	16	47	0	12	76
47	0	0	0	23	0	26	40	19	0	0	33
0	0	67	19	0	21	86	0	54	47	52	151
0	0	0	0	67	0	0	0	86	0	0	0
102.8	99.3	100.3	101.9	100.8	102.0	101.7	99.0	102.4	97.5	101.3	97.1
102.5	97.8	99.9	100.2	98.3	102.2	100.4	97.8	99.5	96.0	100.4	97.1
105.2	100.9	100.1	104.3	103.2	102.6	103.4	99.7	105.5	98.0	103.9	97.1
100.6	99.7	101.6	101.5	102.1	100.0	101.6	100.3	103.3	100.1	100.0	97.5
13	10	14	13	7	11	10	16	17	11	9	10
14	11	15	14	8	10	9	16	17	8	9	8
-	3	7	6	2	4	5	9	10	4	-	4
19	18	19	19	12	22	15	24	23	23	16	18
2	1	2	1	1	1	1	2	1	0	2	5
5	1	8	2	0	1	2	7	2	1	1	4
-	1	3	8	3	4	0	1	1	0	-	29
0	0	0	0	0	0	0	1	1	0	4	10
2	3	4	4	2	3	2	6	3	5	3	1
-	-	-	-	-	-	-	-	-	-	-	-
4	5	8	7	3	5	3	9	5	6	4	1
1	1	1	1	1	2	1	3	1	4	1	1