Supplementary Information: Metabolomics and genomics combine to unravel the pathway for the presence of fragrance in rice.

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Supplementary Information S1. Methodology of chemical synthesis.

A. 2AP

2-(Methoxycarbonyl)-1-pyrroline (6)

Following a method identical to that of De Kimpe (1993), To a solution of methyl prolinate 7 (1.94 g, 15.1 mmol) in anhydrous ether (130 mL) at 0 ºC, was added drop wise tert-butylhypochlorite (1.67 g, 15.4 mmol) and the reaction then stirred for 1 hour. The reaction was checked by GC-MS to monitor for the formation of the N-chloro product, then triethylamine (1.55 g, 15.4 mmol) was added drop wise and stirred at room temperature overnight. The mixture was filtered through a bed of celite then concentrated in vacuo to afford an oil which was purified by short-path Kugelrohr distillation (bp. 70 - 90 ºC, 160 mmHg [lit bp. 41-44 ºC, 13 mmHg]) to give 2-(methoxycarbonyl)-1-pyrroline (244.7 mg, 13%) as a colourless oil with spectroscopic data identical to those reported in the literature by De Kimpe (1993).

2-Acetyl-1-pyrroline (1) and 6-methyl-5-oxo-2,3,4,5-tetrahydropyridine (5)

Synthesised using a method similar to that of De Kimpe (1993): To a solution of 6 (45 mg, 3.5 mmol) in anhydrous ether (5 mL) under nitrogen at -15 ºC (salt / ice) was added methylmagnesium bromide (140 µL, 4.0 mmol, 3 M solution in ether) dropwise over 5 mins. The reaction was monitored over 2.5 hours by GC-MS, then quenched with 1 M HCl and stirred for 30 min. The ethereal layer was then removed and discarded and the aqueous layer neutralised with 2 M NaOH and basified to pH 10. The mixture was extracted with DCM (5 × 5 mL), dried over anhydrous sodium sulfate, filtered and stored in the freezer in DCM. The crude residue was examined by GC-MS and by 1H NMR, revealing the presence of traces of the double addition product. A portion of the final product mixture was purified by silica flash chromatography using silica that was pre-washed with hexane/triethylamine (10 mL, 99:1). After application of the product mixture to the column, fractions were eluted with ether:pentane (1:3), combined and concentrated to give a mixture of 2AP and 6M5OTP, together with trace amounts of tertiary alcohol by-product, as a malodorous slightly pale yellow oil. This was then carefully concentrated under nitrogen, diluted in CDCl3 and subjected to acid-base partitioning by extraction into 1 M HCl, followed by basification to pH 10 using 1 M NaOH, and extraction back into deuterated chloroform. GC-MS and 1H NMR data were run, showing a ratio of 76:24 (GC-MS) and 78:22 (1H NMR). The remaining unpurified sample was stored frozen in solution in DCM at -78 ºC.
2-Acetyl-1-pyrroline: $^1$H NMR (CDCl$_3$, 700 MHz) δ$_H$ 1.93-1.97 (2H, m, H$_2$-4), 2.49 (3H, s, CH$_3$), 2.72-2.75 (2H, m, H$_2$-3) and 4.11-4.13 (2H, tt, $J$ = 15.0, 7.5, 2.5 Hz, H$_2$-2); $^{13}$C NMR (CDCl$_3$, 700 MHz) δ$_C$ 197.9, 174.5, 62.6, 33.2, 26.1, 22.2; GC-MS 111 (14), 83 (35), 69 (15), 68 (17), 55 (4)

6-Methyl-5-oxo-2,3,4,5-tetrahydropyridine: $^1$H NMR (CDCl$_3$, 700 MHz) δ$_H$ 2.08-2.12 (2H, m, H$_2$-3), 2.12 (3H, t, $J$ = 2.0 Hz, CH$_3$), 2.52 (2H, t, $J$ = 6.3 Hz, H$_2$-4) and 3.84-3.86 (2H, m, H$_2$-2); $^{13}$C NMR (CDCl$_3$, 700 MHz) δ$_C$ 191.7, 164.8, 49.9, 36.6, 23.7, 20.1; GC-MS 111 (22), 83 (29), 56 (4).

B. 1-Pyrroline (4)

Following a method identical to that of Ottinger and Hofmann (2002): To a solution of L-proline (2.58 g, 22.4 mmol) in water (40 mL), was added to an aqueous solution of sodium metaperiodate (50 mL, 0.3 mmol/L) and the reaction then stirred for 2 hours in the dark at room temperature. The pH of the reaction was then adjusted to 9 with 1 M aqueous sodium hydroxide. The solution was extracted with diethyl ether (3 × 20 mL), and the combined organic layers then washed with brine (20 mL). After the organic layer was dried over Na$_2$SO$_4$ it was concentrated under a gentle stream of nitrogen. A portion of the product mixture was carefully concentrated under nitrogen and rapidly purified on a neutral alumina pipette column (slightly deactivated, pre-washed with $n$-pentane/water; 5 mL, 99:1). After flushing the column with 100% $n$-pentane (5 mL), 1-pyrroline was eluted with $n$-pentane:diethyl ether (8:2). GC-MS and $^1$H NMR data were collected. 1-Pyrroline was stored frozen in solution in $n$-pentane/ether (8:2) at -20 °C.

1-Pyrroline (4): $^1$H NMR (CDCl$_3$, 500 MHz) δ$_H$ 1.82 (2H, m, H$_2$-3), 2.54 (2H, m, H$_2$-2) 3.85 (2H, m, H$_2$-4) and 7.62 (1H, m, H-1); GC-MS 69 (43), 68 (29), 42 (47), 41 (100).
**Supplementary Information S2. GC-MS, NMR and GC × GC-TOF-MS operating conditions.**

**Nuclear Magnetic Resonance Spectroscopy**

Proton nuclear magnetic resonance ($^1\text{H NMR}$) spectra were recorded on a Bruker Avance 500 spectrometer using a 5 mm SEI probe or a Bruker Avance DRX 700 spectrometer with a 5 mm TXI Zgrad probe. Carbon-13 nuclear magnetic resonance ($^{13}\text{C NMR}$) spectra were recorded on a Bruker Avance DRX 700 spectrometer with a 5 mm TXI Zgrad probe. Measurements were made in deuterated chloroform (CDCl$_3$, referenced to: δ$_\text{H}$ 7.26 ppm, δ$_\text{C}$ 77.16 ppm). Chemical shifts (δ) were recorded in parts per million (ppm) and coupling constants ($J$ values) were measured in Hertz (Hz). Two dimensional NMR (2D NMR) data were acquired from Bruker Avance 500 and 700 MHz instruments. Gradient enhanced HMBC (geHMBC) and HSQC (geHSQC) NMR were obtained with 8 to 64 transients per increment with the evolution delay set at $^2J_{\text{CH}}$ of 4 Hz or 8 Hz (geHMBC) and $^1J_{\text{CH}}$ of 135 Hz (geHSQC). Gradient COSY (gCOSY) was recorded with 8 to 32 transients per increment with a pulse delay of 2.0 seconds.

**Gas Chromatography/Mass Spectrometry**

Gas chromatography/mass spectrometry (GC/MS) spectra were recorded on a Shimadzu GC-MS-QP2010 Plus. GC/MS programme: flow rate 1.5 mL/min; initial oven temperature 100 °C (isothermal for 3 minutes); ramped 16 °C/min to 270 °C held for 10 min; injection temperature 250 °C.

**Comprehensive Two-dimensional Gas Chromatography/Time-of-flight Mass Spectrometry**

Synthesised authentic standards (1 µL) were allowed to equilibrate in 10ml GC vials for two hours without heating and agitation. The headspace (500 µL) was collected using a 2.5 mL headspace syringe and injected on a Leco Pegasus 4D GC × GC-TOF-MS (St. Joseph, MI, USA) in splitless mode. The inlet and transfer line temperatures were set at 250 and 240 °C, respectively. The primary oven temperature was held initially at 45 °C for 1 min and then ramped at a rate of 10 °C/min to 235 °C. The secondary oven and the modulator were set at 15 and 25 °C higher than the primary oven, respectively for the entire run. The modulation period was set at 2.5 s, with a hot pulse of 0.4 s and 0.85 s cold pulse between stages. Data acquisition was done in full scan at 1500 V and 70 V electron
energy. The ion source was set at 240 °C. TOF-MS autotuning (acquisition system adjustment, ion optic focusing and mass calibration) was done every 48 hours. The total analysis time is 30 mins.
Table S1. Information on samples included in Set 2, including variety name, pedigree information, FGR allele, and peak areas of the compounds.

| Taxa            | Pedigree | FGR allele | acetoin (Analyte 4) | 1-pyrroline (Analyte 4) | Pyrrole (Analyte 5) | 2AP (Analyte 5) | 6M5OTP (Analyte 5) | 2-acetylpyrrole |
|-----------------|----------|------------|---------------------|-------------------------|---------------------|-----------------|-------------------|------------------|
| AZUCENA         | #N/A     | #N/A       | 51553.02            | 9753.54                 | 13043.26            | 183313.06       | 69345.01          | 66760.055        |
| Baru            | #N/A     | #N/A       | 1                   | 1                       | 1                   | 734.135         | 1                 | 1                |
| Basmati_370     | #N/A     | #N/A       | 11945.245           | 1                       | 10279.16            | 33556.066       | 7023.7            | 3741.765         |
| BENGAL          | #N/A     | #N/A       | 1                   | 1                       | 1978.765            | 4043.43         | 1418.86           | 2388.7           |
| CALMATI_201     | #N/A     | #N/A       | 1                   | 1                       | 43068.625           | 18097.88        | 30452.87          | 7708.81          |
| DELLA           | #N/A     | #N/A       | 1                   | 1                       | 1400.63             | 1                | 1                 | 1                |
| DELLMONT        | #N/A     | #N/A       | 7681.975            | 18167.926               | 8097.56             | 92207.945       | 19626.795         | 17922.28         |
| DELLROSE        | #N/A     | #N/A       | 7866.265            | 181074.5                | 14578.3             | 128181.52       | 50904.34          | 41068.414        |
| DOONGARA        | #N/A     | #N/A       | 1                   | 1                       | 2058.47             | 7248.855        | 1704.035          | 6464.055         |
| DULAR           | #N/A     | #N/A       | 11067.95            | 1                       | 1662.115            | 4210.57         | 1                 | 1804.275         |
| GOOLARAH        | #N/A     | #N/A       | 1                   | 1                       | 37845.18            | 13568.28        | 166882            | 60648.773        |
| HOM_MALI_NIA    | #N/A     | #N/A       | 15907.39            | 5249.935                | 5690.6              | 46780.19        | 11184.345         | 10045.08         |
| HOM_NANG_NE     | #N/A     | #N/A       | 12055.675           | 14092.48                | 11577.31            | 185398.56       | 69819.39          | 11309.91         |
| Illabong        | #N/A     | #N/A       | 1                   | 1                       | 1526.485            | 1993.35         | 1                 | 1                |
| Jarrah          | #N/A     | #N/A       | 19464.325           | 1                       | 1446.35             | 1                | 1                 | 1                |
| JEFFERSON       | #N/A     | #N/A       | 4119.615            | 1                       | 1                   | 1               | 1                 | 1                |
| Kulu            | #N/A     | #N/A       | 21842.045           | 1                       | 1                   | 1               | 1                 | 1                |
| KYEEMA          | #N/A     | #N/A       | 1                   | 1                       | 101157.69           | 33433.57        | 91890.76          | 21484.42         |
| L_202           | #N/A     | #N/A       | 1                   | 1                       | 3231.91             | 1444.645        | 1                 | 1396.14          |
| LANGI           | #N/A     | #N/A       | 1                   | 1                       | 5440.56             | 4919.945        | 1914.91           | 1207.595         |
| M_9             | #N/A     | #N/A       | 10881.105           | 1                       | 3506.755            | 3262.955        | 1949.33           | 1870.465         |
| M104            | #N/A     | #N/A       | 10891.84            | 1                       | 1967.32             | 714.285         | 1                 | 1                |
| M205            | #N/A     | #N/A       | 1                   | 1                       | 1834.51             | 2757.02         | 1                 | 3227.45          |
| MILLIN          | #N/A     | #N/A       | 8260.535            | 1                       | 2084.345            | 3100.94         | 1                 | 2584.195         |
| NORIN_PL_8      | #N/A     | #N/A       | 11768.57            | 1                       | 4090.94             | 2839.64         | 1                 | 1337.075         |
| Opus_           | #N/A     | #N/A       | 6814.11             | 1                       | 1                   | 1969.29         | 1                 | 1                |
| PANDAN_WANG I_7_Y1_ | #N/A | #N/A | 5078.44 | 1 | 8814.555 | 86772.58 | 16981.54 | 44195.914 |
| Y20140001 | BENGAL/PANDAN WANGI (7) | fgr | 1 | 256318.97 | 9752.59 | 76923.11 | 14194.415 | 13075.28 |
| Y20140002 | BENGAL/PANDAN WANGI (7) | Fgr | 1 | 5158.345 | 11030.7 | 3268.21 | 5662.54 | 1523.69 |
| Y20140003 | BENGAL/PANDAN WANGI (7) | Fgr | 1 | 3816.105 | 1 | 1886.99 | 3424.865 | 1 | 1385.64 |
| Y20140004 | BENGAL/PANDAN WANGI (7) | #N/A | 1 | 13751.96 | 8609.42 | 5215.345 | 2895.825 | 4185.64 |
| Y20140005 | BENGAL/PANDAN WANGI (7) | Fgr | 1 | 17626.164 | 4088.245 | 4243.705 | 1 | 1555.79 |
| Y20140006 | BENGAL/PANDAN WANGI (7) | Fgr | 1 | 17626.164 | 4088.245 | 4243.705 | 1 | 1555.79 |
| Y20140007 | BENGAL/PANDAN WANGI (7) | Fgr | 1 | 6550.7 | 1 | 1739.915 | 1 | 1 |
| Y20140009 | BENGAL/PANDAN WANGI (7) | fgr | 1 | 32792.58 | 9943.131 | 132561.64 | 39848.49 | 22403.795 |
| Y20140010 | BENGAL/PANDAN WANGI (7) | fgr | 1 | 157929.55 | 10800.08 | 71324.32 | 12432.245 | 9965.625 |
| Y20140011 | BENGAL/PANDAN WANGI (7) | fgr | 1 | 49854.21 | 11810.46 | 155429.73 | 54859.547 | 19600.39 |
| Y20140012 | BENGAL/PANDAN WANGI (7) | fgr | 1 | 42482.37 | 12184.84 | 35172.89 | 8388.375 | 8377.61 |
| Y20140013 | BENGAL/PANDAN WANGI (7) | Fgr | 1 | 1 | 2705.84 | 13434.21 | 1660.09 | 4977.105 |
| Y20140014 | BENGAL/PANDAN WANGI (7) | fgr | 1 | 5332.885 | 8326.975 | 46318.14 | 8228.56 | 4711.265 |
| Y20140015 | BENGAL/PANDAN WANGI (7) | fgr | 1 | 52607.516 | 11474.55 | 156571.55 | 47076.91 | 42854.465 |
| Y20140016 | BENGAL/PANDAN WANGI (7) | Fgr | 1 | 4549.5 | 1 | 3026.33 | 122908.47 | 20879.27 | 47762.5 |
| Y20140017 | BENGAL/PANDAN WANGI (7) | fgr | 1 | 12815.431 | 10839.656 | 1 | 4852.16 | 1 | 2647.069 |
| Y20140018 | BENGAL/PANDAN WANGI (7) | fgr | 1 | 3457.515 | 15179.82 | 15644.36 | 267211.88 | 103210.95 | 49811.227 |
| Y20140019 | BENGAL/PANDAN WANGI (7) | fgr | 1 | 4517.415 | 466292.8 | 14472.95 | 149524.28 | 41350.297 | 84468.21 |
| Y20140020 | BENGAL/PANDAN WANGI (7) | Fgr | 1 | 42655.098 | 1 | 39570.664 | 6878.775 | 1 |
| Y20140021 | BENGAL/PANDAN WANGI (7) | Fgr | 1 | 1 | 4598.415 | 1398.84 | 1677.745 |
| Y20140022 | BENGAL/PANDAN WANGI (7) | Fgr | 1 | 4364.385 | 1 | 4732.755 | 1 | 1901.505 |
| Y20140023 | BENGAL/PANDAN WANGI (7) | Fgr | 1 | 8798.53 | 26218.94 | 6373.985 | 5908.27 | 1656.45 | 3119.61 |
| Date       | Code                      | Origin           | Type | Value1 | Value2 | Value3 | Value4 | Value5 | Value6 | Value7 | Value8 |
|------------|---------------------------|------------------|------|--------|--------|--------|--------|--------|--------|--------|--------|
| Y20140024  | BENGAL/PANDAN WANGI (7)   | fgr              | 1    | 1      | 16424.346 | 6886.795 | 64287.27 | 9665.53 | 12742.82 |
| Y20140025  | BENGAL/PANDAN WANGI (7)   | fgr              | 1    | 1      | 30367.71  | 11351.12 | 90345.664 | 16283.835 | 17839.535 |
| Y20140026  | BENGAL/PANDAN WANGI (7)   | #N/A             |      |      | 19657.025 | 24163.346 | 6701.465 | 2921.92 | 1      | 1      |
| Y20140027  | BENGAL/PANDAN WANGI (7)   | #N/A             |      |      | 21325.095 | 1        | 4160.87  | 6803.805 | 1793.8  | 1      |
| Y20140028  | DOONGARA/PANDAN WANGI (7) | fgr              | 1    | 1      | 13362.06  | 204690.94 | 82033.27 | 71251.47 |
| Y20140030  | DOONGARA/PANDAN WANGI (7) | Fgr              | 1    | 1      | 1        | 90345.664 | 16283.835 | 17839.535 |
| Y20140031  | DOONGARA/PANDAN WANGI (7) | Fgr              | 1    | 1      | 1        | 1783.33  | 1        | 1214.84 |
| Y20140032  | DOONGARA/PANDAN WANGI (7) | Fgr              | 1    | 1      | 9382.675  | 1        | 14028.46 | 113193.805 | 18716.244 | 7080.455 |
| Y20140033  | DOONGARA/PANDAN WANGI (7) | Fgr              | 1    | 1      | 1        | 2252.895 | 2229.03  | 1        |
| Y20140034  | DOONGARA/PANDAN WANGI (7) | Fgr              | 1    | 1      | 1        | 1712.57  | 1223.08  | 1        |
| Y20140035  | DOONGARA/PANDAN WANGI (7) | Fgr              | 1    | 1      | 1        | 1860.66  | 1        |
| Y20140036  | DOONGARA/PANDAN WANGI (7) | fgr              | 1    | 1      | 9382.675  | 1        | 14028.46 | 113193.805 | 18716.244 | 7080.455 |
| Y20140037  | DOONGARA/PANDAN WANGI (7) | fgr              | 1    | 1      | 1        | 2252.895 | 2229.03  | 1        |
| Y20140038  | DOONGARA/PANDAN WANGI (7) | Fgr              | 1    | 1      | 1        | 1712.57  | 1223.08  | 1        |
| Y20140039  | DOONGARA/PANDAN WANGI (7) | Fgr              | 1    | 1      | 1        | 1860.66  | 1        |
| Y20140040  | DOONGARA/PANDAN WANGI (7) | Fgr              | 1    | 1      | 1        | 1860.66  | 1        |
| Y20140041  | JEFFERSON/AZUCENA         | Fgr              | 1    | 1      | 1        | 1860.66  | 1        |
| Y20140042  | JEFFERSON/AZUCENA         | Fgr              | 1    | 1      | 1        | 1860.66  | 1        |
| Y20140043  | JEFFERSON/AZUCENA         | Fgr              | 1    | 1      | 1        | 1860.66  | 1        |
| Y20140044  | JEFFERSON/AZUCENA         | Fgr              | 1    | 1      | 1        | 1860.66  | 1        |
| Y20140045  | JEFFERSON/AZUCENA         | Fgr              | 1    | 1      | 1        | 1860.66  | 1        |
| Y20140046  | JEFFERSON/AZUCENA         | Fgr              | 1    | 1      | 1        | 1860.66  | 1        |
| Y20140047  | JEFFERSON/AZUCENA         | Fgr              | 1    | 1      | 1        | 1860.66  | 1        |
| Y20140048  | JEFFERSON/AZUCENA         | Fgr              | 1    | 1      | 1        | 1860.66  | 1        |
| Y20140049  | JEFFERSON/AZUCENA         | Fgr              | 1    | 1      | 1        | 1860.66  | 1        |
| Y20140050  | JEFFERSON/AZUCENA         | Fgr              | 1    | 1      | 1        | 1860.66  | 1        |
| Y20140051  | JEFFERSON/AZUCENA         | Fgr              | 1    | 1      | 1        | 1860.66  | 1        |
| Y20140052  | JEFFERSON/AZUCENA         | Fgr              | 1    | 1      | 1        | 1860.66  | 1        |
| Y20140053  | JEFFERSON/AZUCENA         | Fgr              | 1    | 1      | 1        | 1860.66  | 1        |
| Y20140054  | JEFFERSON/AZUCENA         | Fgr              | 1    | 1      | 1        | 1860.66  | 1        |
| Y20140055  | JEFFERSON/AZUCENA         | Fgr              | 1    | 1      | 1        | 1860.66  | 1        |
| Y20140056  | JEFFERSON/AZUCENA         | Fgr              | 1    | 1      | 1        | 1860.66  | 1        |
| Y20140057  | JEFFERSON/AZUCENA         | Fgr              | 1    | 1      | 1        | 1860.66  | 1        |
| Y20140058  | JEFFERSON/AZUCENA         | fgr              | 1    | 1      | 1        | 1860.66  | 1        |
| Y20140059 | JEFFERSON/AZUCENA | Fgr | 1 | 1 | 1 | 1827.68 | 1 | 1 |
| Y20140060 | JEFFERSON/AZUCENA | Fgr | 1 | 1 | 7715.67 | 46155.31 | 10393.68 | 8514.73 |
| Y20140061 | JEFFERSON/AZUCENA | fgr | 8993.302 | 20273.4 | 21628.44 | 267563.03 | 106636.85 | 81880.99 |
| Y20140062 | JEFFERSON/AZUCENA | fgr | 1 | 1 | 5772.92 | 5741.435 | 12460.65 | 1946.12 |
| Y20140063 | JEFFERSON/AZUCENA | fgr | 10890.91 | 10097.2 | 11043.63 | 244487.67 | 74905.6 | 86728.29 |
| Y20140064 | JEFFERSON/AZUCENA | Fgr | 1 | 1 | 6288.27 | 6697.23 | 1631.215 | 4402.565 |
| Y20140065 | JEFFERSON/AZUCENA | fgr | 1 | 1 | 18913.27 | 23610.94 | 6480.91 | 5517.08 |
| Y20140066 | JEFFERSON/AZUCENA | fgr | 1 | 1 | 4877.92 | 5471.435 | 2160.435 | 1946.12 |
| Y20140067 | JEFFERSON/AZUCENA | Fgr | 9878.75 | 1 | 2344.31 | 3052.91 | 1 | 1 |
| Y20140068 | JEFFERSON/AZUCENA | fgr | 1 | 1 | 18913.27 | 23610.94 | 6480.91 | 5517.08 |
| Y20140069 | JEFFERSON/AZUCENA | fgr | 1 | 1 | 5772.92 | 5741.435 | 12460.65 | 1946.12 |
| Y20140070 | JEFFERSON/AZUCENA | fgr | 1 | 1 | 4877.92 | 5471.435 | 2160.435 | 1946.12 |
| Y20140071 | JEFFERSON/AZUCENA | Fgr | 3195.85 | 46836.22 | 66671.81 | 261935.67 | 103647.08 | 81910.28 |
| Y20140072 | JEFFERSON/AZUCENA | Fgr | 8705.575 | 419732.16 | 17537.76 | 289562.28 | 92274.28 | 105070.76 |
| Y20140073 | JEFFERSON/AZUCENA | Fgr | 10433.38 | 5051.555 | 1643.25 | 3480.67 | 1 | 2925.455 |
| Y20140074 | JEFFERSON/AZUCENA | Fgr | 1 | 1 | 18913.27 | 23610.94 | 6480.91 | 5517.08 |
| Y20140075 | JEFFERSON/AZUCENA | Fgr | 10849.13 | 1 | 4042.89 | 1172.76 | 1 | 1 |
| Y20140076 | JEFFERSON/AZUCENA | fgr | 1 | 1 | 4877.92 | 5471.435 | 2160.435 | 1946.12 |
| Y20140077 | JEFFERSON/AZUCENA | Fgr | 1 | 1 | 5772.92 | 5741.435 | 12460.65 | 1946.12 |
| Y20140078 | KYEEMA/BASMATI 370 | fgr | 11227.465 | 365396 | 18550.6 | 293553.75 | 96295.47 | 117380.84 |
| Y20140079 | KYEEMA/BASMATI 370 | fgr | 3195.85 | 46836.22 | 66671.81 | 261935.67 | 103647.08 | 81910.28 |
| Y20140080 | KYEEMA/BASMATI 370 | fgr | 9500.585 | 46263.72 | 15806.98 | 33198.36 | 38527.305 |
| Y20140081 | KYEEMA/BASMATI 370 | fgr | 3195.85 | 46836.22 | 66671.81 | 261935.67 | 103647.08 | 81910.28 |
| Y20140082 | KYEEMA/BASMATI 370 | Fgr | 31702.35 | 324287.56 | 14834.22 | 176361.47 | 65210.51 | 62614.844 |
| Y20140083 | KYEEMA/BASMATI 370 | Fgr | 31702.35 | 324287.56 | 14834.22 | 176361.47 | 65210.51 | 62614.844 |
| Y20140084 | KYEEMA/BASMATI 370 | Fgr | 31702.35 | 324287.56 | 14834.22 | 176361.47 | 65210.51 | 62614.844 |
| Y20140085 | KYEEMA/BASMATI 370 | Fgr | 31702.35 | 324287.56 | 14834.22 | 176361.47 | 65210.51 | 62614.844 |
| Y20140086 | KYEEMA/BASMATI 370 | Fgr | 31702.35 | 324287.56 | 14834.22 | 176361.47 | 65210.51 | 62614.844 |
| Y20140087 | KYEEMA/BASMATI 370 | Fgr | 31702.35 | 324287.56 | 14834.22 | 176361.47 | 65210.51 | 62614.844 |
| Y20140088 | KYEEMA/BASMATI 370 | Fgr | 31702.35 | 324287.56 | 14834.22 | 176361.47 | 65210.51 | 62614.844 |
| Y20140089 | KYEEMA/BASMATI 370 | Fgr | 31702.35 | 324287.56 | 14834.22 | 176361.47 | 65210.51 | 62614.844 |
| Y20140090 | KYEEMA/BASMATI 370 | Fgr | 31702.35 | 324287.56 | 14834.22 | 176361.47 | 65210.51 | 62614.844 |
| Y20140091 | KYEEMA/BASMATI 370 | Fgr | 31702.35 | 324287.56 | 14834.22 | 176361.47 | 65210.51 | 62614.844 |
| Y20140092 | KYEEMA/BASMATI 370 | Fgr | 31702.35 | 324287.56 | 14834.22 | 176361.47 | 65210.51 | 62614.844 |
| Date       | Variety            | Genotype | Rc | Sf | Rsf | Yt   | Df   | 
|------------|--------------------|----------|----|----|-----|------|------| 
| Y20140093  | KYEEMA/BASMATI 370 | fgr      | 1  | 24262.375 | 9073.769 | 44773.906 | 8874.1 | 9062.774 | 
| Y20140094  | KYEEMA/BASMATI 370 | fgr      | 1  | 50871.12 | 17541.93 | 95784.42 | 19937.436 | 10142.49 | 
| Y20140095  | KYEEMA/BASMATI 370 | fgr      | 1  | 9143.315 | 233817.1 | 52061.35 | 299520.47 | 105959.56 | 111912.42 | 
| Y20140096  | KYEEMA/BASMATI 370 | fgr      | 1  | 3040.51 | 31848.75 | 9318.745 | 177942.8 | 56995.49 | 66506.12 | 
| Y20140097  | KYEEMA/BASMATI 370 | fgr      | 1  | 8843.21 | 174729.19 | 13985.61 | 89978.63 | 20255.83 | 37637.016 | 
| Y20140098  | KYEEMA/BASMATI 370 | fgr      | 1  | 9458.83 | 623688.6 | 20995.85 | 111301.08 | 24460.83 | 30444.006 | 
| Y20140099  | KYEEMA/BASMATI 370 | fgr      | 1  | 9689.905 | 151074.19 | 16349.27 | 177248 | 52937.98 | 68480.92 | 
| Y20140100  | KYEEMA/BASMATI 370 | fgr      | 1  | 230693.19 | 12461.86 | 88511.44 | 19596.23 | 13021.89 | 
| Y20140101  | KYEEMA/BASMATI 370 | fgr      | 1  | 28463.24 | 8111.3 | 48857.555 | 10651.545 | 7280.475 | 
| Y20140102  | KYEEMA/BASMATI 370 | fgr      | 1  | 30410.495 | 48248.934 | 8535.475 | 199361.03 | 60403.28 | 82444.53 | 
| Y20140103  | KYEEMA/BASMATI 370 | fgr      | 1  | 23761.705 | 5831.88 | 193038.44 | 64426.38 | 73108.28 | 
| Y20140106  | KYEEMA/BASMATI 370 | fgr      | 1  | 10001.11 | 65689.51 | 13094.03 | 10548.67 | 
| Y20140107  | KYEEMA/BASMATI 370 | fgr      | 1  | 41883.1 | 15264.97 | 34589.684 | 29320.78 | 
| Y20140108  | KYEEMA/BASMATI 370 | fgr      | 1  | 12736.4 | 160933.1 | 58319.344 | 67387.195 | 
| Y20140109  | KYEEMA/BASMATI 370 | fgr      | 1  | 22783.52 | 158264.97 | 34589.684 | 29320.78 | 
| Y20140110  | KYEEMA/BASMATI 370 | fgr      | 1  | 64134.31 | 44934.03 | 808427.58 | 73989.96 | 73108.28 | 
| Y20140111  | KYEEMA/BASMATI 370 | fgr      | 1  | 12736.4 | 160933.1 | 58319.344 | 67387.195 | 
| Y20140112  | KYEEMA/BASMATI 370 | fgr      | 1  | 23761.705 | 193038.44 | 64426.38 | 72844.87 | 
| Y20140117  | KYEEMA/KDML 105   | fgr      | 1  | 26096.23 | 11476.47 | 161156.56 | 51217.85 | 58126.746 | 
| Y20140118  | KYEEMA/KDML 105   | fgr      | 1  | 18591.105 | 719819.94 | 48386 | 662168.5 | 217139.69 | 266148.84 | 
| Y20140119  | KYEEMA/KDML 105   | fgr      | 1  | 7485.79 | 15454.11 | 21042.65 | 239611.55 | 86572.75 | 89363.57 | 
| Y20140120  | KYEEMA/KDML 105   | fgr      | 1  | 4026.655 | 119584.23 | 20328.09 | 207504.69 | 79542.39 | 47827.9 | 
| Y20140121  | KYEEMA/KDML 105   | fgr      | 1  | 32877.305 | 17945.37 | 93092.1 | 21242.285 | 16341.405 | 
| Y20140122  | KYEEMA/KDML 105   | fgr      | 1  | 32877.305 | 17945.37 | 93092.1 | 21242.285 | 16341.405 | 
| Y20140123  | KYEEMA/KDML 105   | fgr      | 1  | 32877.305 | 17945.37 | 93092.1 | 21242.285 | 16341.405 | 
| Y20140124  | KYEEMA/KDML 105   | fgr      | 1  | 32877.305 | 17945.37 | 93092.1 | 21242.285 | 16341.405 | 
| Y20140125  | KYEEMA/KDML 105   | fgr      | 1  | 32877.305 | 17945.37 | 93092.1 | 21242.285 | 16341.405 | 
| Y20140126  | KYEEMA/KDML 105   | fgr      | 1  | 32877.305 | 17945.37 | 93092.1 | 21242.285 | 16341.405 | 
| Y20140127  | KYEEMA/KDML 105   | fgr      | 1  | 32877.305 | 17945.37 | 93092.1 | 21242.285 | 16341.405 | 
| Y20140129  | KYEEMA/KDML 105   | fgr      | 1  | 32877.305 | 17945.37 | 93092.1 | 21242.285 | 16341.405 | 
| Y20140130  | KYEEMA/KDML 105   | fgr      | 1  | 32877.305 | 17945.37 | 93092.1 | 21242.285 | 16341.405 |
| Date       | Variety          | Code | Weight  | Length | Width | Height | Thickness | Density | Area  |
|------------|------------------|------|---------|--------|-------|--------|-----------|---------|-------|
| Y20140131 | KYEEMA/KDML 105  | fgr  | 10236.78| 187478.6| 13520.3| 289992  | 94468.79  | 102957.625|
| Y20140132 | KYEEMA/KDML 105  | fgr  | 11548.578| 918473.9| 22299.03| 360634.72 | 141771.4 | 145683.33|
| Y20140133 | KYEEMA/KDML 105  | fgr  | 8752.73  | 31331.955| 11945.77| 160871.14 | 53150.184 | 56983.477|
| Y20140134 | KYEEMA/KDML 105  | fgr  | 1       | 48306.33 | 19036.46 | 107986.17 | 21305.74   | 15638.15 |
| Y20140135 | KYEEMA/KDML 105  | fgr  | 1       | 37298.27 | 19036.46 | 107986.17 | 21305.74   | 15638.15 |
| Y20140136 | LANGI/BASMATI 370| fgr  | 19141.035| 382671.4 | 48317.81| 339721.56 | 134159.44 | 128116.83|
| Y20140137 | LANGI/BASMATI 370| fgr  | 16905.645| 30154.936| 18151.19| 319610.6 | 128175.53 | 71452.8 |
| Y20140138 | LANGI/BASMATI 370| fgr  | 9446.445 | 460863.28| 39611.66| 243307.83| 81496.27   | 97122.086|
| Y20140139 | LANGI/BASMATI 370| fgr  | 1       | 1       | 4742.59 | 3000.755  | 1         | 2489.38 |
| Y20140140 | LANGI/BASMATI 370| Fgr  | 16905.645| 30154.936| 18151.19| 319610.6 | 128175.53 | 71452.8 |
| Y20140141 | LANGI/BASMATI 370| Fgr  | 9446.445 | 460863.28| 39611.66| 243307.83| 81496.27   | 97122.086|
| Y20140142 | LANGI/BASMATI 370| fgr  | 1       | 1       | 4742.59 | 3000.755  | 1         | 2489.38 |
| Y20140143 | LANGI/BASMATI 370| Fgr  | 1       | 1       | 4742.59 | 3000.755  | 1         | 2489.38 |
| Y20140144 | LANGI/BASMATI 370| Fgr  | 1       | 1       | 4742.59 | 3000.755  | 1         | 2489.38 |
| Y20140145 | LANGI/BASMATI 370| Fgr  | 1       | 1       | 4742.59 | 3000.755  | 1         | 2489.38 |
| Y20140146 | LANGI/BASMATI 370| Fgr  | 1       | 1       | 4742.59 | 3000.755  | 1         | 2489.38 |
| Y20140147 | LANGI/BASMATI 370| Fgr  | 1       | 1       | 4742.59 | 3000.755  | 1         | 2489.38 |
| Y20140148 | LANGI/BASMATI 370| Fgr  | 1       | 1       | 4742.59 | 3000.755  | 1         | 2489.38 |
| Y20140149 | LANGI/BASMATI 370| Fgr  | 1       | 1       | 4742.59 | 3000.755  | 1         | 2489.38 |
| Y20140150 | LANGI/BASMATI 370| Fgr  | 1       | 1       | 4742.59 | 3000.755  | 1         | 2489.38 |
| Y20140151 | LANGI/BASMATI 370| Fgr  | 1       | 1       | 4742.59 | 3000.755  | 1         | 2489.38 |
| Y20140152 | LANGI/BASMATI 370| Fgr  | 1       | 1       | 4742.59 | 3000.755  | 1         | 2489.38 |
| Y20140153 | LANGI/BASMATI 370| Fgr  | 1       | 1       | 4742.59 | 3000.755  | 1         | 2489.38 |
| Y20140154 | LANGI/BASMATI 370| Fgr  | 1       | 1       | 4742.59 | 3000.755  | 1         | 2489.38 |
| Y20140155 | LANGI/BASMATI 370| Fgr  | 1       | 1       | 4742.59 | 3000.755  | 1         | 2489.38 |
| Y20140156 | LANGI/BASMATI 370| Fgr  | 1       | 1       | 4742.59 | 3000.755  | 1         | 2489.38 |
| Y20140157 | LANGI/BASMATI 370| Fgr  | 1       | 1       | 4742.59 | 3000.755  | 1         | 2489.38 |
| Y20140158 | LANGI/BASMATI 370| Fgr  | 1       | 1       | 4742.59 | 3000.755  | 1         | 2489.38 |
| Y20140159 | LANGI/BASMATI 370| Fgr  | 1       | 1       | 4742.59 | 3000.755  | 1         | 2489.38 |
| Y20140160 | LANGI/BASMATI 370| Fgr  | 1       | 1       | 4742.59 | 3000.755  | 1         | 2489.38 |
| Y20140161 | LANGI/BASMATI 370| Fgr  | 1       | 1       | 4742.59 | 3000.755  | 1         | 2489.38 |
| Y20140162 | LANGI/BASMATI 370| Fgr  | 1       | 1       | 4742.59 | 3000.755  | 1         | 2489.38 |
| Y20140163 | LANGI/BASMATI 370| Fgr  | 1       | 1       | 4742.59 | 3000.755  | 1         | 2489.38 |
| Y20140164 | LANGI/BASMATI 370| Fgr  | 1       | 1       | 4742.59 | 3000.755  | 1         | 2489.38 |
| Y20140165 | LANGI/BASMATI 370| Fgr  | 1       | 1       | 4742.59 | 3000.755  | 1         | 2489.38 |
| Y20140166 | LANGI/BASMATI 370| Fgr  | 1       | 1       | 4742.59 | 3000.755  | 1         | 2489.38 |
| Y20140167 | LANGI/BASMATI 370| Fgr  | 1       | 1       | 4742.59 | 3000.755  | 1         | 2489.38 |
| Y20140168 | LANGI/BASMATI 370| Fgr  | 1       | 1       | 4742.59 | 3000.755  | 1         | 2489.38 |
| Y20140169 | LANGI/BASMATI 370| Fgr  | 1       | 1       | 4742.59 | 3000.755  | 1         | 2489.38 |
| Year   | Variety          | Stock | Quantity | Weight (kg) | Value 1 (KES) | Value 2 (KES) | Value 3 (KES) | Value 4 (KES) | Value 5 (KES) |
|--------|------------------|-------|----------|-------------|---------------|---------------|---------------|---------------|---------------|
| Y20140170 | LANGI/BASMATI 370 | fgr   | 1        | 32317.047   | 12853.3       | 67046.41      | 14534.848     | 9040.019      |               |
| Y20140171 | LANGI/BASMATI 370 | fgr   | 17369.7   | 480682.9    | 52800.84      | 101756.75     | 17876.775     | 16537.705     |               |
| Y20140172 | LANGI/BASMATI 370 | fgr   | 142851.305| 924820.44   | 22265.65      | 55403.246     | 12698.285     | 11987.39      |               |
| Y20140174 | LANGI/BASMATI 370 | fgr   | 3727.075  | 2209.65     | 2495.28       | 1            | 1             |               |               |
| Y20140176 | LANGI/BASMATI 370 | Fgr   | 42851.305 | 1            | 42851.305     | 139864.89     | 52112.01      | 11223.97      |               |
| Y20140177 | LANGI/BASMATI 370 | Fgr   | 3827.735  | 1            | 3827.735      | 1            | 1             |               |               |
| Y20140178 | LANGI/BASMATI 370 | Fgr   | 13655.815 | 924820.44   | 22265.65      | 55403.246     | 12698.285     | 11987.39      |               |
| Y20140179 | LANGI/BASMATI 370 | Fgr   | 9551.06   | 1            | 9551.06       | 38996.273     | 8475.504      | 7398.891      |               |
| Y20140180 | LANGI/BASMATI 370 | Fgr   | 12766.895 | 23160.03    | 5078.075      | 1974.97       | 1             | 1             |               |
| Y20140181 | LANGI/BASMATI 370 | Fgr   | 13537.975 | 6500.445    | 4118.47       | 1             | 1             |               |               |
| Y20140182 | LANGI/BASMATI 370 | Fgr   | 7408.97   | 1            | 7408.97       | 1             | 1             |               |               |
| Y20140183 | LANGI/BASMATI 370 | Fgr   | 11170.235 | 11170.235   | 8395.96       | 3850.07       | 1             |               | 2752.885      |
| Y20140185 | LANGI/BASMATI 370 | Fgr   | 12831.33  | 3743.395    | 6295.08       | 1760.196      | 1             |               | 4846.02       |
| Y20140186 | LANGI/BASMATI 370 | Fgr   | 49982.766 | 17720.97    | 98940.65      | 19540.33      | 1             |               | 15810.01      |
| Y20140187 | LANGI/BASMATI 370 | Fgr   | 25570.365 | 9300.28     | 120403.055    | 21330.096     | 1             |               | 30404.22      |
| Y20140189 | LANGI/BASMATI 370 | Fgr   | 1        | 2275.135    | 1480.26       | 1             |               | 1             |               |
| Y20140190 | LANGI/BASMATI 370 | Fgr   | 4590.57   | 1            | 2166.655      | 3188.155      | 1             |               | 1646.73       |
| Y20140191 | LANGI/BASMATI 370 | Fgr   | 1        | 1            | 1794.725      | 6387.095      | 3518.195      |               | 1804.005      |
| Y20140192 | LANGI/BASMATI 370 | Fgr   | 34480.405 | 8599.05     | 4137.35       | 1             |               | 7091.21       |
| Y20140193 | LANGI/BASMATI 370 | Fgr   | 16709.655 | 4577.87     | 915.665       | 1             |               | 1             |               |
| Y20140195 | LANGI/BASMATI 370 | Fgr   | 1        | 1            | 2955.915      | 3187.46       | 1             |               | 3143.345      |
| Y20140196 | LANGI/BASMATI 370 | Fgr   | 1        | 1            | 27578.309     | 6437.471      | 3685.167      | 1             | 3559.078      |
| Y20140198 | LANGI/BASMATI 370 | Fgr   | 1        | 1            | 3132.335      | 15214.21      | 2455.7        |               | 1901.02       |
| Y20140199 | LANGI/BASMATI 370 | Fgr   | 1        | 1            | 2974.61       | 722.18        | 1             |               |               |
| Y20140201 | LANGI/BASMATI 370 | Fgr   | 1        | 1            | 1            | 1738.92       | 1             |               |               |
| Y20140202 | LANGI/BASMATI 370 | Fgr   | 1        | 1            | 2169.67       | 2638.03       | 1             |               |               |
| Y20140203 | LANGI/BASMATI 370 | Fgr   | 1        | 1            | 2974.61       | 722.18        | 1             |               |               |
| Y20140204 | LANGI/BASMATI 370 | Fgr   | 14360.885 | 218045.08   | 15950.74      | 344490.88     | 98783.55      |               | 174608.97     |
| Y20140205 | LANGI/BASMATI 370 | Fgr   | 14612.565 | 303984.16   | 19290.21      | 437838.4      | 127842.01     |               | 147162.19     |
| Y20140206 | LANGI/BASMATI 370 | Fgr   | 1        | 54822.773   | 39147.9       | 73413.17      | 17417.836     |               | 11705.68      |
| Date       | Plant Type                  | Unit | Paddy | Middling | Rice | By-products | Value |
|------------|-----------------------------|------|-------|----------|------|-------------|-------|
| Y20140207 | LANGI/BASMATI 370           | fgr  | 9991.597 | 34445.027 | 18569.65 | 273169.56 | 84417.1 | 96735.586 |
| Y20140208 | LANGI/BASMATI 370           | Fgr  | 215656.39 | 1 | 4339.065 | 6628.345 | 1 | 7322.06 |
| Y20140209 | LANGI/BASMATI 370           | fgr  | 1 | 48824.83 | 15774.24 | 69044.41 | 15727.5 | 12254.77 |
| Y20140210 | LANGI/BASMATI 370           | Fgr  | 1 | 1 | 2404.905 | 2952.845 | 1 | 1628.39 |
| Y20140214 | LANGI/BASMATI 370           | #N/A | 20972.295 | 10520.85 | 7583.76 | 15727.5 | 1934.97 |
| Y20140215 | LANGI/BASMATI 370           | Fgr  | 1 | 1 | 2049.15 | 4925.83 | 1 | 7322.06 |
| Y20140216 | LANGI/BASMATI 370           | Fgr  | 1 | 1 | 1 | 1016.135 | 1 | 7322.06 |
| Y20140217 | LANGI/BASMATI 370           | Fgr  | 1 | 1 | 1 | 757.75 | 1 | 7322.06 |
| Y20140218 | LANGI/BASMATI 370           | Fgr  | 1 | 1 | 1 | 1016.135 | 1 | 7322.06 |
| Y20140219 | LANGI/BASMATI 370           | Fgr  | 1 | 1 | 36031.395 | 8118.21 | 15030.34 | 8944.16 |
| Y20140221 | LANGI/KDML 105              | Fgr  | 1 | 1 | 3507.15 | 4621.365 | 1 | 3976.36 |
| Y20140222 | LANGI/KDML 105              | Fgr  | 1 | 1 | 7466.11 | 8776.19 | 3748.6 | 3488.82 |
| Y20140223 | LANGI/KDML 105              | Fgr  | 1 | 1 | 9532.14 | 279951.78 | 18178.38 | 44238.336 | 35083.36 |
| Y20140224 | LANGI/KDML 105              | Fgr  | 1 | 1 | 4366.725 | 2599.095 | 1 | 1 |
| Y20140225 | LANGI/KDML 105              | Fgr  | 1 | 1 | 11217.46 | 35599.24 | 146318.95 | 60374.23 | 7822.355 |
| Y20140226 | LANGI/KDML 105              | Fgr  | 1 | 1 | 3643.415 | 892.92 | 1 | 1 |
| Y20140227 | LANGI/KDML 105              | Fgr  | 1 | 1 | 20946.88 | 9552.605 | 15557.59 | 12274.395 |
| Y20140228 | LANGI/KDML 105              | Fgr  | 1 | 1 | 51630.804 | 28587.443 | 21670 | 98045.94 | 94271.66 |
| Y20140229 | LANGI/KDML 105              | Fgr  | 1 | 1 | 10164.145 | 491926.5 | 393862.8 | 135518.9 | 142545.12 |
| Y20140231 | LANGI/KDML 105              | Fgr  | 1 | 1 | 8992.945 | 33515.047 | 13791.03 | 64009 | 68002.445 |
| Y20140232 | LANGI/KDML 105              | Fgr  | 1 | 1 | 7976.35 | 4222.66 | 1 | 3855.81 |
| Y20140233 | LANGI/KDML 105              | Fgr  | 1 | 1 | 12073.675 | 62653.63 | 19555.52 | 274810.4 | 98508.47 | 98232.53 |
| Y20140234 | LANGI/PANDAN WANGI (7)      | Fgr  | 1 | 1 | 4131.925 | 5568.49 | 1967.9 | 4882.255 |
| Y20140235 | LANGI/PANDAN WANGI (7)      | Fgr  | 1 | 1 | 42787.49 | 33212.92 | 12087 | 877.46 | 1 |
| Y20140237 | LANGI/PANDAN WANGI (7)      | #N/A | 769301.02 | 1 | 5600.04 | 5755.985 | 1860.16 | 3068.55 |
| Y20140238 | LANGI/PANDAN WANGI (7)      | Fgr  | 1 | 1 | 8495.695 | 4478.87 | 1434.895 | 2466.735 |
| Y20140239 | LANGI/PANDAN WANGI (7)      | Fgr  | 1 | 1 | 7572.81 | 46151.055 | 9775.695 | 12171.575 |
| Y20140240 | LANGI/PANDAN WANGI (7)      | Fgr  | 1 | 1 | 4079.715 | 42795.344 | 224618.38 | 80928.66 | 87666.28 |
| Y20140241 | LANGI/PANDAN WANGI (7)      | Fgr  | 1 | 1 | 3394.3 | 3495.78 | 1 | 1362.695 |
| Y20140242 | LANGI/PANDAN WANGI (7)      | Fgr  | 1 | 1 | 4099.85 | 5004.195 | 1535.73 | 1 |
| Y20140243 | LANGI/PANDAN WANGI (7)      | Fgr  | 1 | 1 | 17565.965 | 28908.57 | 12773.54 | 89693.34 | 110471.79 |
| Y20140244 | LANGI/PANDAN WANGI (7)      | Fgr  | 1 | 1 | 36715.435 | 19684.275 | 4398.955 | 2646.785 | 1 |
| Y20140245 | LANGI/PANDAN WANGI (7)      | Fgr  | 1 | 1 | 8904.655 | 364992.88 | 18133.71 | 399433.3 | 139297 | 148471.47 |
| Year  | Cultivar/Cross | Type | Code 1 | Code 2 | Code 3 | Code 4 | Code 5 | Code 6 |
|-------|----------------|------|--------|--------|--------|--------|--------|--------|
| Y20140246 | LANGI/PANDAN WANGI (7) | fgr | 6149.614 | 24409.695 | 5487.659 | 65307.383 | 13499.863 | 13293.333 |
| Y20140247 | LANGI/PANDAN WANGI (7) | fgr | 9728.59 | 1 | 7673.695 | 5892.4 | 1353.885 | 4843.105 |
| Y20140249 | LANGI/PANDAN WANGI (7) | fgr | 12571.987 | 1 | 9843.058 | 319564.4 | 96198.76 | 111118.91 |
| Y20140251 | YRL126/KDML 105 | fgr | 12833.235 | 445450.97 | 21153.8 | 311308.7 | 108990.96 | 121734.086 |
| Y20140252 | YRL126/KDML 105 | fgr | 6842.13 | 255578.92 | 16064.27 | 74890.586 | 16149.675 | 15905.165 |
| Y20140253 | YRL126/KDML 105 | fgr | 1 | 47207.77 | 8163.13 | 27322.57 | 6280.585 | 5332.31 |
| Y20140254 | YRL126/KDML 105 | fgr | 1 | 198567.39 | 15986.71 | 42738.504 | 10019.625 | 9038.07 |
| Y20140255 | YRL126/KDML 105 | fgr | 6915.38 | 184022.7 | 12286.24 | 103771.6 | 22994.895 | 28250.215 |
| Y20140256 | YRL126/KDML 105 | fgr | 8585 | 219303.8 | 19659.44 | 89819.9 | 18388.795 | 14279.09 |
| Y20140257 | YRL126/KDML 105 | fgr | 7705.815 | 407164.25 | 22101.54 | 109428.63 | 34470.57 | 33862.566 |
| Y20140262 | Pelde/Gopalbhog(4)/YR71048-10/YRL101 | fgr | 1 | 20995.27 | 10973.51 | 71714.98 | 14967.827 | 9626.479 |
| Y20140269 | PELDE/G'BHOG(4)/D.10///YRL101///YRF203 | fgr | 1 | 10314.635 | 316312 | 17054.76 | 54969.99 | 13166.255 | 8554.395 |
| Y20140270 | PELDE/G'BHOG(4)/D.10///YRL117/YRF203 | fgr | 1 | 31413.26 | 16958.01 | 78049.195 | 16223.585 | 10490.7 |
| Y20140271 | YRF205/LANGI | fgr | 1 | 180127.52 | 10056.21 | 74756.695 | 16355.029 | 14906.579 |
| Y20140272 | YRF208/DELLROSE | fgr | 1 | 31546.314 | 7254.535 | 47849.71 | 10109.28 | 9510.535 |
| Y20140273 | YRF208/DELLROSE | fgr | 7705.815 | 407164.25 | 22101.54 | 109428.63 | 34470.57 | 33862.566 |
| Y20140274 | KYEEMA///PELDE/G'BHOG(4)/D.10//YRL101 | fgr | 1 | 20995.27 | 10973.51 | 71714.98 | 14967.827 | 9626.479 |
| Y20140275 | KYEEMA///PELDE/G'BHOG(4)/D.10//YRL101 | fgr | 10314.635 | 316312 | 17054.76 | 54969.99 | 13166.255 | 8554.395 |
| Y20140276 | KYEEMA///PELDE/G'BHOG(4)/D.10//YRL101 | fgr | 1 | 31413.26 | 16958.01 | 78049.195 | 16223.585 | 10490.7 |
| Y20140277 | KYEEMA///PELDE/G'BHOG(4)/D.10//YRL101 | fgr | 1 | 180127.52 | 10056.21 | 74756.695 | 16355.029 | 14906.579 |
| Y20140278 | KYEEMA///PELDE/G'BHOG(4)/D.10//YRL101 | fgr | 1 | 31546.314 | 7254.535 | 47849.71 | 10109.28 | 9510.535 |
| Y20140279 | PELDE/G'BHOG(4)/D.10//YRL101///YRF203 | fgr | 7705.815 | 407164.25 | 22101.54 | 109428.63 | 34470.57 | 33862.566 |
| Y20140280 | YRF208/DELLROSE | fgr | 4433.92 | 5153.64 | 1928.84 | 1 | 1 | 1 |
| Date       | Material	| Type	| Weight 1 | Weight 2 | Weight 3 | Weight 4 | Weight 5 | Weight 6 | Weight 7 | Weight 8 | Weight 9 | Weight 10 | Weight 11 |
|------------|-----------|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Y20140281  | KYEEM///YRD91V55//P/GO(4)/D.10/4/CALMATI201 | fgr   | 325077.03 | 14835.51 | 47084.33 | 8079.125 | 9196.14  |
| Y20140282  | YRF209/3/L202//PELDE*4/M9 | Fgr   | 226384.83 | 15367.71 | 79795.8 | 18416.984 | 15503.965 |
| Y20140283  | YRF208/YRL125_CT18 | fgr   | 9612.261  | 940661.06 | 63870.31 | 219466.95 | 82112.79 | 87607.65 |
| Y20140284  | YRF208/YRL125_CT18 | fgr   | 4397.455  | 103127.555 | 14780.02 | 78119.8 | 17456.35 | 13943.65 |
| Y20140285  | BASMATI370/PELDE//BASMATI370//L202 | Fgr   | 17601.435 | 4945.2 | 609.545 | 1 | 1 |
| Y20140286  | BASMATI370/PELDE//BASMATI370//L202 | Fgr   | 10901.405 | 3056.855 | 2707.6 | 1 | 3009.72 |
| Y20140287  | L202///BASMATI370/PELDE//BASMATI 370 | fgr   | 1 | 1 | 1614.2 | 1456.14 | 1 | 1 |
| Y20140288  | L202///BASMATI370/PELDE//BASMATI 370 | Fgr   | 1 | 1 | 1 | 588.655 | 1 | 1 |
| Y20140289  | PELDE/G'BHOG(4)/D.10///YRL101///YRF203 | fgr   | 645187.4 | 43565.09 | 94355.62 | 18400.324 | 12321.98 |
| Y20140290  | PELDE/G'BHOG(4)/D.10///YRL101///YRF203 | fgr   | 467169.8 | 19375.88 | 74923.19 | 12754.35 | 12598.04 |
| Y20140291  | PELDE/G'BHOG(4)/D.10///YRL101///YRF203 | fgr   | 670328.06 | 24009.35 | 108266.91 | 22585.4 | 6679.835 |
| Y20140292  | PELDE/G'BHOG(4)/D.10///YRL101///YRF203 | fgr   | 692836.7 | 17505.01 | 53526.797 | 10408.085 | 13759.505 |
| Y20140293  | YRF208/3/DELLMONT //BASMATI370//PELDE | fgr   | 4111.89 | 22682.02 | 14011.4 | 66704.35 | 13524.97 | 11155.185 |
| Y20140294  | YRF208///MILLIN//LIJIANGHEIGU | fgr   | 568251.5 | 39709.81 | 113953.266 | 22598.02 | 9891.415 |
| Y20140295  | YRF208///MILLIN//LIJIANGHEIGU | Fgr   | 1 | 1 | 1713.38 | 974.595 | 1 | 1 |
| Y20140296  | YRF208///MILLIN//LIJIANGHEIGU | Fgr   | 1 | 1 | 1 | 1 | 1 |
| Y20140297  | YRF208///MILLIN//LIJIANGHEIGU | Fgr   | 1 | 1 | 2727.91 | 2397.47 | 1 | 1 |
| Y20140298  | 2*YRF208///MILLIN//LIJIANGHEIGU | #N/A | 1 | 1 | 3344.695 | 3763.335 | 1 | 2788.915 |
| Y20140299  | KYEEMA///LIJIANGHEIGU | Fgr   | 209796.95 | 11438.02 | 97368.516 | 27679.945 | 16448.115 |
| Y20140300  | KYEEMA///LIJIANGHEIGU | Fgr   | 45259.37 | 15405.99 | 73121.16 | 14693.61 | 9200.71 |
| Y20140301  | YRF208///MILLIN//LIJIANGHEIGU | Fgr   | 1 | 1 | 2041.25 | 2838.835 | 1 | 1230.04 |
| Y20140302  | YRF208///MILLIN//LIJIANGHEIGU | Fgr   | 1 | 1 | 1 | 910.7 | 1 | 1 |
| Y20140303  | YRF208///MILLIN//LIJIANGHEIGU | Fgr   | 1 | 1 | 1 | 1 | 1 | 1 |
| Date       | Variety                        | Type | Output1 | Output2 | Output3 | Output4 | Output5 | Output6 |
|-----------|--------------------------------|------|---------|---------|---------|---------|---------|---------|
| 20140304  | YRF208/MILLIN/LIJIANGHEIGU     | Fgr  | 1       | 1       | 1910.82 | 3019.93 | 1647.51 | 2839.81 |
| 20140305  | YRF208/MILLIN/LIJIANGHEIGU     | fgr  | 3709.34 | 34128.22| 15629   | 77473.17| 12675.71| 28735.78|
| 20140306  | YRF208/MILLIN/LIJIANGHEIGU     | Fgr  | 1       | 1       | 1       | 1       | 1       | 1       |
| 20140307  | YRF208/MILLIN/LIJIANGHEIGU     | Fgr  | 1       | 1       | 1615.50 | 918.47  | 1       | 1       |
| 20140308  | YRF208/MILLIN/LIJIANGHEIGU     | Fgr  | 1       | 1       | 3240.24 | 4039.16 | 1       | 4757.08 |
| 20140309  | 2*YRF208/MILLIN/LIJIANGHEIGU   | fgr  | 19380.61| 30370.69| 12356.78| 99613.66| 1516.86 | 33646.51|
| 20140310  | 2*YRF208/MILLIN/LIJIANGHEIGU   | fgr  | 1       | 1       | 17626.74| 14696.47| 78251.22| 15886.31|
| 20140311  | 2*YRF208/MILLIN/LIJIANGHEIGU   | Fgr  | 1       | 1       | 1014.24 | 1       | 1       | 1       |
| 20140312  | 2*YRF208/MILLIN/LIJIANGHEIGU   | Fgr  | 1       | 1       | 1       | 1       | 1014.24 | 1       |
| 20140313  | 2*YRF208/MILLIN/LIJIANGHEIGU   | Fgr  | 1       | 1       | 9583.94 | 1       | 1       | 1390.01 |
| 20140314  | 2*YRF208/MILLIN/LIJIANGHEIGU   | fgr  | 3466.78 | 16859.03| 13992.66| 16869.14| 48634.75| 51232.41|
| 20140315  | 2*YRF208/MILLIN/LIJIANGHEIGU   | fgr  | 9992.68 | 27674.24| 20100.16| 171424.92| 66844.81| 15353.67|
| 20140316  | 2*YRF208/MILLIN/LIJIANGHEIGU   | Fgr  | 1       | 1       | 1420.35 | 2918.11 | 1       | 1474.96 |
| 20140317  | 2*YRF208/MILLIN/LIJIANGHEIGU   | fgr  | 1       | 1       | 4082.01 | 10001.94| 64318.19| 14196.71|
| 20140318  | 2*YRF208/MILLIN/LIJIANGHEIGU   | fgr  | 9610.74 | 63273.49| 18288.7 | 79071.51| 17388.37| 9263.8  |
| 20140319  | KYEEEMA/LIJIANGHEIGU           | Fgr  | 1       | 1       | 1513.85 | 3206.4  | 1       | 1272.05 |
| 20140320  | KYEEEMA/LIJIANGHEIGU           | fgr  | 10475.28| 47703.78| 11552.71| 53332.97| 10886.94| 9309.34 |
| 20140321  | KYEEEMA/LIJIANGHEIGU           | #N/A | 1       | 1       | 4608.87 | 2545.90 | 1       | 1064.76 |
| 20140322  | KYEEEMA/LIJIANGHEIGU           | fgr  | 1       | 1       | 15684.85| 50315.59| 70076.02| 15281.57|
| 20140323  | KYEEEMA/NORIN PL8              | Fgr  | 154902.99| 4259.75 | 6033.89 | 1720.42 | 2767.41 |
| 20140324  | KYEEEMA/NORIN PL8              | Fgr  | 1       | 1       | 2549.68 | 2152.54 | 1508.20 | 2419.81 |
| 20140325  | KYEEEMA/NORIN PL8              | Fgr  | 1       | 1       | 1263.91 | 1       | 1619.41 |
| 20140326  | KYEEEMA/NORIN PL8              | Fgr  | 171104.055| 1853.92 | 2296.20 | 1       | 1767.44 |
| 20140327  | KYEEEMA/NORIN PL8              | Fgr  | 31500.165| 2232.52 | 4137.98 | 1       | 2543.76 |
| 20140328  | YRK4/KOSHIHIKARI (TYNAN)/JYUODEKI| #N/A | 1       | 1       | 2037.57 | 2322.89 | 1       | 1       |
| 20140329  | YRK4/KOSHIHIKARI (TYNAN)/JYUODEKI| #N/A | 1       | 1       | 1517.59 | 1794.51 | 1       | 1379.67 |
| 20140330  | M104/YRM49/KIRARA 397          | #N/A | 1       | 1       | 2735.30 | 1       | 2363.56 |
| 20140331  | M104/AKIHAKARI/HSC55           | #N/A | 1       | 1       | 1       | 1       | 1       | 1       |
| 20140332  | CALMOCHI101/DOONGARA/DOONGARA  | #N/A | 1       | 1       | 2296.83 | 5572.38 | 2072.33 | 2398.98 |
| Y2014036S | Doongara/Phka Rumdang/4/PELDE/G’BHOG(4)/D.10/YRL101///YRL117/YRF203 | #N/A | 9039.25 | 1 | 1710.755 | 9023.4 | 1816.04 | 7066.355 |
|------------|-----------------------------------------------------------------|------|---------|---|----------|-------|---------|----------|
| YRF_208    | #N/A                                                            | #N/A | 1       | 320803.5 | 60733.68 | 65247.18 | 15653.555 | 6134.74   |
| YRF_209__smoo th_ | #N/A                                                       | #N/A | 1       | 456586.6 | 23808.98 | 78337.74 | 19526.244 | 13647.935 |
| YRF203     | #N/A                                                            | #N/A | 1       | 103909.45 | 10659.14 | 57663.355 | 11345.73 | 21747.494 |
| YRF205     | #N/A                                                            | #N/A | 1       | 32823.72 | 15729.35 | 37733.586 | 9311.19 | 6730.295 |
| YRF206     | #N/A                                                            | #N/A | 1       | 461174.97 | 14249.53 | 25130.15 | 5330.98 | 5284.225 |
| YRL_101    | #N/A                                                            | #N/A | 18155.438 | 1 | 4206.598 | 1 | 1 | 1 |
| YRL_117    | #N/A                                                            | #N/A | 1       | 1 | 2951.755 | 2359.315 | 1 | 1389.395 |
| YRL_125    | #N/A                                                            | #N/A | 11313.785 | 1 | 1 | 1646.885 | 1 | 1 |
| YRL_126    | #N/A                                                            | #N/A | 1       | 8807.885 | 2441.525 | 3843.5 | 1 | 4792.27 |
Table S2. GC × GC-TOF-MS parameters for comprehensive profiling of rice volatile metabolites.

| **Autosampler settings** |  |
|--------------------------|------------------|
| Incubator and agitator   | On               |
| Incubator temperature    | 80 °C            |
| Fill speed               | 50 µl/s          |
| Injection speed          | 100 µl/s         |
| Injection volume         | 1.5 ml           |
| Syringe temperature      | 80 °C            |

| **GC × GC-TOF-MS conditions** |  |
|-------------------------------|----------------|
| Injection mode                | Splitless      |
| Injector temperature         | 250 °C         |
| Carrier gas                   | Helium (99.9999%) |
| Flow rate                     | 1 ml/min       |
| Primary column                | Agilent DB-624UI (midpolar) |
| Primary column composition   | 6% cyanopropyl phenyl, 94% polydimethyl siloxane |
| Primary column length         | 30 m × 250 µ × 1.4 µ |
| Secondary column             | Restek Stabilwax (polar) |
| Secondary column composition | crossbond polyethylene glycol |
| Secondary column length      | 0.9 m × 250 µ × 0.50 µ |
| Secondary column temperature | 15 °C offset primary |
| Modulator temperature        | 25 °C offset primary |
| Modulation                   | 2.5 s           |
| Hot pulse time                | 0.4 s           |
| Cool time                     | 0.85 s          |
| Transfer line                 | 240 °C          |
| MS voltage                    | 1500 V          |
| Electron energy               | 70 V            |
| Scan rate                     | 200 spectra/s   |
| Mass range                    | 35-500 m/z      |
| Ion source                    | 240 °C          |

| **Metadata pre-processing parameters** |  |
|----------------------------------------|----------------|
| Baseline offset                        | 0.5            |
| Peak Width                             | 15             |
| Match Required to combine (2D)         | 600            |
| Peak width (2D)                        | 15             |
| Minimum signal/noise (S/N)             | 25             |
| Segmented Processing S/N               | 250            |
| Number of hits to return               | 5              |
| Minimum mol Weight                     | 45             |
| Maximum mol Weight                     | 500            |
| Mass Threshold                         | 10             |
| Minimum similarity match               | 600            |

| **Stat Compare options** |  |
|-------------------------|------------------|
| ChromaTof version       | V4.50            |
| Minimum similary match  | 700              |
| Maximum modulation periods apart | 1              |
| Maximum RT difference (s) | 0.1            |
| Minimum number of samples that contain the analyte | 5 |
| Minimum percent of samples in a class that contain the analyte | 50 |
Figure S1. OPLS-da Scores plot of the Set 1 rice varieties and the compounds with VIP scores greater than 1.3.

| Putative compound                          | VIP  | Putative compound                        | VIP  |
|--------------------------------------------|------|------------------------------------------|------|
| Pyrrole                                    | 2.2144 | 2-Octene, 3,7-dimethyl-                  | 1.3427 |
| 2-Acetyl-1-pyrroline                       | 1.6191 | Benzene, 1,2,3-trimethyl-                | 1.69128 |
| Analyte 5                                  | 1.60788 | 2-Decen-1-ol                             | 1.32913 |
| Ethanone, 1-(1H-pyrrol-2-yl)-              | 1.47624 | Toluene                                  | 1.62535 |
| Analyte 4                                  | 1.44464 | 2-Butanol                                 | 1.62546 |
| 1-Pentene, 2,3,3-trimethyl-                | 1.33509 | 1-Pentanol                                | 1.33878 |
| 2-Decen-1-ol                               | 1.32913 | 2-Butanone                                | 1.62546 |
| Pentanal                                   | 1.3135 | Toluene                                  | 1.62535 |

| Putative compound                          | VIP  | Putative compound                        | VIP  |
|--------------------------------------------|------|------------------------------------------|------|
| Pyrrole                                    | Decane | 3,7-dimethyl-                           | 1.83784 |
| 2-Acetyl-1-pyrroline                       | 1-Octene, 1-ethyl- | 1.83784 |
| Analyte 5                                  | 1-Octene, 1-ethyl- | 1.83784 |
| Ethanone, 1-(1H-pyrrol-2-yl)-              | 1-Octene, 1-ethyl- | 1.83784 |
| Analyte 4                                  | 1-Octene, 1-ethyl- | 1.83784 |
| 1-Pentene, 2,3,3-trimethyl-                | 1-Octene, 1-ethyl- | 1.83784 |
| 2-Decen-1-ol                               | 1-Octene, 1-ethyl- | 1.83784 |
| Pentanal                                   | 1-Octene, 1-ethyl- | 1.83784 |
Figure S2. Mass spectral EI pattern of chemical standards analysed by GC × GC-TOF-MS (A) 2-acetylpyrrole (RT: 820, 2.12s) $m/z$ (%): 109 (60), 95 (6), 94 (100), 80 (2), 66 (80), 65 (8), 53 (11), 50 (7), 40 (18), 39 (60), 38 (23), 37 (10), 22 (22); (B) 2-acetyl-1-pyrroline (RT: 627.5, 1.02s) $m/z$ (%): 83 (22), 69 (8), 68 (10), 43 (100), 41 (50), 42 (20), 39 (16); (C) pyrrole (RT: 475, 2.25s) $m/z$ (%): 68 (4), 67 (100), 66 (8), 39 (83), 41 (72), 40 (55), 38 (35), 37 (23), 52 (4).
Figure S3. GC x GC HRT 4D EI spectra of (A) Analyte 4 (1-pyrroline), and (B) Analyte 5 (6M5OTP).
Figure S4. Identification of Analyte 4 (1-pyrroline). MS Electron ionisation fragmentation pattern of Analyte 4 detected in GC × GC-TOF-MS (A) rice, and (B) synthesised 1-pyrroline standard. (C) $^1$H NMR trace of the synthesised 1-pyrroline standard.
Figure S5. (A) HSQC and (B) HMBC of 2AP and 6M5OP.
Figure S6. Manhattan plots for 2-AP (A); pyrrole (B); 1-pyrroline (Analyte 4) (C); 6M5OTP (Analyte 5) (D); 2-acetylpyrrole (E). QQ plot for 2AP (pink), pyrrole (yellow), 1-pyrroline (Analyte 4) (green), 6M5OTP (red), 2-acetylpyrrole (blue) (F) before addition of the FGR functional allele in the SNP matrix.