

Table S1. Linear models constructed at the tillering stage, before the first top-dressing fertilization (TdF), built considering the 23 possible inputs (before input selection) that do not depend on the RE channel. G, R, RE, and NIR represent, respectively, the green, red, red-edge, and near-infrared reflectance values.

Model formula	Adj. R ²	RMSE
$PH_{25} = 33.51 - 55.25 \cdot G_{25}$	0.12	2.59
$PH_{45} = 64.07 - 352.2 \cdot R_{25} + 8.09 \cdot mSR_{25}$	0.50	5.97
$BT_{25} = 1.11 - 30.43 \cdot G_{25} + 37.10 \cdot R_{25} + 1.14 \cdot CI_{G,25}$	0.85	0.45
$BT_{45} = 7.91 - 117.3 \cdot R_{25} - 2.88 \cdot MCARI_{25} + 44.39 \cdot MTCARI_{25}$	0.56	1.03
$BT_{99} = 25.10 - 263.0 \cdot R_{25}$	0.39	3.17
$BSL_{99} = 14.65 + 41.04 \cdot G_{25} - 254.4 \cdot R_{25} - 1.71 \cdot CI_{G,25} + 52.86 \cdot MTCARI_{25}$	0.59	1.88
$Yield = 14.79 - 201.5 \cdot R_{25} - 1.04 \cdot CI_{G,25} + 53.41 \cdot MTCARI_{25}$	0.61	1.48
$HI = 0.63 - 1.44 \cdot G_{25}$	0.24	0.05
$NCT_{25} = 4.01 - 6.43 \cdot G_{25}$	0.16	0.26
$NCT_{45} = 2.61 - 14.97 \cdot G_{25} + 2.28 \cdot gNDVI_{25}$	0.69	0.32
$NCT_{99} = 2.30 + 8.76 \cdot G_{25} - 36.48 \cdot R_{25} - 0.42 \cdot CI_{G,25} + 7.27 \cdot MTCARI_{25}$	0.71	0.25
$NCSL_{99} = 2.33 - 25.64 \cdot R_{25} - 0.79 \cdot CI_{G,25} + 1.40 \cdot MCARI_{125}$ $+ 0.89 \cdot MCARI_{225} + 1.09 \cdot MTCARI_{25}$	0.69	0.29
$NCG = 1.63 + 2.58 \cdot G_{25} - 9.15 \cdot R_{25} - 0.62 \cdot gNDVI_{25} + 1.35 \cdot MTCARI_{25}$	0.59	0.08
$NU_{25} = 71.41 - 773.6 \cdot G_{25} + 40.22 \cdot CI_{G,25}$	0.75	21.90
$NU_{45} = 96.70 - 1775.2 \cdot R_{25} + 49.95 \cdot NDVI_{25} + 34.68 \cdot mSR_{25}$	0.49	31.92
$NU_{99} = 449.1 - 7260.7 \cdot R_{25} - 133.1 \cdot CI_{G,25} + 752.5 \cdot MCARI_{225} + 113.6 \cdot MTCARI_{25}$	0.68	60.63
$NUSL_{99} = -594.5 - 2439.2 \cdot R_{25} + 848.0 \cdot TNDVI_{25} - 122.8 \cdot CI_{G,25}$ $+ 181.5 \cdot MCARI_{125} - 40.79 \cdot MTCARI_{25}$	0.70	38.92
$NUG = 220.9 + 166.1 \cdot G_{25} - 3425.5 \cdot R_{25} - 23.25 \cdot CI_{G,25} + 822.2 \cdot MTCARI_{25}$	0.62	23.77

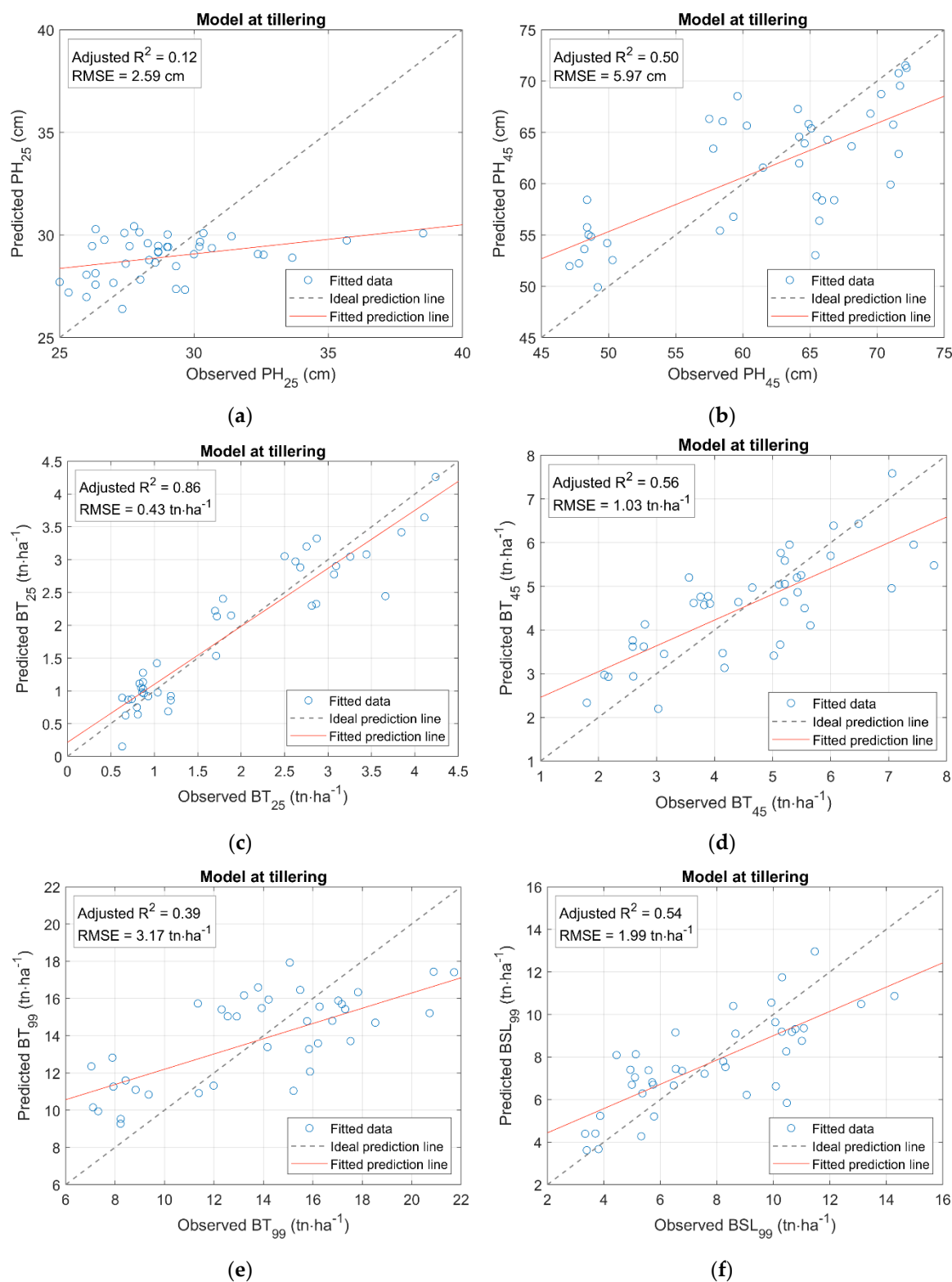
Table S2. Linear models constructed at the booting stage, before the second TdF, using features extracted from two UAV images (at BBCH 25 and 45), built considering the 23 possible inputs (before input selection) that do not depend on the RE channel. G, R, RE, and NIR represent, respectively, the green, red, red-edge, and near-infrared reflectance values.

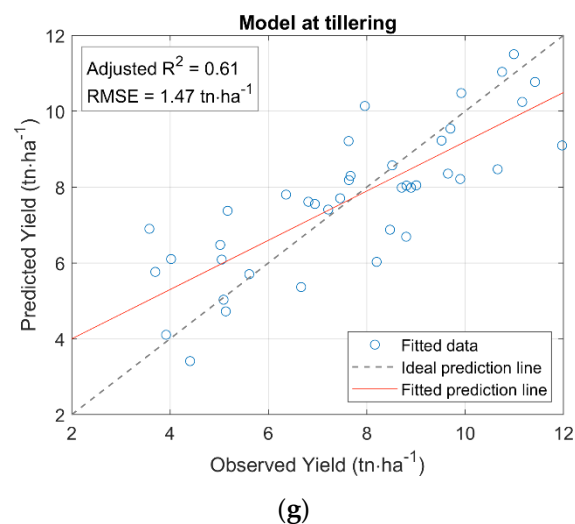
Model formula	Adj. R ²	RMSE
$PH_{45} = -21.67 + 97.38 \cdot NDVI_{45} + 41.34 \cdot MTCARI_{45}$	0.84	3.39
$BT_{45} = -7.79 + 11.97 \cdot NDVI_{45} + 0.96 \cdot mSR_{45}$	0.87	0.55
$BT_{99} = -23.48 + 43.89 \cdot NDVI_{45} + 17.05 \cdot MTCARI_{45}$	0.70	2.23
$BSL_{99} = 8.76 - 186.7 \cdot R_{45} + 1.60 \cdot mSR_{45}$	0.69	1.61
$Yield = 3.05 - 52.48 \cdot R_{25} - 57.75 \cdot R_{45} + 5.81 \cdot NDVI_{45} + 1.41 \cdot mSR_{45}$	0.75	1.18
$HI = 0.39 + 3.80 \cdot R_{45}$	0.31	0.04
$NCT_{45} = -0.73 - 7.08 \cdot G_{25} + 34.66 \cdot R_{45} + 4.24 \cdot gNDVI_{45}$	0.87	0.21
$NCT_{99} = 1.81 - 0.33 \cdot CI_{G,25} - 19.81 \cdot R_{45} + 0.05 \cdot SR_{45}$	0.75	0.23
$NCSL_{99} = -7.39 - 10.40 \cdot R_{25} - 6.84 \cdot GWDRVI_{25} + 0.27 \cdot CI_{G,25} + 1.74 \cdot MCARI_{125}$ $+ 0.06 \cdot SR_{45} - 0.41 \cdot mSR_{45} + 11.72 \cdot gNDVI_{45} - 5.68 \cdot gRDVI_{45}$ $+ 8.39 \cdot MTCARI_{45}$	0.86	0.19
$NCG = -38.14 - 7.86 \cdot gNDVI_{25} + 19.86 \cdot mSR_{G,25} - 50.46 \cdot GWDRVI_{25} - 10.12 \cdot R_{45}$	0.60	0.08
$NU_{45} = -92.17 - 741.9 \cdot R_{25} + 47.32 \cdot NDVI_{45} + 262.7 \cdot gNDVI_{45} + 293.0 \cdot MTCARI_{45}$	0.88	15.60
$NU_{99} = 302.9 - 7080.7 \cdot R_{45} + 8.96 \cdot SR_{45} - 3.34 \cdot mSR_{45}$	0.66	62.41
$NUSL_{99} = -430.2 + 1666.9 \cdot R_{25} + 188.4 \cdot mSR_{25} - 94.29 \cdot CI_{G,25}$ $- 1213.2 \cdot MTCARI_{25} - 952.6 \cdot DVI_{45} + 1.21 \cdot SR_{45} + 18.67 \cdot mSR_{45}$ $+ 951.3 \cdot gNDVI_{45} - 312.5 \cdot gRDVI_{45} + 1608.4 \cdot MTCARI_{45}$	0.88	24.70
$NUG = 47.03 - 450.4 \cdot R_{25} + 127.0 \cdot NDVI_{25} - 19.40 \cdot CI_{G,25} - 205.5 \cdot MTCARI_{25}$ $- 1755.5 \cdot G_{45} + 28.57 \cdot mSR_{45} + 208.5 \cdot gNDVI_{45} - 32.24 \cdot CI_{G,45}$ $+ 553.8 \cdot MTCARI_{45}$	0.84	15.55

Table S3. Linear models constructed at the booting stage, before the second TdF, using features extracted from three UAV images (at BBCH 25, 31, and 45), built considering the 23 possible inputs (before input selection) that do not depend on the RE channel. G, R, RE, and NIR represent, respectively, the green, red, red-edge, and near-infrared reflectance values.

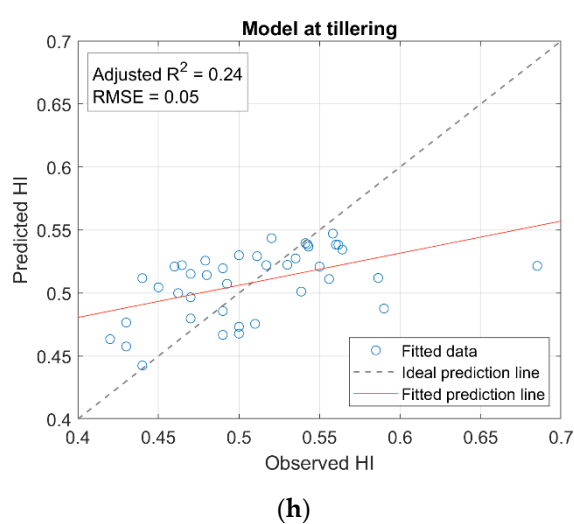
Model formula	Adj. R ²	RMSE
$PH_{45} = -21.67 + 97.38 \cdot NDVI_{45} + 41.34 \cdot MTCARI_{45}$	0.84	3.39
$BT_{45} = -7.79 + 11.97 \cdot NDVI_{45} + 0.96 \cdot mSR_{45}$	0.87	0.55
$BT_{99} = -23.48 + 43.89 \cdot NDVI_{45} + 17.05 \cdot MTCARI_{45}$	0.70	2.23
$BSL_{99} = 8.76 - 186.7 \cdot R_{45} + 1.60 \cdot mSR_{45}$	0.69	1.61
$Yield = -8.51 - 54.07 \cdot R_{25} + 25.02 \cdot G_{31} + 18.02 \cdot NDVI_{45} + 0.65 \cdot mSR_{45}$	0.79	1.08
$HI = 0.39 + 3.80 \cdot R_{45}$	0.31	0.04
$NCT_{45} = -0.53 - 5.26 \cdot G_{25} - 0.38 \cdot G_{31} - 4.77 \cdot MTCARI_{31} + 27.88 \cdot R_{45} + 4.56 \cdot gNDVI_{45}$	0.88	0.20
$NCT_{99} = -0.83 + 5.49 \cdot G_{31} - 0.28 \cdot CI_{G,31} + 10.24 \cdot R_{45} - 0.07 \cdot SR_{45} + 0.90 \cdot mSR_{45}$	0.83	0.19
$NCSL_{99} = -0.19 + 2.41 \cdot G_{31} - 0.29 \cdot CI_{G,31} + 0.49 \cdot mSR_{45}$	0.80	0.23
$NCG = 1.29 + 2.40 \cdot G_{31} - 7.18 \cdot R_{45}$	0.63	0.08
$NU_{45} = -184.7 + 290.3 \cdot OSAVI_{45} + 181.4 \cdot gNDVI_{45}$	0.85	17.28
$NU_{99} = -259.1 + 343.8 \cdot G_{31} - 64.54 \cdot CI_{G,31} + 3188.6 \cdot R_{45} + 150.3 \cdot mSR_{45}$	0.84	43.19
$NUSL_{99} = -81.33 + 190.2 \cdot G_{31} - 40.05 \cdot CI_{G,31} + 75.72 \cdot mSR_{45}$	0.82	29.86
$NUG = -58.37 - 766.6 \cdot R_{25} + 231.6 \cdot G_{31} - 12.69 \cdot CI_{G,31} + 161.0 \cdot NDVI_{45} + 12.56 \cdot mSR_{45} + 252.0 \cdot MTCARI_{45}$	0.82	16.33

Figure S1. Scatter plots of predicted versus observed values for all lineal models constructed at the tillering stage. The gray dashed line represents the ideal perfect linear relationship, whereas the continuous red line is the simple linear regression line of the predicted versus observed data.

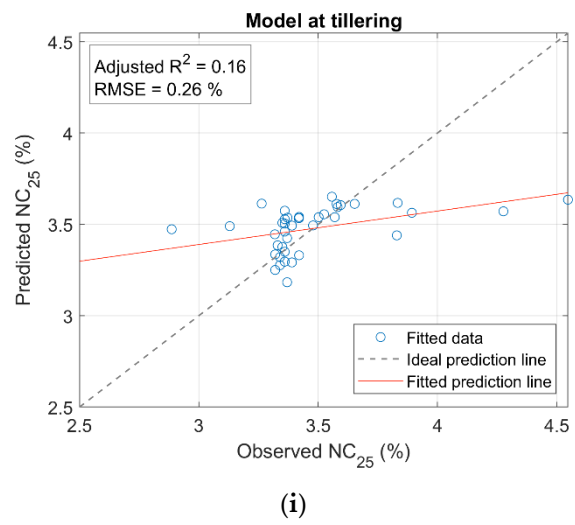




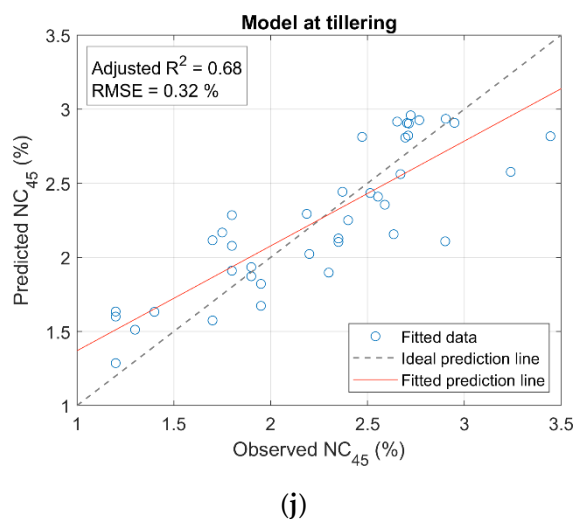
(g)



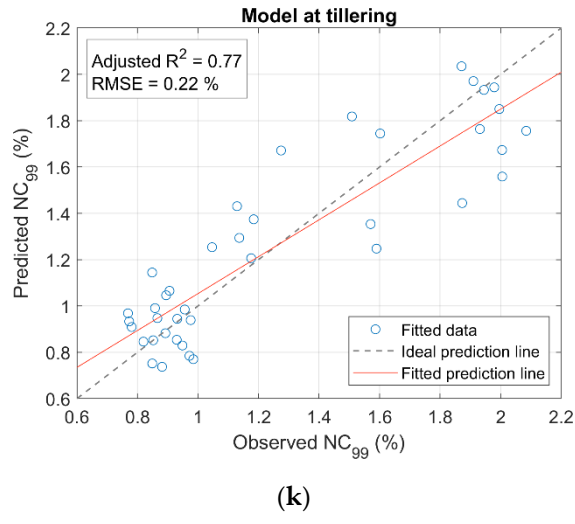
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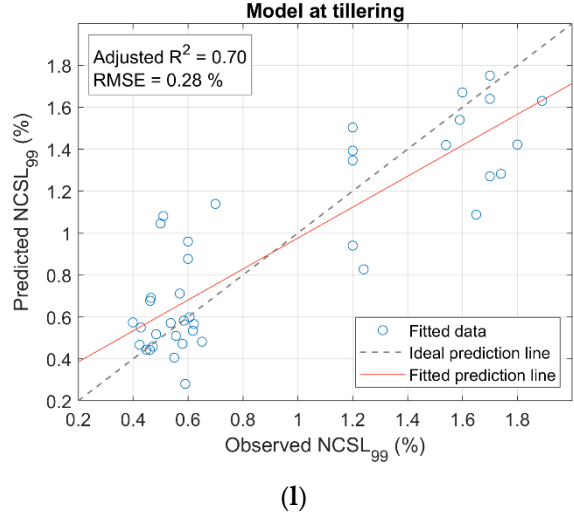
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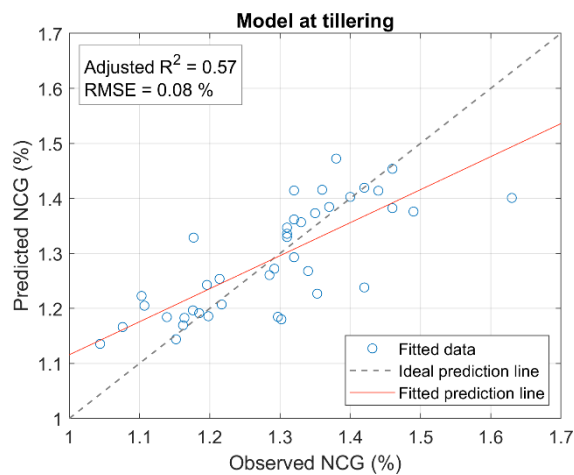
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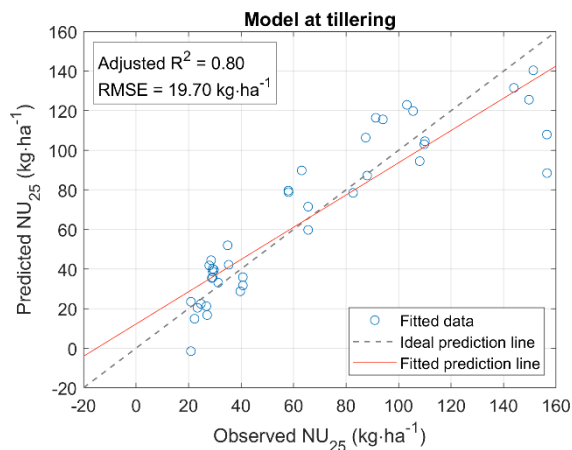
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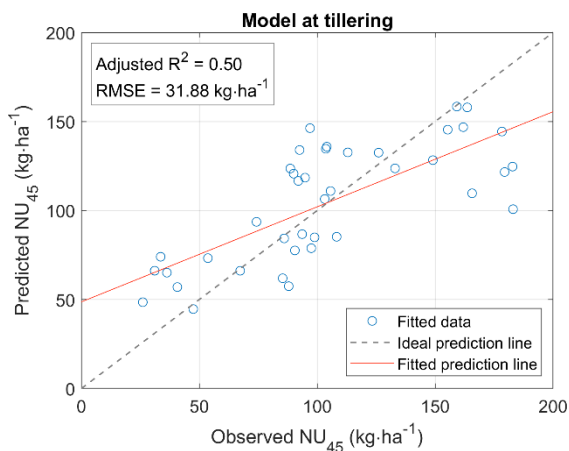
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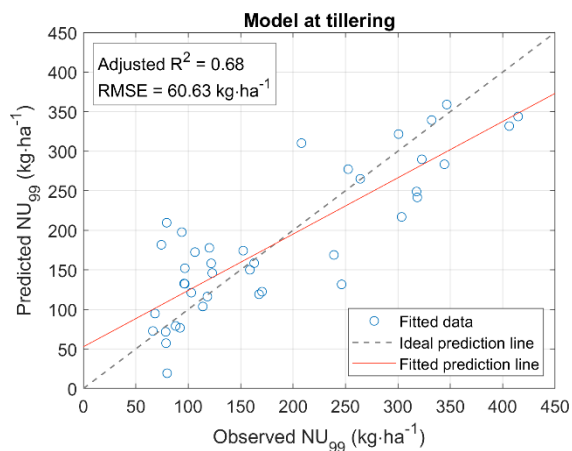
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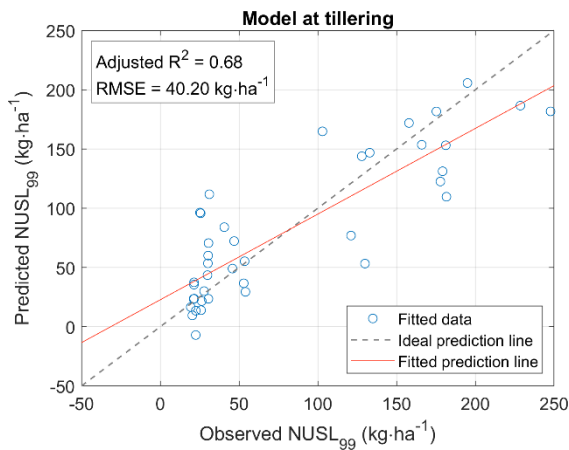
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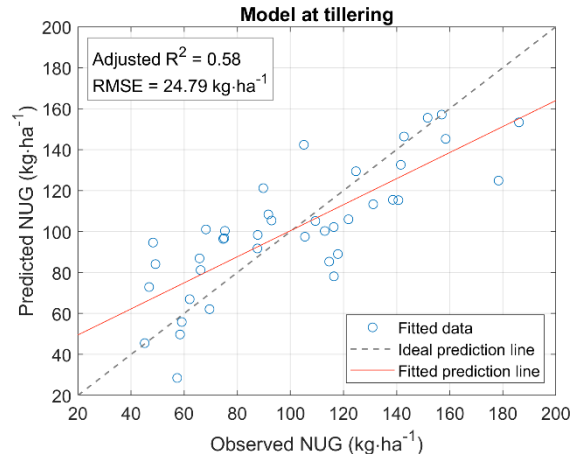
(o)



(p)

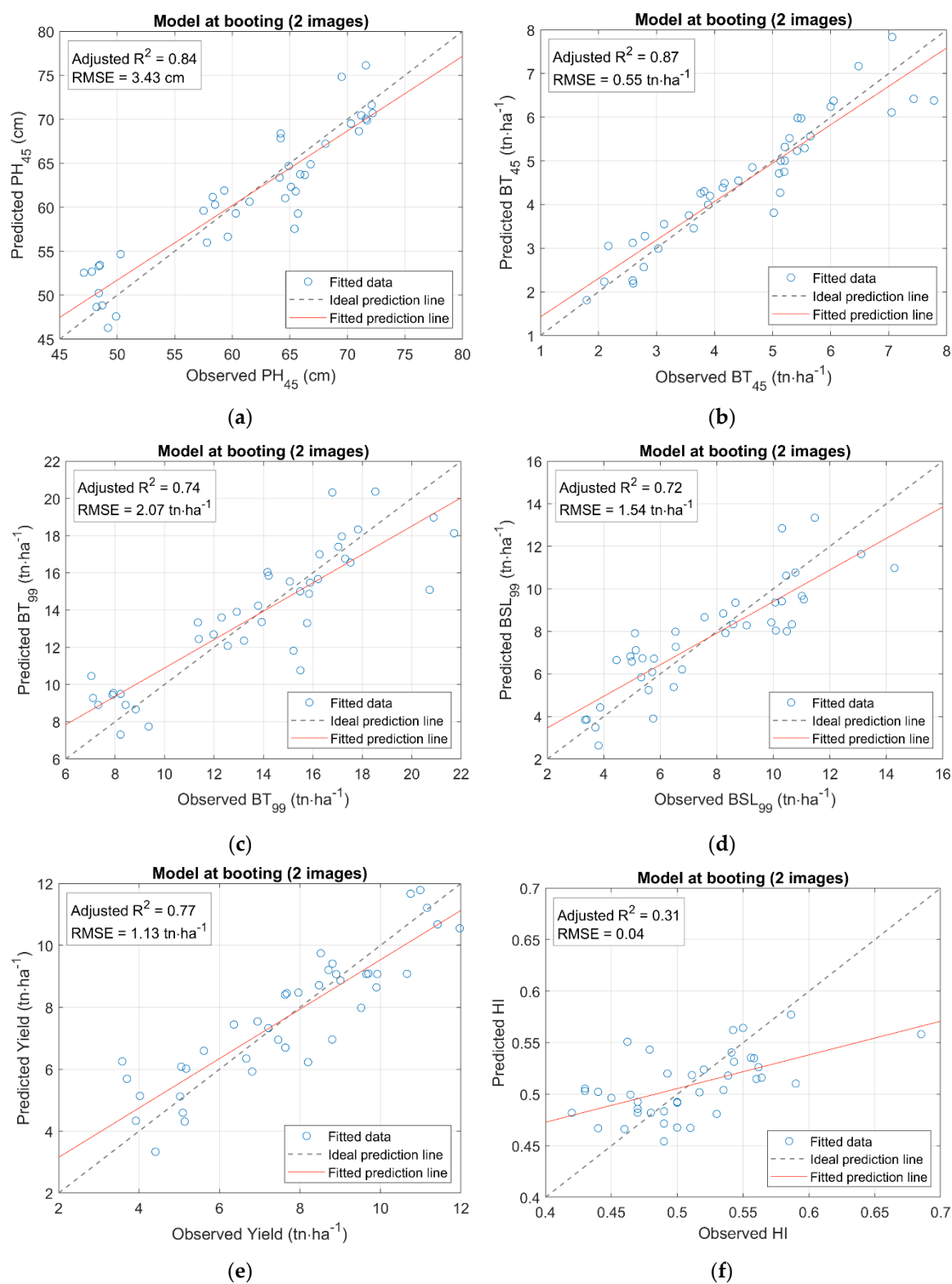


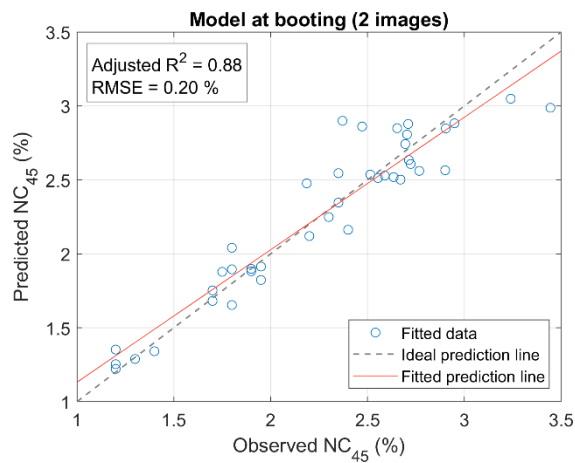
(q)



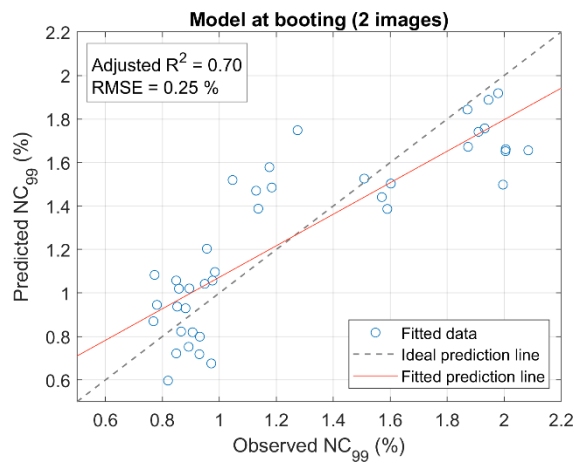
(r)

Figure S2. Scatter plots of predicted versus observed values for all lineal models constructed at the booting stage, using features extracted from two UAV images. The gray dashed line represents the ideal perfect linear relationship, whereas the continuous red line is the simple linear regression line of the predicted versus observed data.

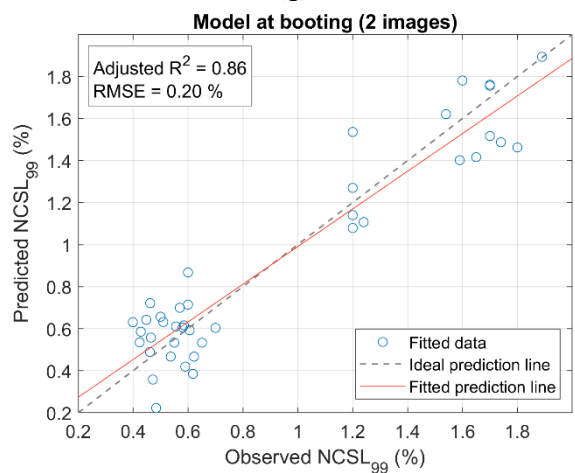




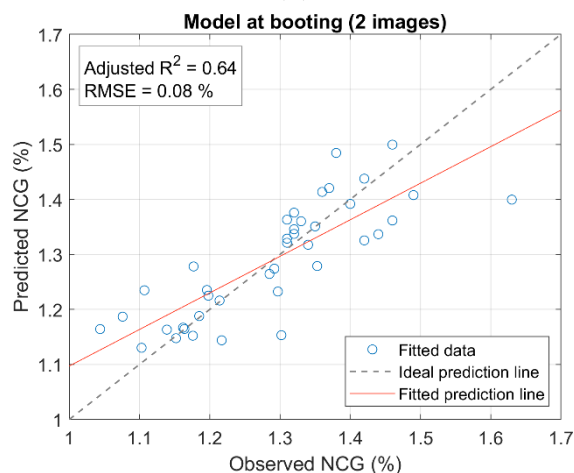
(g)



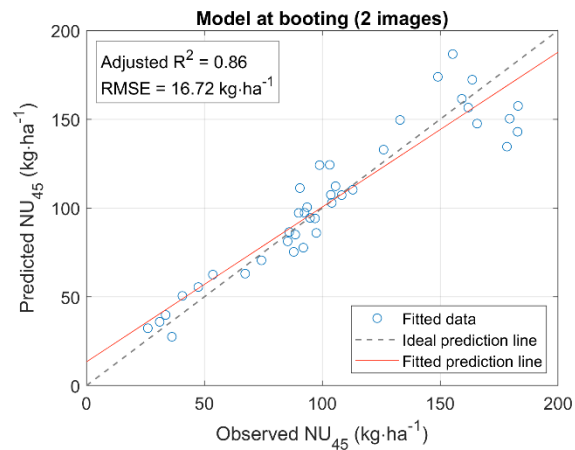
(h)



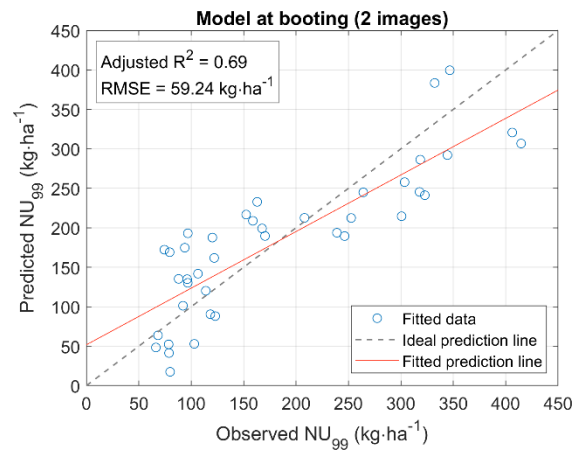
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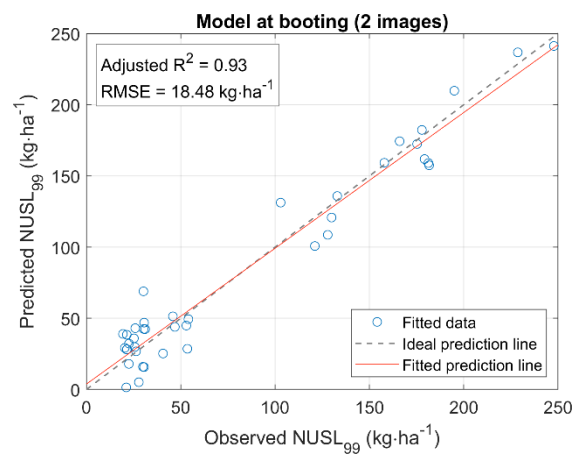
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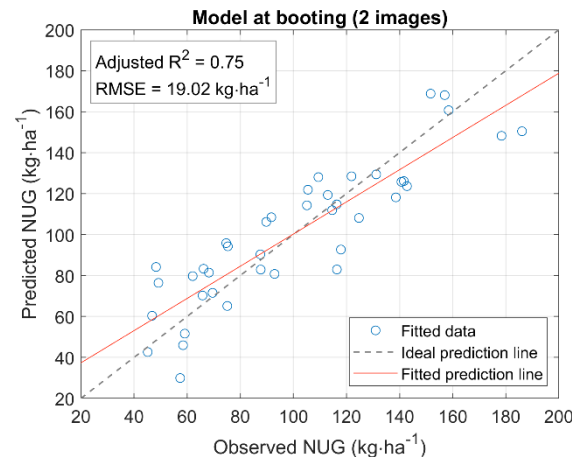
(k)



(l)

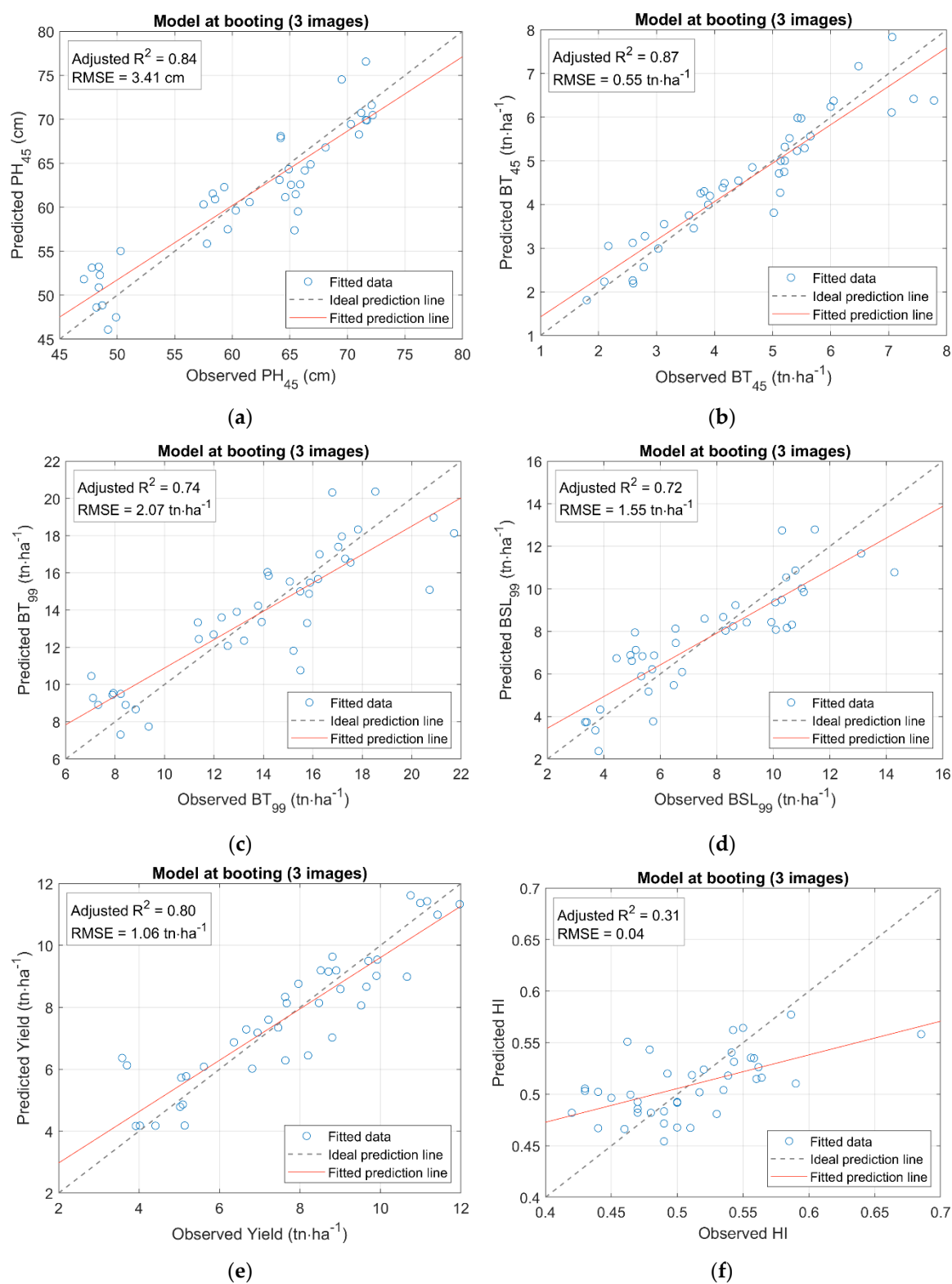


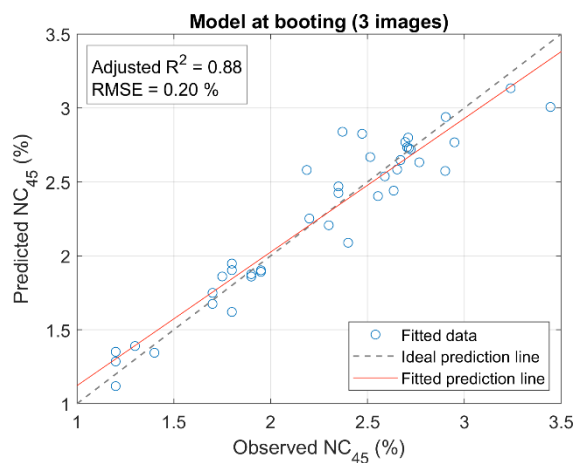
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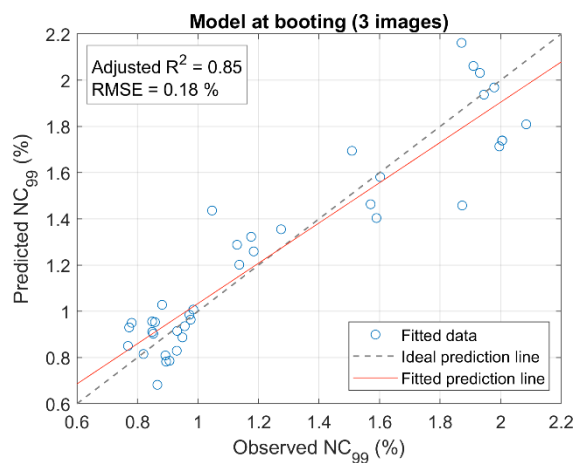
(n)

Figure S3. Scatter plots of predicted versus observed values for all lineal models constructed at the booting stage, using features extracted from three UAV images. The gray dashed line represents the ideal perfect linear relationship, whereas the continuous red line is the simple linear regression line of the predicted versus observed data.

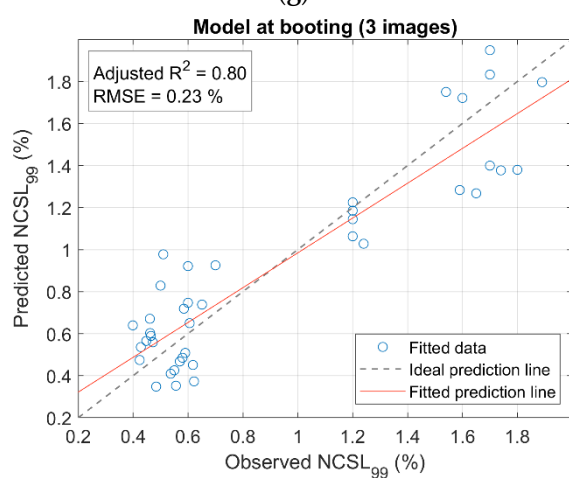




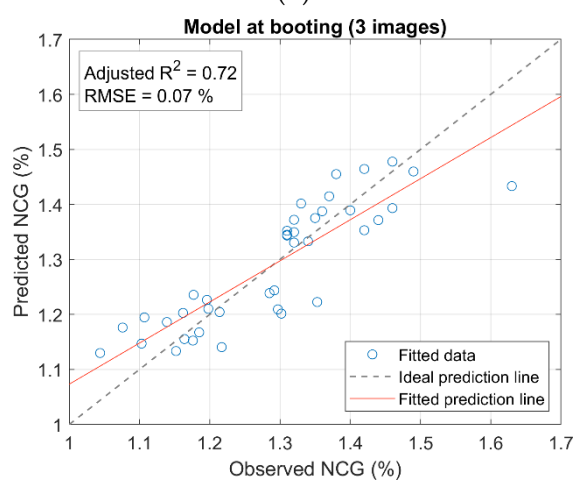
(g)



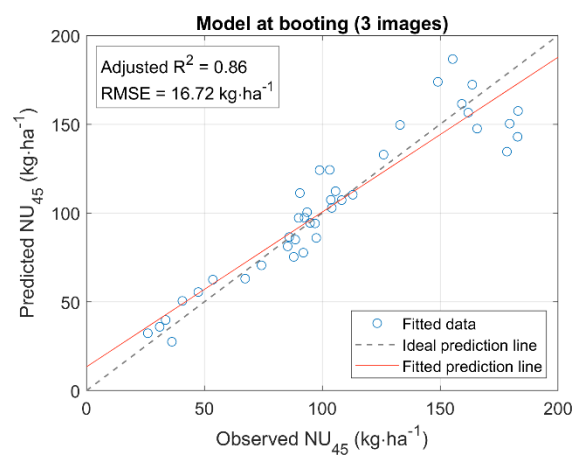
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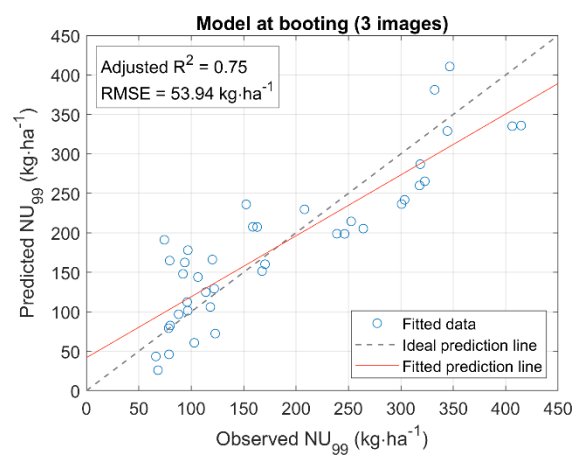
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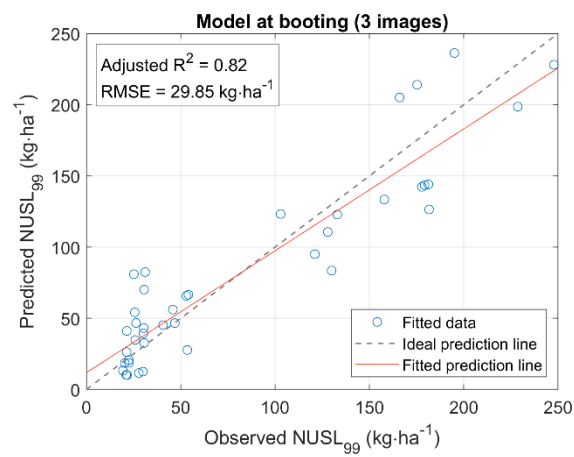
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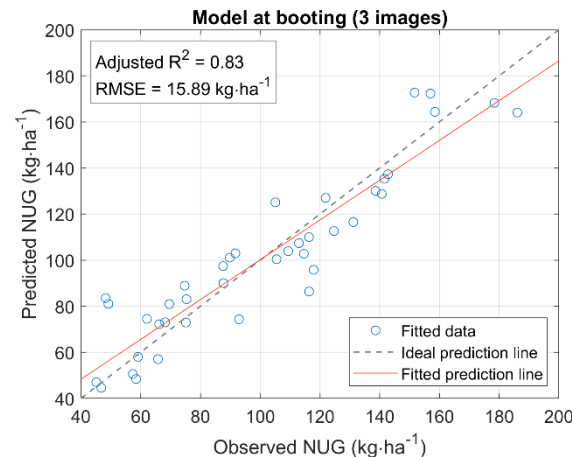
(k)



(l)



(m)



(n)