

Correction

## **Correction: Tilly, N. *et al.* Fusion of Plant Height and Vegetation Indices for the Estimation of Barley Biomass. *Remote Sens.* 2015, 7, 11449–11480**

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After publication of the research paper [1] an error during the data analysis process was recognized. In Table 4 [1] the units for fresh and dry biomass are stated as being  $\text{g}/\text{m}^2$ . However, the values actually refer to the sampling area (0.2 m by 0.2 m), hence each value should have been multiplied by 25 to extrapolate it to  $\text{g}/\text{m}^2$ . Unfortunately, this step was missed out.

All analyses were re-executed based on the correct values, and the corresponding tables and figures are presented in the same order as in the paper in the following Tables 1–3, Figure 1–3. Thus, the stated sensitivity thresholds for the saturation of the NDVI and RGBVI must also be corrected to be about  $185 \text{ g}/\text{m}^2$  and  $1375 \text{ g}/\text{m}^2$  for dry and fresh biomass, respectively. In comparison to the originally stated values the  $R^2$  and  $d$  values for all models did not change and hence, the overall statements of the study are correct. For the linear BRMs, the value ranges were extended through the multiplication by 25 and thus, the  $\text{SE}_E$  and RMSE differ. In contrast, the log-transformation for the exponential BRMs converted the factor to a constant summand, which is added to each value ( $\ln(25) \cong 3.22$ ). Consequently, the absolute difference between the biomass values and hence, the  $\text{SE}_E$  and RMSE, do not differ. We apologize for any inconvenience this has caused.

**Table 1.** Correction of Table 4 [1]. Statistics for the plot-wise averaged CSM-derived plant heights and destructively taken biomass for the reduced data sets of 2013 and 2014 (n: number of samples;  $\bar{X}$ : mean value; min: minimum; max: maximum; SD: standard deviation).

	n	CSM-Derived Plant Height (m)				Fresh Biomass (g/m <sup>2</sup> )				Dry Biomass (g/m <sup>2</sup> )			
		$\bar{X}$	min	max	SD	$\bar{X}$	min	max	SD	$\bar{X}$	min	max	SD
2013													
3	12	0.22	0.01	0.39	0.13	1282.92	491.00	2172.50	473.20	168.31	52.00	272.00	56.59
4	12	0.47	0.24	0.71	0.17	2891.54	1560.25	4465.50	806.12	415.31	205.00	725.00	146.02
5	12	0.78	0.58	0.99	0.13	5070.42	2668.75	7730.00	1561.62	883.38	434.50	1429.25	328.93
6	12	0.78	0.65	0.93	0.07	4631.73	2986.25	7655.75	1193.95	1258.88	886.75	1687.50	219.92
		Mean pre-anthesis period				123.27	62.93	191.57	3081.63	1573.33	4789.33	946.98	489.00
		Mean whole observed period				138.77	77.06	220.24	42.14	3469.15	1926.56	5505.94	1008.72
2014													
2	36	0.17	0.12	0.25	0.03	656.28	266.25	1116.50	202.07	89.01	33.00	155.25	27.66
3	36	0.41	0.34	0.52	0.04	2227.08	1226.75	3236.50	531.72	289.83	165.75	417.75	66.03
4	36	0.63	0.53	0.70	0.04	2825.48	1643.75	4162.00	603.19	465.49	276.62	706.65	97.89
5	36	0.81	0.69	0.99	0.05	3185.13	2106.50	5433.25	687.74	777.23	486.35	1271.35	156.02
6	36	0.78	0.66	0.99	0.05	3569.34	1994.75	6044.00	898.59	1166.38	652.60	1876.35	276.46
		Mean pre-anthesis period				88.94	52.43	139.48	2223.49	1310.81	3487.06	506.18	405.39
		Mean whole observed period				99.71	57.90	159.94	23.72	2492.66	1447.60	3998.45	584.66

**Table 2.** Correction of Table 5 [1]. Statistics for the model calibration as mean values of the four subset combinations ( $R^2$ : coefficient of determination;  $SE_E$ : standard error of the estimate).

	Estimator	Bivariate BRMs				Multivariate BRMs										
		Whole Period		Pre-Anthesis		Whole Period		Pre-Anthesis								
		$R^2$	$SE_E^a$	$R^2$	$SE_E^a$	$R^2$	$SE_E^a$	$R^2$	$SE_E^a$							
Dry biomass	Linear	PH	0.65	250.71	0.76	143.34	GnyLi	0.65	865.76	0.77	635.30					
		GnyLi	0.52	293.80	0.68	166.75										
		NDVI	0.07	409.44	0.34	239.09						NDVI	0.69	537.36	0.76	518.25
		NRI	0.54	289.57	0.70	159.97						NRI	0.65	876.08	0.77	621.60
		RDVI	0.13	396.88	0.39	230.33						RDVI	0.69	479.48	0.76	535.08
		REIP	0.12	398.08	0.58	189.95						REIP	0.73	48353.45	0.76	6462.41
	RGBVI	0.05	413.80	0.26	252.59	RGBVI	0.68	557.08	0.76	580.76						
	Exponential	PH	0.84	0.37	0.84	0.34	PH	0.86	2.43	0.88	2.14					
		GnyLi	0.80	0.42	0.85	0.32	GnyLi									
		NDVI	0.30	0.77	0.61	0.53	NDVI					0.85	2.85	0.88	3.99	
		NRI	0.81	0.40	0.87	0.30	NRI					0.87	2.29	0.89	1.96	
		RDVI	0.41	0.71	0.68	0.48	RDVI					0.85	2.52	0.88	2.84	
		REIP	0.37	0.73	0.77	0.40	REIP					0.84	30.39	0.86	48.43	
		RGBVI	0.23	0.81	0.48	0.60	RGBVI					0.85	2.51	0.87	2.73	

Table 2. Cont.

		Bivariate BRMs				Multivariate BRMs						
		Whole Period		Pre-Anthesis		Whole Period		Pre-Anthesis				
		Estimator	$R^2$	$SE_E^a$	$R^2$	$SE_E^a$	Estimator <sup>b</sup>	$R^2$	$SE_E^a$	$R^2$	$SE_E^a$	
Fresh biomass	Linear	PH	0.59	901.99	0.60	843.32						
		GnyLi	0.58	913.81	0.62	829.48	GnyLi	0.62	3295.30	0.64	2968.91	
		NDVI	0.25	1222.39	0.42	1022.79	NDVI	0.60	4561.69	0.63	5008.60	
		NRI	0.59	909.94	0.62	821.35	NRI	0.62	3056.34	0.64	2718.09	
		RDVI	0.35	1143.49	0.50	945.26	RDVI	0.61	3813.94	0.64	3955.80	
		REIP	0.30	1180.82	0.55	894.62	REIP	0.60	14599.87	0.63	59169.39	
	RGBVI	0.22	1243.84	0.37	1066.53	RGBVI	0.61	4007.93	0.64	3881.46		
	Exponential	PH	0.70	0.37	0.68	0.39	PH					
		GnyLi	0.76	0.33	0.76	0.34	GnyLi	0.77	1.87	0.77	1.77	
		NDVI	0.46	0.50	0.65	0.41	NDVI	0.77	3.74	0.79	4.30	
		NRI	0.77	0.33	0.77	0.33	NRI	0.77	1.67	0.77	1.56	
		RDVI	0.59	0.43	0.74	0.35	RDVI	0.79	2.69	0.82	2.89	
		REIP	0.47	0.49	0.71	0.37	REIP	0.72	22.27	0.74	73.05	
		RGBVI	0.38	0.53	0.55	0.47	RGBVI	0.77	2.58	0.78	2.68	

<sup>a</sup> The  $SE_E$  for exponential models is calculated from natural log-transformed biomass values; <sup>b</sup> each fused with PH.

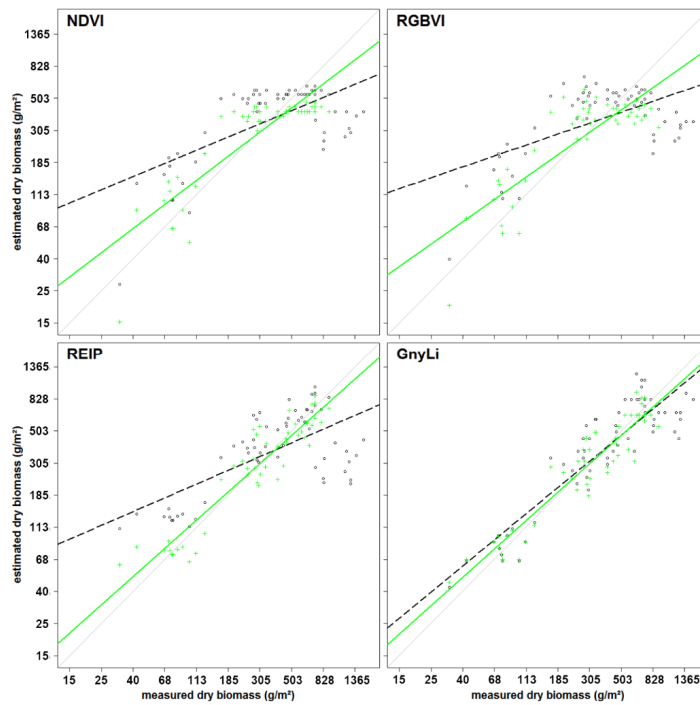
Table 3. Correction of Table 6 [1]. Statistics for the model validation as mean values of the four subset combinations ( $R^2$ : coefficient of determination; RMSE: root mean square error (g/m<sup>2</sup>); d: Willmott’s index of agreement).

		Bivariate BRMs						Multivariate BRMs							
		Whole Period			Pre-Anthesis			Whole Period			Pre-Anthesis				
		Estimator	$R^2$	RMSE <sup>a</sup>	d	$R^2$	RMSE <sup>a</sup>	d	Estimator <sup>b</sup>	$R^2$	RMSE <sup>a</sup>	d	$R^2$	RMSE <sup>a</sup>	d
Dry biomass	Linear	PH	0.66	257.57	0.88	0.80	147.75	0.92							
		GnyLi	0.54	299.67	0.81	0.72	173.31	0.88	GnyLi	0.65	262.19	0.88	0.79	148.20	0.92
		NDVI	0.07	412.70	0.33	0.38	244.47	0.64	NDVI	0.71	250.35	0.89	0.80	148.32	0.92
		NRI	0.55	295.41	0.82	0.74	166.41	0.89	NRI	0.66	261.77	0.88	0.80	147.67	0.92
		RDVI	0.13	400.36	0.44	0.41	233.53	0.71	RDVI	0.72	247.16	0.89	0.80	148.27	0.92
		REIP	0.15	404.95	0.46	0.68	197.50	0.83	REIP	0.73	228.46	0.91	0.80	147.88	0.92
	RGBVI	0.04	416.42	0.26	0.28	254.41	0.58	RGBVI	0.70	261.30	0.88	0.80	149.33	0.92	
	Exponential	PH	0.85	0.39	0.95	0.85	0.36	0.95							
		GnyLi	0.80	0.42	0.94	0.86	0.33	0.95	GnyLi	0.87	0.36	0.96	0.89	0.31	0.96
		NDVI	0.29	0.77	0.63	0.59	0.54	0.81	NDVI	0.85	0.38	0.95	0.87	0.30	0.96
		NRI	0.81	0.40	0.94	0.87	0.31	0.96	NRI	0.87	0.36	0.96	0.89	0.29	0.96
		RDVI	0.40	0.71	0.73	0.66	0.48	0.87	RDVI	0.85	0.38	0.95	0.88	0.30	0.96
		REIP	0.40	0.75	0.72	0.82	0.43	0.90	REIP	0.85	0.39	0.95	0.89	0.34	0.95
		RGBVI	0.22	0.82	0.55	0.48	0.62	0.75	RGBVI	0.85	0.38	0.95	0.86	0.31	0.96

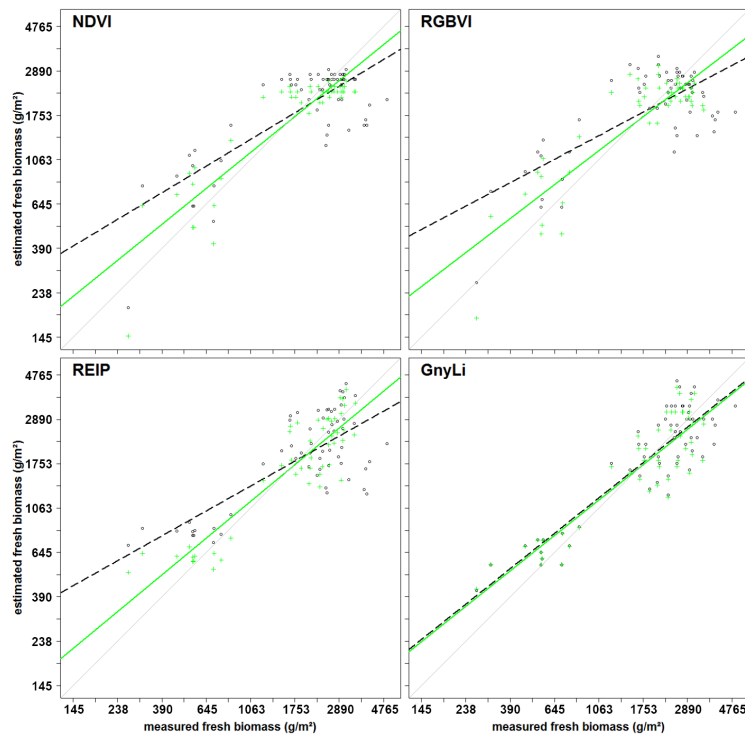
Table 3. Cont.

		Bivariate BRMs						Multivariate BRMs							
		Whole Period			Pre-Anthesis			Whole Period			Pre-Anthesis				
		Estimator	R <sup>2</sup>	RMSE <sup>a</sup>	d	R <sup>2</sup>	RMSE <sup>a</sup>	d	Estimator <sup>b</sup>	R <sup>2</sup>	RMSE <sup>a</sup>	d	R <sup>2</sup>	RMSE <sup>a</sup>	d
Fresh biomass	Linear	PH	0.67	963.45	0.84	0.70	892.55	0.85							
		GnyLi	0.65	970.70	0.83	0.72	886.24	0.84	GnyLi	0.69	939.84	0.85	0.74	861.73	0.86
		NDVI	0.27	1254.02	0.58	0.51	1053.83	0.70	NDVI	0.67	952.58	0.84	0.73	862.84	0.85
		NRI	0.65	962.49	0.83	0.72	873.75	0.85	NRI	0.69	938.46	0.85	0.74	857.99	0.86
		RDVI	0.38	1175.32	0.67	0.59	964.42	0.77	RDVI	0.68	943.96	0.85	0.74	841.36	0.86
		REIP	0.41	1244.11	0.66	0.77	951.74	0.81	REIP	0.67	966.67	0.84	0.77	908.74	0.84
	RGBVI	0.21	1260.32	0.53	0.41	1066.26	0.67	RGBVI	0.66	948.90	0.85	0.71	852.97	0.86	
	Exponential	PH	0.73	0.40	0.89	0.71	0.42	0.88							
		GnyLi	0.78	0.35	0.92	0.79	0.36	0.91	GnyLi	0.79	0.34	0.92	0.80	0.36	0.92
		NDVI	0.44	0.51	0.73	0.64	0.42	0.83	NDVI	0.78	0.34	0.92	0.79	0.34	0.92
		NRI	0.77	0.34	0.92	0.79	0.35	0.92	NRI	0.79	0.34	0.92	0.79	0.35	0.92
		RDVI	0.57	0.44	0.82	0.73	0.36	0.89	RDVI	0.80	0.33	0.93	0.83	0.31	0.93
		REIP	0.54	0.53	0.77	0.82	0.42	0.87	REIP	0.77	0.39	0.90	0.82	0.40	0.88
		RGBVI	0.36	0.54	0.68	0.53	0.47	0.78	RGBVI	0.76	0.34	0.92	0.76	0.34	0.92

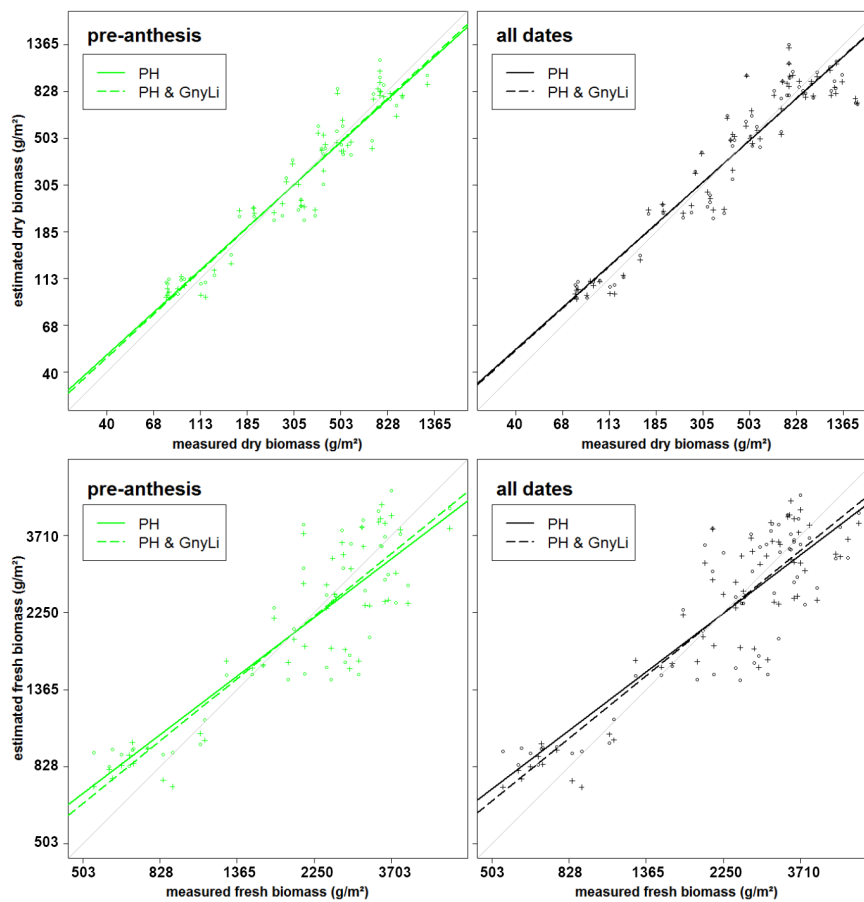
<sup>a</sup> The RMSE for exponential models is calculated from natural log-transformed biomass values; <sup>b</sup> each fused with PH.



**Figure 1.** Correction of Figure 5 [1]. Scatterplots of measured *vs.* estimated dry biomass for one validation data set for NDVI, RGBVI, REIP, and GnyLi (exponential model). Pre-anthesis: crosses and solid green line; whole observed period: circles and dashed black line; 1:1 line: light grey.



**Figure 2.** Correction of Figure 6 [1]. Scatterplots of measured *vs.* estimated fresh biomass for one validation data set for NDVI, RGBVI, REIP, and GnyLi (exponential model). Pre-anthesis: crosses and solid green line; whole observed period: circles and dashed black line; 1:1 line: light grey.



**Figure 3.** Correction of Figure 7 [1]. Scatterplot for one validation data set for the pre-anthesis (green) and for the whole observed period (black) of the bivariate BRM of PH (circles and solid regression line) and multivariate BRM of PH and GnyLi (crosses and dashed regression line) for fresh biomass (top) and dry biomass (bottom) (all exponential models); 1:1 line: light grey.

**Reference**

1. Tilly, N.; Aasen, H.; Bareth, G. Fusion of Plant Height and Vegetation Indices for the Estimation of Barley Biomass. *Remote Sens.* **2015**, *7*, 11449–11480. [CrossRef]



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