

Can We Use Machine Learning For Agricultural Land Suitability Assessments?

Supplementary materials

This document presents the supplementary materials to the manuscript “Can We Use Machine Learning For Agricultural Land Suitability Assessments?” The materials in this document contains 16 pages in total and includes seven tables:

Supplementary Table S1: Overview of the target specialty crops in the study, including their codes in the Danish farmers’ registrations, the corresponding crops in the ECOCROP database, the mean number of fields and cropped area per year in the period 2011 – 2019 for each crop, and the number of training points extracted for training machine learning models.

Supplementary Table S2: Covariates used for machine learning models to predict land suitability for specialty crops, including the mean and range for numeric covariates and number of classes for categorical variables, as well as the data source for each covariate.

Supplementary Table S3: Climatic requirements for each of the crops in the study, according to ECOCROP. GMIN and GMAX: Minimum and maximum length of the growing season (days). KTMP, TMIN, TOPMN, TOPMX, TMAX: Killing, minimum suitable, minimum optimal, maximum optimal, and maximum suitable temperature (°C). RMIN, ROPMN, ROPMX, RMAX: Minimum suitable, minimum optimal, maximum optimal, and maximum suitable total precipitation (mm).

Supplementary Table S4: Soil requirements for growing the crops in the study according to ECOCROP. For texture and drainage, the table lists the suitability of each class, and for pH, it lists the minimum and maximum values for the suitable and optimal thresholds for growth. L: Light texture. M: Medium texture. H: Heavy texture. O: Organic soil. I: Insufficiently drained. W: Well-drained. MIN, OPMN, OPMX, MAX: Minimum suitable, minimum optimal, maximum optimal, maximum suitable soil pH for growing each crop.

Supplementary Table S5: Predictive accuracies of Maxent models trained on land use data. Code: Crop code in the Danish farmers’ registrations. OA: Overall accuracy (fraction of observations correctly predicted). AUC: Area under the receiver operator characteristic curve.

Supplementary Table S6: Predictive accuracies of ECOCROP maps of land suitability, based on datasets with equal numbers of presence and absence observations. OA: Overall accuracy (fraction of observations correctly predicted). AUC: Area under the receiver operator characteristic curve.

Supplementary Table S7: Rank correlations (Spearman's ρ) between suitabilities predicted with Maxent models trained from land use data and by ECOCROP. Code: Code of the crop from the Danish farmers' registrations. Name: Name in the Danish farmers' registrations. ECOCROP code: Code for the crop in the ECOCROP database. ECOCROP name: Name of the crop in the ECOCROP database.

Supplementary Table S1: Overview of the target specialty crops in the study, including their codes in the Danish farmers' registrations, the corresponding crops in the ECOCROP database, the mean number of fields and cropped area per year in the period 2011 – 2019 for each crop, and the number of training points extracted for training machine learning models.

Name (code)	Scientific name	ECO CROP	Fields (n yr ⁻¹)	Area (ha yr ⁻¹)	Training points
Table potatoes (152) ^c	<i>Solanum tuberosum</i>	1	2,797	9,974	13,500
Gherkin (400)	<i>Cucumis sativus</i>	463	42	66	6,517
Asparagus (401)	<i>Asparagus officinalis</i>	353	150	163	12,933
Cauliflower (403)	<i>Brassica oleracea</i> var. <i>botrytis</i>	153	76	372	13,500
Broccoli (404)	<i>Brassica oleracea</i> var. <i>italica</i>	358	51	299	13,500
Kale (406)	<i>Brassica oleracea</i> convar. <i>acephala</i> var. <i>laciniata</i>	41	39	85	7,977
Carrot (407) ^c	<i>Daucus carota</i> subsp. <i>sativus</i>	62	349	2,195	13,500
White cabbage (408)	<i>Brassica oleracea</i> var. <i>capitata</i> f. <i>alba</i>	41	93	257	13,500
Celeriac (410)	<i>Apium graveolens</i> var. <i>rapaceum</i>	367	38	106	10,498
Onions (411)	<i>Allium cepa</i> var. <i>cepa</i>	27	256	1,434	13,500
Parsnip (412)	<i>Pastinaca sativa</i>	442	38	174	13,427
Root parsley (413)	<i>Petroselinum crispum</i> var. <i>tuberosum</i>	385	25	119	11,211
Leek (415)	<i>Allium ampeloprasum</i> var. <i>porrum</i>	446	83	319	13,500
Beet (417)	<i>Beta vulgaris</i> var. <i>conditiva</i>	458	86	331	13,500
Red cabbage (418)	<i>Brassica oleracea</i> var. <i>capitata</i> f. <i>rubra</i>	41	49	183	13,461
Lettuce (420)	<i>Lactuca sativa</i>	63	183	643	13,500
Savoy cabbage (421)	<i>Brassica oleracea</i> var. <i>sabauda</i> L.	41	64	224	12,319

Spinach (422)	<i>Spinacia oleracea</i>	441	44	175	13,480
Sweet corn (423)	<i>Zea mays</i> convar. <i>saccharata</i> var. <i>rugosa</i>	2	154	373	13,500
Peas (424) ^c	<i>Pisum sativum</i>	48	374	2,898	13,500
Jerusalem artichoke (429)	<i>Helianthus tuberosus</i>	460	72	128	12,417
Leaf parsley (430)	<i>Petroselinum crispum</i> var. <i>crispum</i>	385	23	27	2,647
Pumpkin (511, 551, 552, 553) ^a	<i>Cucurbita</i>	163	96	231	12,656
Rhubarb (512)	<i>Rheum rhabarbarum</i>	479	45	52	5,115
Strawberry (513)	<i>Fragaria x ananassa</i>	88	851	1,173	13,500
Black currant (514)	<i>Ribes nigrum</i>	404	400	1,142	13,500
Red currant (515)	<i>Ribes rubrum</i>	405	113	255	13,500
Gooseberry (516)	<i>Ribes uva-crispa</i>	407	23	38	3,650
Raspberry (518)	<i>Rubus idaeus</i>	439	68	30	2,943
Blueberry (519)	<i>Vaccinium corymbosum</i>	391	74	68	6,724
Sour cherry (520, 521) ^b	<i>Prunus cerasus</i>	437	278	915	13,500
Plum (522, 523) ^b	<i>Prunus domestica</i>	98	96	69	6,698
Sweet cherry (524, 525) ^b	<i>Prunus avium</i>	97	118	137	10,884
Elder (526)	<i>Sambucus nigra</i>	-	34	26	2,413
Hazel (527)	<i>Corylus avellana</i>	395	38	32	3,162
Apple (528)	<i>Malus domestica</i>	21	1,090	1,497	13,500
Pear (529)	<i>Pyrus communis</i>	431	251	301	13,500
Wine grape (530)	<i>Vitis vinifera</i>	3	132	76	7,377
Rose hip (534)	<i>Rosa rosgusa</i>	-	49	152	13,045
Tomato (540)	<i>Solanum lycopersicum</i>	17	24	12	1,091
Cucumber (541)	<i>Cucumis sativus</i>	49	27	11	1,049

^a Includes pumpkin (511), butternut pumpkin (551), marrow (552) and gourd (553).

^b The codes include orchards with and without underlying grass cover.

^c Historic data available.

Supplementary Table S2: Covariates used for machine learning models to predict land suitability for specialty crops, including the mean and range for numeric covariates and number of classes for categorical variables, as well as the data source for each covariate.

Description	Mean (range)/ Number of classes	Source
Soil		
Geology, 1 m depth	10 classes	Jakobsen et al. (2015)
Soil drainage class	2.9 (1 - 5)	Møller et al. (2017)
Clay (<2 μm , %), 0 – 30 cm depth	8.2 (0 - 51.2)	Adhikari et al. (2013)
Clay (<2 μm , %), 30 – 60 cm depth	10.1 (0 - 62.7)	Adhikari et al. (2013)
Clay (<2 μm , %), 60 – 100 cm depth	11.2 (0 - 59.1)	Adhikari et al. (2013)
Silt (2 - 20 μm ; %), 0 – 30 cm depth	9.7 (0 - 41.8)	Adhikari et al. (2013)
Silt (2 - 20 μm ; %), 30 – 60 cm depth	9.2 (0 - 45.8)	Adhikari et al. (2013)
Silt (2 - 20 μm ; %), 60 – 100 cm depth	8.4 (0 - 36.3)	Adhikari et al. (2013)
Fine sand (20 - 200 μm ; %), 0 – 30 cm depth	42.8 (0 - 95.9)	Adhikari et al. (2013)
Fine sand (20 - 200 μm ; %), 30 – 60 cm depth	40.5 (0 - 98.4)	Adhikari et al. (2013)
Fine sand (20 - 200 μm ; %), 60 – 100 cm depth	40.3 (0 - 96.9)	Adhikari et al. (2013)
Coarse sand (200 - 2000 μm ; %), 0 – 30 cm depth	39.2 (0 - 98.6)	Adhikari et al. (2013)
Coarse sand (200 - 2000 μm ; %), 30 – 60 cm depth	40.1 (0 - 99.1)	Adhikari et al. (2013)
Coarse sand (200 - 2000 μm ; %), 60 – 100 cm depth	39.8 (0 - 99.7)	Adhikari et al. (2013)
Soil organic matter (%), 0 – 30 cm depth	4.6 (0 - 100)	Adhikari et al. (2014a)
Soil organic matter (%), 30 – 60 cm depth	4.7 (0 - 100)	Adhikari et al. (2014a)
Soil organic matter (%), 60 – 100 cm depth	5.1 (0 - 100)	Adhikari et al. (2014a)
Bulk density (g cm^{-3}), 0 – 30 cm depth	1.43 (0.39 - 1.68)	Adhikari et al. (2014b)
Bulk density (g cm^{-3}), 30 – 60 cm depth	1.46 (0.25 - 2.05)	Adhikari et al. (2014b)
Bulk density (g cm^{-3}), 60 – 100 cm depth	1.54 (0.34 - 1.91)	Adhikari et al. (2014b)
Plant available water (mm), 0 – 30 cm depth	21.8 (3.1 - 194.8)	Adhikari et al. (2013), derived
Plant available water (mm), 30 – 60 cm depth	21.7 (2.8 - 198.9)	Adhikari et al. (2013), derived
Plant available water (mm), 60 – 100 cm depth	22.2 (3 - 195.7)	Adhikari et al. (2013), derived
pH, 0 – 30 cm depth	6.3 (3 - 8.7)	Adhikari et al. (2014b)
pH, 30 – 60 cm depth	6.3 (2.3 - 9.1)	Adhikari et al. (2014b)
pH, 60 – 100 cm depth	6.3 (2.4 - 9.6)	Adhikari et al. (2014b)
Phosphorus sorption capacity (mmol kg^{-1}), 0 – 25 cm depth	13 (2 - 96)	Møller et al. (2020)
Phosphorus sorption capacity (mmol kg^{-1}), 25 – 50 cm depth	14 (2 - 95)	Møller et al. (2020)
Phosphorus sorption capacity (mmol kg^{-1}), 50 – 75 cm depth	13 (2 - 97)	Møller et al. (2020)
Phosphorus sorption capacity (mmol kg^{-1}), 75 – 100 cm depth	11 (1 - 90)	Møller et al. (2020)
Climate		
Mean temperature (°C)	8.1 (7.3 - 9.4)	Worldclim 2
Maximum annual temperature (°C)	18.9 (17.3 - 20.6)	Worldclim 2

Minimum annual temperature (°C)	-3.6 (-5.5 - -0.5)	Worldclim 2
Temperature in warmest quarter (°C)	15.8 (14.9 - 17.4)	Worldclim 2
Temperature in coldest quarter (°C)	1.1 (-0.3 - 2.3)	Worldclim 2
Mean annual precipitation (mm)	704 (447 - 932)	Worldclim 2
Precipitation in wettest month (mm)	79 (50 - 110)	Worldclim 2
Precipitation in driest month (mm)	37 (20 - 52)	Worldclim 2
Degree days above 5 °C	1592 (1401 - 1910)	Worldclim 2, derived
Risk of frost in autumn and spring (%)	3.5 (2.4 - 4.5)	Roell et al. (2020)
Length of the growing season (days)	152 (147 - 159)	Roell et al. (2020)
Mean annual precipitation (mm)	385 (269 - 481)	Roell et al. (2020)
Solar radiation (not considering topography) (MJ m ⁻²)	3078 (2970 - 3340)	Roell et al. (2020)
Potential solar radiation (based on topography) (MJ m ⁻²)	4569 (439 - 6145)	DEM, ArcGIS
Topography		
Elevation above sea level (m)	30.9 (-39.5 - 170.5)	DEM
Slope gradient (°)	1.6 (0 - 90)	DEM, ArcGIS
Sine of the surface aspect	-0.03 (-1 - 1)	DEM, SAGA GIS, R
Cosine of the surface aspect	0.01 (-1 - 1)	DEM, SAGA GIS, R
Topographic wetness index	6 (-16 - 63)	DEM, ArcGIS
SAGA GIS wetness index	14 (7 - 19)	DEM, SAGA GIS, R
Relative slope position	0.17 (0 - 1)	DEM, SAGA GIS, R
Valley depth (m)	7.5 (0 - 89.9)	DEM, SAGA GIS, R
Landscape elements	11 classes	Madsen et al. (1992)
Socio-economy		
Distance to cities with population over 10,000 (m)	12470 (0 - 57054)	Agency for Data Supply and Efficiency (2019), derived
Distance to cities with population over 100,000 (m)	54813 (0 - 171968)	Agency for Data Supply and Efficiency (2019), derived

Supplementary Table S3: Climatic requirements for each of the crops in the study, according to ECOCROP. GMIN and GMAX: Minimum and maximum length of the growing season (days). KTMP, TMIN, TOPMN, TOPMX, TMAX: Killing, minimum suitable, minimum optimal, maximum optimal, and maximum suitable temperature (°C). RMIN, ROPMN, ROPMX, RMAX: Minimum suitable, minimum optimal, maximum optimal, and maximum suitable total precipitation (mm).

ECOCROP name	GMIN	GMAX	KTMP	TMIN	TOPMN	TOPMX	TMAX	RMIN	ROPMN	ROPMX	RMAX
Potato	90	160	-1	7	15	25	30	250	500	800	2000
Maize	65	365	0	10	18	33	47	400	600	1200	1800
European wine grape	160	270	0	10	18	30	38	400	700	850	1200
Tomato	70	150	0	7	20	27	35	400	600	1300	1800
Apple	180	320	-2	6	10	30	35	400	900	1200	1800
Onion	85	175	0	4	12	25	30	300	350	600	2800
Cabbage	60	200	-10	7	15	24	32	300	500	1000	2500
Pea	60	140	-2	4	10	24	30	350	800	1200	2500
Cucumber	40	180	0	6	18	32	38	400	1000	1200	4300
Carrot	40	150	-1	3	15	24	30	400	600	1200	4000
Lettuce	35	85	-1	5	12	21	30	900	1100	1400	4100
Garden strawberry	180	270	0	6	11	24	28	300	600	900	1700
Cherry, Sweet	180	240	-3	6	18	28	40	300	500	900	1500
Plum	180	210	-2	6	18	33	36	600	900	1500	1800
Cauliflower	60	120	-5	5	10	25	30	450	600	1100	1900
Pumpkin	80	140	0	10	20	30	40	300	600	1600	2800
Asparagus	210	270	-5	6	15	30	38	500	800	1200	4000
Sprouting broccoli	80	120	0	3	15	24	35	350	900	1500	2000
Celeriac	80	270	-5	7	15	25	26	700	1000	1200	1700
Parsley	70	365	-5	7	11	20	28	300	900	1500	2800
Highbush blueberry	160	200	-29	7	18	30	42	700	900	1100	1300
European hazelnut	150	210	-3	5	10	24	35	600	900	1100	1400
Black currant	150	180	-28	5	17	25	30	500	700	900	1100
Red currant	150	180	-10	5	10	22	25	500	800	1200	1700
European gooseberry	150	180	-28	3	15	25	40	500	900	1300	1700

Pear	180	270	-34	10	20	35	37	400	600	900	2100
Cherry, Sour	180	240	-4	4	15	25	30	500	800	1600	2700
Red raspberry	120	180	-35	5	17	23	28	300	800	1200	1700
Spinach	40	120	-7	2	13	20	27	300	800	1200	1700
Parsnip	80	150	-5	5	15	21	25	300	500	800	1100
Leek	120	150	0	6	18	24	27	350	750	1000	2800
Garden beet	55	90	-2	5	15	25	30	500	800	1500	2500
Jerusalem artichoke	80	150	0	7	15	27	30	300	700	1500	2000
West Indian gherkin	40	80	0	8	21	28	32	300	800	1000	1700
Garden rhubarb	60	330	0	5	15	24	30	400	800	1300	2000

Supplementary Table S4: Soil requirements for growing the crops in the study according to ECOCROP. For texture and drainage, the table lists the suitability of each class, and for pH, it lists the minimum and maximum values for the suitable and optimal thresholds for growth. L: Light texture. M: Medium texture. H: Heavy texture. O: Organic soil. I: Insufficiently drained. W: Well-drained. MIN, OPMN, OPMX, MAX: Minimum suitable, minimum optimal, maximum optimal, maximum suitable soil pH for growing each crop.

ECOCROP name	Texture				Drainage		pH			
	L	M	H	O	I	W	MIN	OPMN	OPMX	MAX
Potato	0.5	1	0.5	1	0	1	4.2	5.0	6.2	8.5
Maize	0.5	1	0.5	1	0	1	4.5	5.0	7.0	8.5
European wine grape	0.5	1	0.5	1	0	1	4.5	5.5	7.5	8.5
Tomato	0.5	1	0.5	1	0	1	5.0	5.5	6.8	7.5
Apple	1	1	0.5	0.5	0	1	4.5	6.2	7.0	8.2
Onion	0.5	1	0.5	1	0	1	4.3	6.0	7.0	8.3
Cabbage	0.5	1	0.5	1	0	1	5.0	6.0	7.5	8.3
Pea	1	1	1	1	0	1	4.5	5.5	7.0	8.3
Cucumber	0.5	1	0.5	1	0	1	4.5	6.0	7.5	8.7
Carrot	0.5	1	0.5	1	0	1	4.2	5.8	6.8	8.7
Lettuce	1	1	0.5	0.5	0	1	4.2	6.0	7.0	7.5
Garden strawberry	0.5	1	0	1	0	1	4.5	6.0	6.8	8.2
Cherry, Sweet	0.5	1	1	0.5	0	1	4.5	5.5	6.5	7.0
Plum	0.5	1	1	0.5	0	1	4.5	5.5	6.1	7.4
Cauliflower	0.5	1	0.5	0.5	0	1	5.5	6.0	7.0	8.5
Collards	1	1	1	1	0	1	4.5	5.4	6.0	8.3
Pumpkin	0.5	1	0.5	1	0	1	4.5	5.5	7.5	8.3
Asparagus	0.5	1	0	1	0	1	4.5	6.0	6.7	8.2
Sprouting broccoli	0.5	1	0.5	1	0	1	5.5	6.0	6.8	8.5
Celeriac	0.5	1	0.5	1	0.5	1	5.3	6.0	6.8	8.3
Parsley	0.5	1	0.5	1	0	1	5.3	6.0	7.5	8.3
Highbush blueberry	0.5	1	0.5	1	0	1	4.0	4.5	5.0	5.5
European hazelnut	0.5	1	0.5	0.5	0	1	5.5	6.0	6.5	7.5
Eastern elderberry	0	1	0.5	0	0.5	1	5.3	6.0	6.5	7.3
Black currant	0.5	1	0.5	0.5	0	1	6.0	6.5	7.5	8.0
Red currant	0.5	1	1	0.5	0	1	6.0	6.5	7.5	8.0
European gooseberry	0	0.5	1	0	0	1	5.0	6.0	7.0	7.5
Pear	0.5	1	1	0.5	0	1	4.5	5.5	6.5	8.3

Cherry, Sour	0.5	1	0.5	0.5	0	1	4.5	6.0	6.5	7.5
Red raspberry	0.5	1	0	1	0	1	4.5	5.5	6.5	7.8
Spinach	1	1	0.5	0.5	0	1	5.3	6.0	7.5	8.3
Parsnip	0.5	1	0.5	0.5	0	1	5.8	6.0	6.8	8.3
Leek	0.5	1	0.5	1	0	1	4.5	6.0	6.5	7.5
Garden beet	1	1	0.5	0.5	0	1	5.0	6.0	6.8	8.3
Jerusalem artichoke	0.5	1	0.5	1	0	1	4.5	6.0	6.6	8.3
West Indian gherkin	0.5	1	0.5	1	0	1	5.5	6.0	7.5	8.3
Garden rhubarb	0.5	1	0.5	1	0	1	5.3	6.0	7.0	7.8

Supplementary Table S5: Predictive accuracies of Maxent models trained on land use data. Code: Crop code in the Danish farmers' registrations. OA: Overall accuracy (fraction of observations correctly predicted). AUC: Area under the receiver operator characteristic curve.

Code	Name	OA	AUC
152	Table potatoes	0.78	0.78
400	Gherkin	0.65	0.65
401	Asparagus	0.75	0.75
403	Cauliflower	0.71	0.71
404	Broccoli	0.85	0.85
406	Kale	0.66	0.66
407	Carrot	0.84	0.84
408	White cabbage	0.77	0.77
410	Celeriac	0.73	0.74
411	Onions	0.86	0.86
412	Parsnip	0.80	0.80
413	Root parsley	0.80	0.79
415	Leek	0.75	0.75
417	Beet	0.80	0.80
418	Red cabbage	0.84	0.84
420	Lettuce	0.78	0.78
421	Savoy cabbage, pointed cabbage	0.71	0.71
422	Spinach	0.69	0.68
423	Sweet corn	0.74	0.73
424	Peas	0.86	0.86
429	Jerusalem artichoke	0.76	0.76
430	Leaf parsley	0.70	0.70
511	Pumpkin	0.81	0.81
512	Rhubarb	0.68	0.68
513	Strawberry	0.68	0.68
514	Blackcurrant	0.74	0.74
515	Redcurrant	0.61	0.61
516	Gooseberry	0.55	0.55
518	Raspberry	0.55	0.55
519	Blueberry	0.49	0.49
520	Sour cherry	0.76	0.76
522	Plum	0.60	0.62
524	Sweet cherry	0.68	0.68
526	Elder	0.50	0.50
527	Hazel	0.49	0.50
528	Apple	0.79	0.79

529	Pear	0.73	0.73
530	Wine grape	0.67	0.67
534	Rose hip	0.54	0.54
540	Tomato	0.50	0.50
541	Cucumber	0.58	0.59

Supplementary Table S6: Predictive accuracies of ECOCROP maps of land suitability, based on datasets with equal numbers of presence and absence observations. OA: Overall accuracy (fraction of observations correctly predicted). AUC: Area under the receiver operator characteristic curve.

ECOCROP code	Name	OA	AUC
1	Potato	0.49	0.49
2	Maize	0.51	0.50
3	European wine grape	0.50	0.50
17	Tomato	0.45	0.70
21	Apple	0.50	0.50
27	Onion	0.49	0.51
41	Cabbage	0.50	0.57
48	Pea	0.49	0.50
49	Cucumber	0.51	0.67
62	Carrot	0.50	0.42
63	Lettuce	0.50	0.50
88	Garden strawberry	0.51	0.50
97	Cherry, Sweet	0.50	0.76
98	Plum	0.48	0.71
153	Cauliflower	0.50	0.50
163	Pumpkin	0.50	0.71
353	Asparagus	0.49	0.49
358	Sprouting broccoli	0.49	0.47
367	Celeriac	0.50	0.64
385	Parsley	0.51	0.48
391	Highbush blueberry	0.50	0.49
395	European hazelnut	0.51	0.40
404	Black currant	0.49	0.70
405	Red currant	0.51	0.70
407	European gooseberry	0.61	0.66
431	Pear	0.50	0.50
437	Cherry, Sour	0.49	0.71
439	Red raspberry	0.63	0.60
441	Spinach	0.49	0.50
442	Parsnip	0.50	0.36
446	Leek	0.52	0.49
458	Garden beet	0.50	0.50
460	Jerusalem artichoke	0.50	0.50
463	West Indian gherkin	0.50	0.75
479	Garden rhubarb	0.48	0.74

Supplementary Table S7: Rank correlations (Spearman's ρ) between suitabilities predicted with Maxent models trained from land use data and by ECOCROP. Code: Code of the crop from the Danish farmers' registrations. Name: Name in the Danish farmers' registrations. ECOCROP code: Code for the crop in the ECOCROP database. ECOCROP name: Name of the crop in the ECOCROP database.

Code	Name	ECOCROP code	ECOCROP name	Rank correlation
152	Table potatoes	1	Potato	-0.38
400	Gherkin	463	West Indian gherkin	0.60
401	Asparagus	353	Asparagus	-0.09
403	Cauliflower	153	Cauliflower	0.33
404	Broccoli	358	Sprouting broccoli	0.08
406	Kale	41	Cabbage	0.30
407	Carrot	62	Carrot	-0.22
408	White cabbage	41	Cabbage	0.39
410	Celeriac	367	Celeriac	0.22
411	Onions	27	Onion	-0.11
412	Parsnip	442	Parsnip	0.17
413	Root parsley	385	Parsley	-0.18
415	Leek	446	Leek	-0.05
417	Beet	458	Garden beet	0.07
418	Red cabbage	41	Cabbage	0.38
420	Lettuce	63	Lettuce	0.15
421	Savoy cabbage, pointed cabbage	41	Cabbage	0.28
422	Spinach	441	Spinach	0.41
423	Sweet corn	2	Maize	0.00
424	Peas	48	Pea	-0.06
429	Jerusalem artichoke	460	Jerusalem artichoke	-0.04
430	Leaf parsley	385	Parsley	-0.13
511	Pumpkin	163	Pumpkin	0.38
512	Rhubarb	479	Garden rhubarb	0.22
513	Strawberry	88	Garden strawberry	0.00
514	Blackcurrant	404	Black currant	0.42
515	Redcurrant	405	Red currant	0.49
516	Gooseberry	407	European gooseberry	0.29
518	Raspberry	439	Red raspberry	0.04
519	Blueberry	391	Highbush blueberry	0.13
520	Sour cherry	437	Cherry, Sour	0.00
522	Plum	98	Plum	-0.09
524	Sweet cherry	97	Cherry, Sweet	0.09
527	Hazel	395	European hazelnut	0.05

528	Apple	21	Apple	0.00
529	Pear	431	Pear	0.00
530	Wine grape	3	European wine grape	0.00
540	Tomato	17	Tomato	0.17
541	Cucumber	49	Cucumber	0.47
