

Monitor. Forecast. Decide better.

ABIM 2018

by **EFOS**

Timing problem

..."a type of parasitic wasp, targets all larval stages of leaf miners,

specifically the second and third one.

Host feeding takes place when adult female wasp kills the larva inside the leaf mine",...

..."apply at <u>first egg hatch</u> based on pheromone trap catches and degree days after biofix dates. These pests must be controlled <u>before the larvae penetrate</u> <u>the fruit so early timing is critical</u>"....



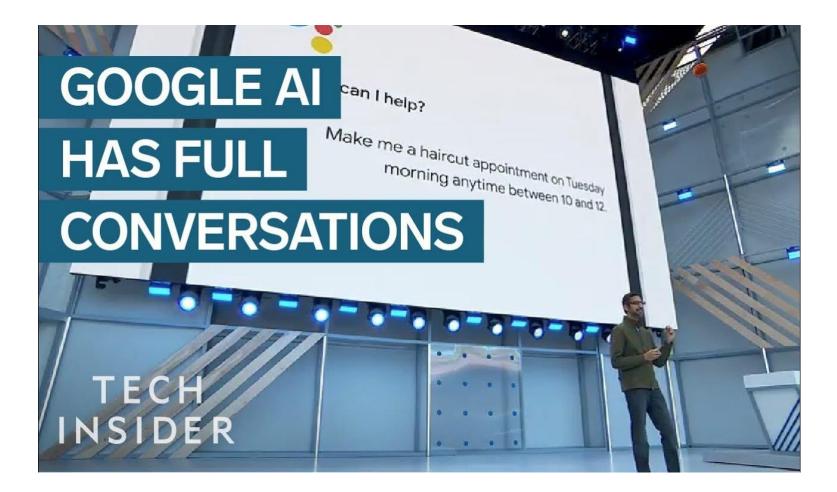
Reality check

<30 readings throughout the season

Labor intensive

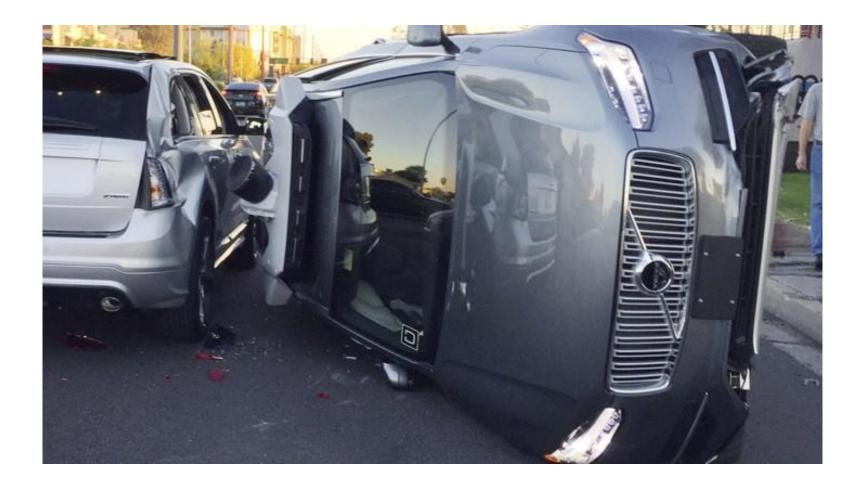


Popularity of Al





Not almighty...





Data, Data, Data...

Quantity

Quality

Understanding

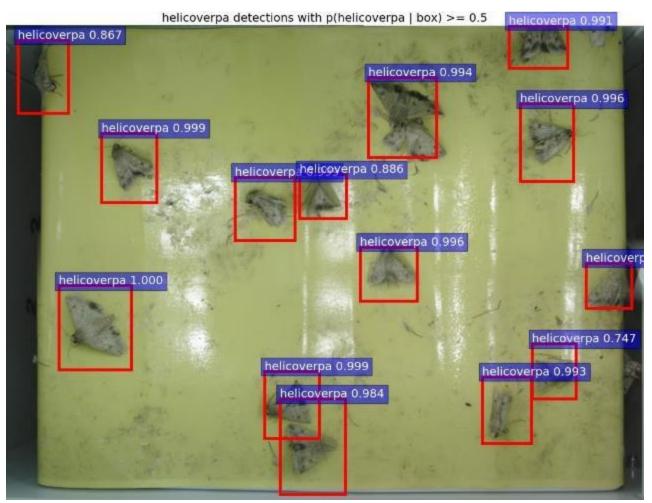


Automated, frequent, reliable and accurate pest data collection





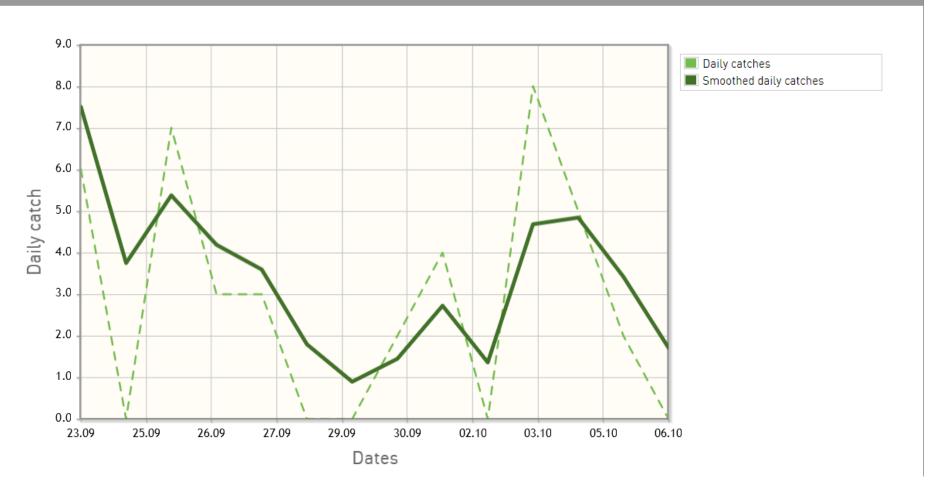
Deep learning used for automated pest marking and counting insects





Identifying peaks

Daily catches chart

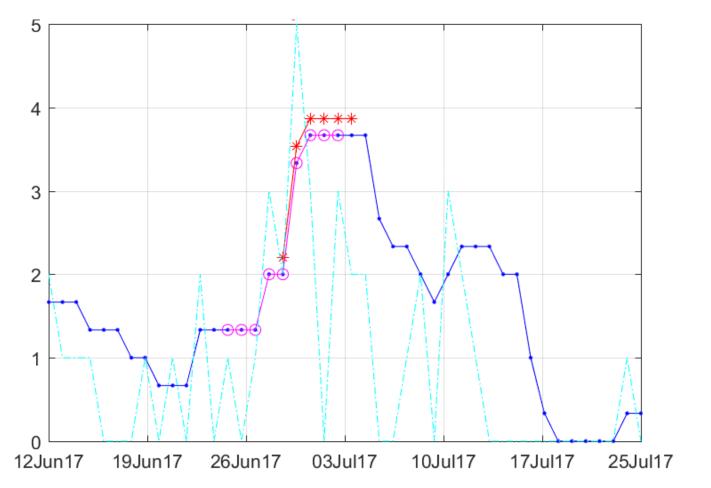




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Trapview: Decision Support System

Trapview predictive service



Red Asterisk – forecast of pest population growth



Timing problem

..."a type of parasitic wasp, targets all larval stages of leaf miners,

specifically the second and third one.

Host feeding takes place when adult female wasp kills the larva inside the leaf mine",...

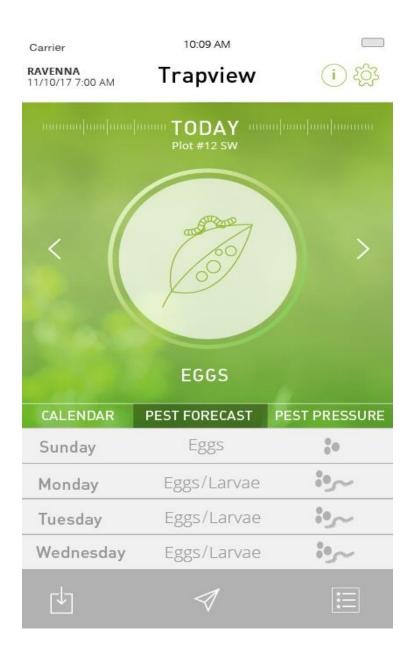
..."apply at <u>first egg hatch</u> based on pheromone trap catches and degree days after biofix dates. These pests must be controlled <u>before the larvae penetrate</u> <u>the fruit so early timing is critical</u>"....



Device monitoring info

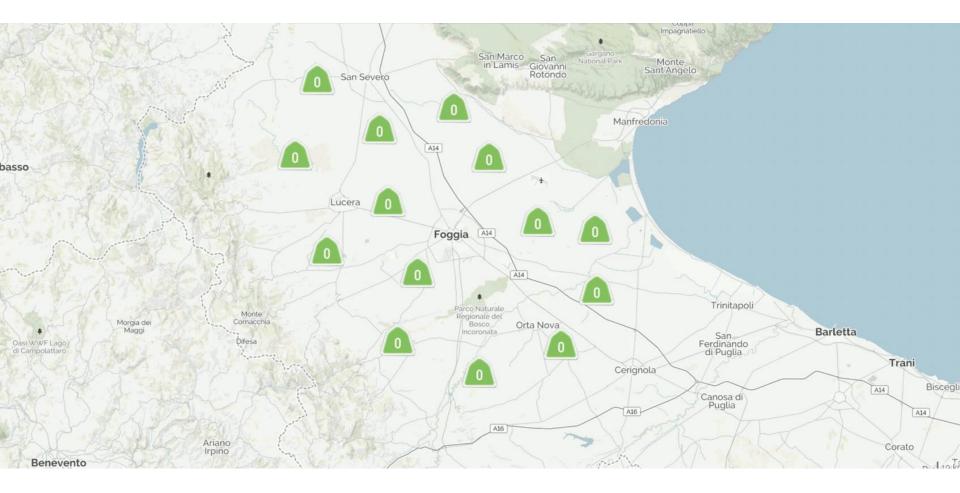
Pest*	Native budworm (Helicoverpa punctigera)
Valid from *	26.07.2017 00:00:00
Сгор *	Peas (Pisum sativum)
Valid from *	05.09.2018 07:19:20
Protection measure *	Spraying 💿
Valid from *	05.09.2018 07:19:20
Location name *	Hornsdale - Field Peas
Location details	Hornsdale Props, Don's 92 Hornsdale
Valid from *	06.09.2018 04:32:00
Area radius (KM)	1







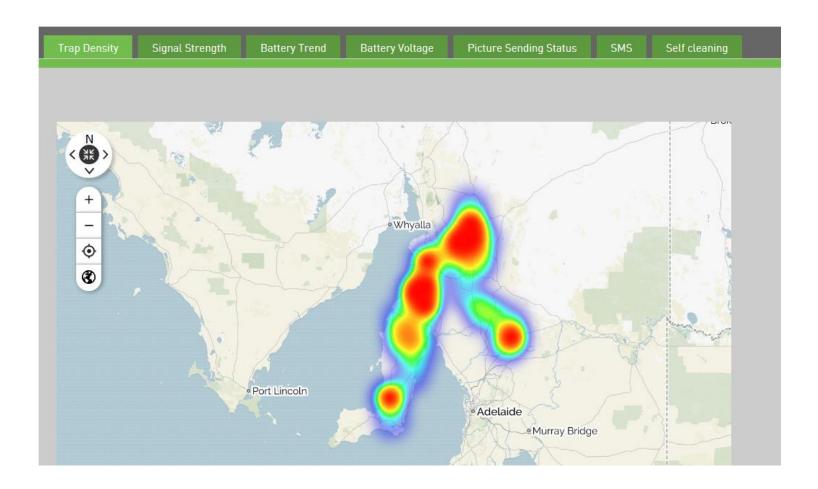
Area-wide overview



Population overview, accumulated pest pressure, trends,...



Area-wide overview – network density map





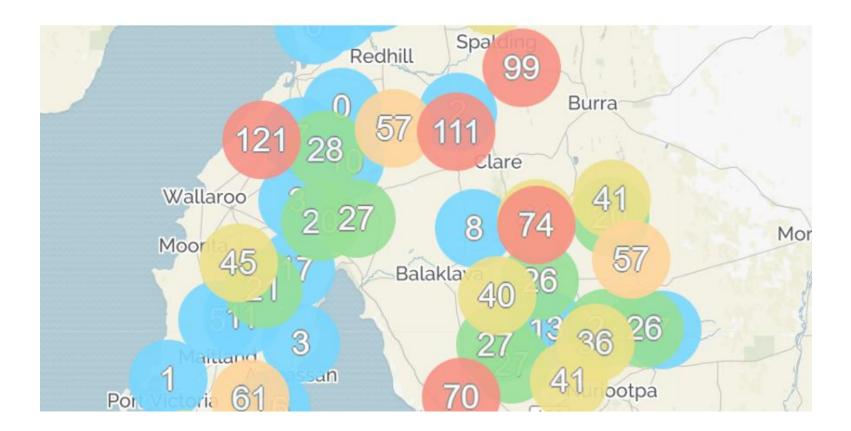
Area-wide network health

nal Strength	Battery Trend	Battery Voltage	Picture Sending	Status				
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ow table 🕅 🗉	KCEL EXPORT	CSV EXPORT	CHART EXPORT	RESET TABLE				
ow table 🗹 🛛 EX	KCEL EXPORT	CSV EXPORT	CHART EXPORT	RESET TABLE				
ow table 🗹 💽 EX	KCEL EXPORT	CSV EXPORT 18.06.2017	CHART EXPORT 19.06.2017	RESET TABLE 20.06.2017	21.06.2017	22.06.2017	23.06.2017	24.06.2017
					21.06.2017 4.15785	22.06.2017 4.160842	23.06.2017 4.133166	24.06.2017 4.110975
DEVICE NO. S01202 S01235	17.06.2017 4.114154 4.152177	18.06.2017 4.158286 4.118829	19.06.2017 4.13728 4.120076	20.06.2017 4.114154 4.132043	4.15785 4.103245	4.160842 4.105989	4.133166 4.110975	4.110975 4.095392
DEVICE NO. S01202 S01235 S03479	17.06.2017 4.114154 4.152177 4.225731	18.06.2017 4.158286 4.118829 4.197245	19.06.2017 4.13728 4.120076 4.22704	20.06.2017 4.114154 4.132043 4.227477	4.15785 4.103245 4.227103	4.160842 4.105989 4.226729	4.133166 4.110975 4.197993	4.110975 4.095392 4.200486
DEVICE NO. S01202 S01235 S03479 S03483	17.06.2017 4.114154 4.152177 4.225731 4.202169	18.06.2017 4.158286 4.118829 4.197245 4.166389	19.06.2017 4.13728 4.120076 4.22704 4.20753	20.06.2017 4.114154 4.132043 4.227477 4.197556	4.15785 4.103245 4.227103 4.197556	4.160842 4.105989 4.226729 4.199738	4.133166 4.110975 4.197993 4.197556	4.110975 4.095392 4.200486 4.195936
DEVICE NO. S01202 S01235 S03479 S03483 S03486	17.06.2017 4.114154 4.152177 4.225731 4.202169 4.090779	18.06.2017 4.158286 4.118829 4.197245 4.166389 4.047207	19.06.2017 4.13728 4.120076 4.22704 4.20753 4.070832	20.06.2017 4.114154 4.132043 4.227477 4.197556 4.105302	4.15785 4.103245 4.227103 4.197556 4.104928	4.160842 4.105989 4.226729 4.199738 4.100752	4.133166 4.110975 4.197993 4.197556 4.102435	4.110975 4.095392 4.200486 4.195936 4.094145
DEVICE NO. S01202 S01235 S03479 S03483 S03486 S03487	17.06.2017 4.114154 4.152177 4.225731 4.202169 4.090779 4.204164	18.06.2017 4.158286 4.118829 4.197245 4.166389 4.047207 4.157289	19.06.2017 4.13728 4.120076 4.22704 4.20783 4.070832 4.208029	20.06.2017 4.114154 4.132043 4.227477 4.197556 4.105302 4.209213	4.15785 4.103245 4.227103 4.197556 4.104928 4.205099	4.160842 4.105989 4.226729 4.199738 4.100752 4.205847	4.133166 4.110975 4.197993 4.197556 4.102435 4.205411	4.110975 4.095392 4.200486 4.195936 4.094145 4.205411
DEVICE NO. S01202 S01235 S03479 S03483 S03484 S03486 S03487 S03487	17.06.2017 4.114154 4.152177 4.225731 4.202169 4.090779 4.204164 4.202543	18.06.2017 4.158236 4.118829 4.197245 4.166339 4.047207 4.157289 4.160281	19.06.2017 4.13728 4.120076 4.22704 4.20753 4.070832 4.070832 4.208029 4.197993	20.06.2017 4.114154 4.132043 4.227477 4.197556 4.105302 4.209213 4.197245	4.15785 4.103245 4.227103 4.197556 4.104928 4.205099 4.19338	4.160842 4.105989 4.226729 4.199738 4.100752 4.205847 4.187583	4.133166 4.110975 4.197993 4.197556 4.102435 4.205411 4.190076	4.110975 4.095392 4.200486 4.195936 4.094145 4.205411 4.192195
DEVICE NO. S01202 S01235 S03479 S03483 S03486 S03487 S03487 S03491 S03509	17.06.2017 4.114154 4.152177 4.225731 4.202169 4.090779 4.204164 4.202543 4.203852	18.06.2017 4.158286 4.118829 4.197245 4.166389 4.047207 4.157289 4.160281 4.160281 4.15143	19.06.2017 4.13728 4.120076 4.22704 4.20783 4.070832 4.070832 4.208029 4.197993 4.205909	20.06.2017 4.114154 4.132043 4.227477 4.197554 4.105302 4.209213 4.197245 4.205535	4.15785 4.103245 4.227103 4.197556 4.104928 4.205099 4.19338 4.20192	4.160842 4.105989 4.226729 4.199738 4.100752 4.205847 4.187583 4.199614	4.133166 4.110975 4.197993 4.197556 4.102435 4.205411 4.190076 4.199427	4.110975 4.095392 4.200486 4.195936 4.094145 4.205411 4.192195 4.191323
DEVICE NO. S01202 S01235 S03479 S03483 S03486 S03486 S03487 S03509 S03509 S03515	17.06.2017 4.114184 4.182177 4.225731 4.202169 4.090779 4.204164 4.202543 4.203852 4.203852 4.22704	18.06.2017 4.155286 4.118829 4.197245 4.165389 4.047207 4.157289 4.160281 4.15143 4.180103	19.06.2017 4.13728 4.120076 4.22704 4.20753 4.070832 4.208029 4.197993 4.205909 4.225918	20.06.2017 4.114154 4.132043 4.227477 4.197856 4.105302 4.209213 4.197245 4.205535 4.224609	4.15785 4.103245 4.227103 4.197556 4.104928 4.205099 4.19338 4.20192 4.224173	4.160842 4.105989 4.226729 4.199738 4.100752 4.205847 4.107583 4.197814 4.21875	4.133166 4.110975 4.197993 4.197556 4.102435 4.205411 4.190076 4.199427 4.217939	4.110975 4.095392 4.200486 4.195936 4.205411 4.192195 4.191323 4.219623
DEVICE NO. S01202 S01235 S03479 S03483 S03486 S03487 S03491 S03599 S03515 S03496	17.06.2017 4.114154 4.152177 4.225731 4.202169 4.090779 4.204164 4.202543 4.203852	18.06.2017 4.158286 4.118829 4.197245 4.166389 4.047207 4.157289 4.160281 4.160281 4.15143	19.06.2017 4.13728 4.120076 4.22704 4.20753 4.070832 4.208029 4.197993 4.205909 4.225918 4.219685	20.06.2017 4.114154 4.132043 4.227477 4.197556 4.105302 4.209213 4.197245 4.205535 4.205535 4.224609 4.18135	4.15785 4.103245 4.227103 4.197556 4.104928 4.205099 4.19338 4.20192 4.224173 4.224173 4.21501	4.160842 4.105989 4.226729 4.199738 4.100752 4.205847 4.187583 4.197814 4.21875 4.168945	4.133166 4.110975 4.197993 4.197556 4.102435 4.205411 4.190076 4.199427 4.217939 4.216381	4.110975 4.095392 4.200486 4.195936 4.094145 4.205411 4.192195 4.191323
DEVICE NO. S01202 S01235 S03479 S03483 S03486 S03486 S03487 S03509 S03509 S03515	17.06.2017 4.114154 4.152177 4.225731 4.202169 4.090779 4.202164 4.202543 4.202852 4.22704 4.163024	18.06.2017 4.158286 4.118829 4.197245 4.166389 4.047207 4.167289 4.160281 4.15143 4.150103 4.17094	19.06.2017 4.13728 4.120076 4.22704 4.20753 4.070832 4.208029 4.197993 4.205909 4.225918 4.219685	20.06.2017 4.114154 4.132043 4.227477 4.197556 4.105302 4.209213 4.197245 4.205535 4.2224609 4.18135 3.927464	4.15785 4.103245 4.227103 4.197556 4.104928 4.205099 4.19338 4.20192 4.224173 4.22192 4.224173 4.21501 4.187708	4.160842 4.105989 4.226729 4.199738 4.100752 4.205847 4.187583 4.199614 4.21875 4.168945 4.200611	4.133166 4.110975 4.197993 4.197556 4.102435 4.205411 4.199076 4.199427 4.217939 4.216381 4.165579	4.110975 4.095392 4.200486 4.195936 4.094145 4.205411 4.192195 4.191323 4.219423 4.163896
DEVICE NO. \$01202 \$01235 \$03483 \$03483 \$03484 \$03487 \$03487 \$03487 \$03509 \$03515 \$03553 \$03523 \$03523 \$03562	17.06.2017 4.114154 4.152177 4.225731 4.202169 4.090779 4.204164 4.202543 4.203852 4.22704 4.163024	18.06.2017 4.158286 4.118829 4.197245 4.166389 4.047207 4.157289 4.160281 4.160281 4.15143 4.180103 4.17094	19.06.2017 4.13728 4.120076 4.22704 4.20753 4.070832 4.208029 4.197993 4.205909 4.225918 4.219685	20.06.2017 4.114154 4.132043 4.227477 4.197556 4.105302 4.209213 4.197245 4.205535 4.222609 4.18135 3.927464 3.780731	4.15785 4.103245 4.227103 4.197556 4.104928 4.205099 4.19338 4.20192 4.224173 4.224173 4.21501	4.140842 4.105989 4.224729 4.199738 4.100752 4.205847 4.187583 4.199614 4.21875 4.168945 4.200611 3.914561	4.133166 4.110975 4.197993 4.197556 4.102435 4.205411 4.190076 4.199427 4.217939 4.216381 4.165579 3.938497	4.110975 4.095392 4.200486 4.195936 4.094145 4.205411 4.192195 4.191323 4.219623 4.163896
DEVICE NO. S01202 S01235 S03429 S03483 S03484 S03487 S03487 S03491 S03509 S03515 S03546 S03523 S03562 S03513	17.06.2017 4.114154 4.152177 4.225731 4.202169 4.090779 4.204164 4.202543 4.203852 4.22704 4.183024 3.854721	18.06.2017 4.158286 4.118829 4.197245 4.166389 4.047207 4.157289 4.160281 4.150281 4.15103 4.150103 4.17094 3.829039	19.06.2017 4.13728 4.120076 4.22704 4.20753 4.070832 4.208029 4.197993 4.205909 4.225918 4.219685 - - 3.805228	20.06.2017 4.114154 4.132043 4.227477 4.197556 4.105302 4.209213 4.197245 4.205335 4.2224609 4.18135 3.927464	4.15785 4.103245 4.227103 4.197556 4.205099 4.19338 4.20192 4.2224173 4.221501 4.187708 3.915372	4.160842 4.105989 4.226729 4.199738 4.100752 4.205847 4.187583 4.199614 4.21875 4.168945 4.200611 3.914561	4.133166 4.110975 4.197993 4.197556 4.102435 4.205411 4.190076 4.199427 4.217939 4.216381 4.165579 3.938497 3.665849	4.110975 4.095392 4.200486 4.195936 4.094145 4.205411 4.192195 4.191323 4.219423 4.163896
DEVICE NO. S01202 S01225 S03483 S03484 S03486 S03487 S03487 S03491 S03509 S03515 S03496 S03515 S03562 S03562	17.06.2017 4.114184 4.182177 4.225731 4.202169 4.204164 4.202543 4.203852 4.203852 4.22704 4.143024 3.854721 3.663169	18.06.2017 4.155226 4.118229 4.197245 4.16339 4.047207 4.157289 4.160281 4.15143 4.180103 4.17094 3.829039	19.06.2017 4.13728 4.120076 4.22704 4.20753 4.070832 4.208029 4.197993 4.205909 4.225918 4.219685 - - 3.805228	20.06.2017 4.114154 4.132043 4.227477 4.197555 4.105302 4.209213 4.197245 4.205535 4.224609 4.18135 3.927464 3.780731 -	4.18785 4.103245 4.227103 4.197556 4.104928 4.205099 4.19338 4.20192 4.224173 4.21501 4.187708 3.915372	4.160842 4.105989 4.226729 4.199738 4.205847 4.187583 4.199614 4.21875 4.168945 4.168945 4.200611 3.914561 -	4.133166 4.110975 4.197953 4.197956 4.102435 4.205411 4.190076 4.199427 4.21739 4.216381 4.165579 3.938497 3.665849 4.192882	4.110975 4.095392 4.200486 4.195936 4.094145 4.205411 4.192195 4.191323 4.219623 4.163896
DEVICE NO. S01202 S01225 S03479 S03483 S03486 S03487 S03497 S03509 S03509 S03509 S03515 S03496 S03562 S03566 S03566	17.06.2017 4.114154 4.152177 4.225731 4.202169 4.090779 4.204164 4.202543 4.203852 4.22704 4.183024 3.854721	18.06.2017 4.155286 4.118229 4.197245 4.165389 4.047207 4.157289 4.160281 4.15143 4.180103 4.17094 - 3.829039 - - - - - - - - - - - - -	19.06.2017 4.13728 4.120076 4.22704 4.20753 4.070832 4.208029 4.197993 4.205909 4.225918 4.219685 3.805228	20.06.2017 4.114154 4.132043 4.227477 4.197856 4.105302 4.209213 4.197245 4.205535 4.224609 4.18135 3.927464 3.780731 -	4.15785 4.103245 4.227103 4.197556 4.104928 4.205099 4.19338 4.20192 4.224173 4.21901 4.187708 3.915372 - - 3.629509 3.637986	4.160842 4.105989 4.226729 4.199738 4.100752 4.205847 4.187583 4.199614 4.21875 4.168945 4.200611 3.914561	4.133166 4.110975 4.197993 4.197556 4.102435 4.205411 4.190076 4.199427 4.217939 4.216381 4.165579 3.938497 3.665849	4.110975 4.095392 4.200486 4.195936 4.205411 4.192195 4.191323 4.219623 4.163896 - - 3.971036 3.65413 4.147689 3.973217
DEVICE NO. S01202 S01202 S03479 S03483 S03486 S03487 S03497 S03597 S03597 S03597 S03597 S03552 S03562 S03564 S03561 S03564	17.06.2017 4.114154 4.152177 4.225731 4.202169 4.090779 4.204164 4.202543 4.203852 4.22704 4.163024 3.854721 3.663169 3.661557	18.06.2017 4.155226 4.118229 4.197245 4.16339 4.047207 4.157289 4.160281 4.15143 4.180103 4.17094 3.829039	19.06.2017 4.13728 4.120076 4.22704 4.20783 4.070832 4.208029 4.197993 4.205909 4.225918 4.219685 3.805228	20.06.2017 4.114154 4.132043 4.227477 4.197555 4.105302 4.209213 4.197245 4.205535 4.224609 4.18135 3.927464 3.780731 -	4.18785 4.103245 4.227103 4.197556 4.104928 4.205099 4.19338 4.20192 4.224173 4.21501 4.187708 3.915372	4.140842 4.105989 4.226729 4.199738 4.100752 4.205847 4.187583 4.199614 4.21875 4.18945 4.18945 4.200411 3.914561 - 3.707987 3.713472	4.133166 4.110975 4.197993 4.197556 4.102435 4.205411 4.190076 4.199427 4.217939 4.216381 4.165579 3.938497 3.645849 4.192882 3.806537	4.110975 4.095392 4.200486 4.195936 4.094145 4.094145 4.195195 4.195195 4.195195 4.19523 4.219623 4.163896 - - 3.971036 3.65413 4.147689 3.973217 4.112035
DEVICE NO. S01202 S01202 S03479 S03483 S03486 S03487 S03487 S03491 S03509 S03515 S03549 S03562 S03564 S03564 S03564	17.06.2017 4.114184 4.152177 4.225731 4.202169 4.090779 4.204164 4.202543 4.202543 4.202543 4.202543 4.202543 4.202543 4.22704 4.163024 - 3.854721 - 3.663169 3.681557	18.06.2017 4.155226 4.115229 4.197245 4.165389 4.047207 4.157289 4.160281 4.15743 4.180103 4.17094 - - - - - - - - - - - - -	19.06.2017 4.13728 4.120076 4.22704 4.20753 4.070832 4.208029 4.205909 4.225918 4.219685 - - - - - - - -	20.06.2017 4.114154 4.132043 4.227477 4.197556 4.105302 4.209213 4.197245 4.205355 4.204535 4.205535 4.224609 4.18135 3.927464 3.780791 - - -	4.15785 4.103245 4.227103 4.197556 4.104928 4.205099 4.19338 4.20192 4.224173 4.21501 4.187708 3.915372 3.629509 3.637986	4.160842 4.105989 4.226729 4.199738 4.100752 4.205847 4.197583 4.199614 4.21875 4.18845 4.200611 3.914561 - 3.707987 3.713472	4.133166 4.110975 4.197993 4.197955 4.192435 4.205411 4.190076 4.199427 4.217939 4.216381 4.165579 3.938497 3.665849 4.192882 3.806537 -	4.110975 4.095392 4.200486 4.195936 4.094145 4.205411 4.192195 4.191323 4.219623 4.163896 - - 3.971036 3.65413 4.147689 3.973217 4.112035 4.117395
DEVICE NO. S01202 S01202 S03479 S03483 S03486 S03487 S03497 S03597 S03597 S03597 S03597 S03552 S03562 S03564 S03561 S03564	17.06.2017 4.114184 4.182177 4.225731 4.202169 4.090779 4.202464 4.202543 4.202543 4.202543 4.202543 4.22704 4.163024 3.854721 3.663169 3.6631557	18.06.2017 4.158286 4.118829 4.197245 4.166389 4.047207 4.157289 4.160281 4.15743 4.160103 4.17094 - - 3.829039 - - - 3.658369 -	19.06.2017 4.13728 4.120076 4.22704 4.20783 4.070832 4.070832 4.197993 4.205909 4.225918 4.219685 3.805228	20.06.2017 4.114154 4.132043 4.227477 4.197556 4.105302 4.209213 4.197245 4.205535 4.224609 4.18135 3.927464 3.780731 - -	4.15785 4.103245 4.227103 4.197554 4.205099 4.19338 4.20192 4.224173 4.224173 4.21501 4.187708 3.915372 3.629509 3.637986	4.160842 4.105989 4.226729 4.199738 4.100752 4.205847 4.187583 4.199614 4.21875 4.188945 4.200611 3.914561 - 3.707887 3.713472 - 4.019718	4.133166 4.110975 4.197993 4.197556 4.102435 4.205411 4.190076 4.199427 4.217939 4.216381 4.165579 3.938497 3.645849 4.192882 3.806537	4.110975 4.095392 4.200486 4.195936 4.094145 4.094145 4.195195 4.195195 4.195195 4.19523 4.219623 4.163896 - - 3.971036 3.65413 4.147689 3.973217 4.112035

Signal strength, battery status, battery trends, picture sending status,... 🔽



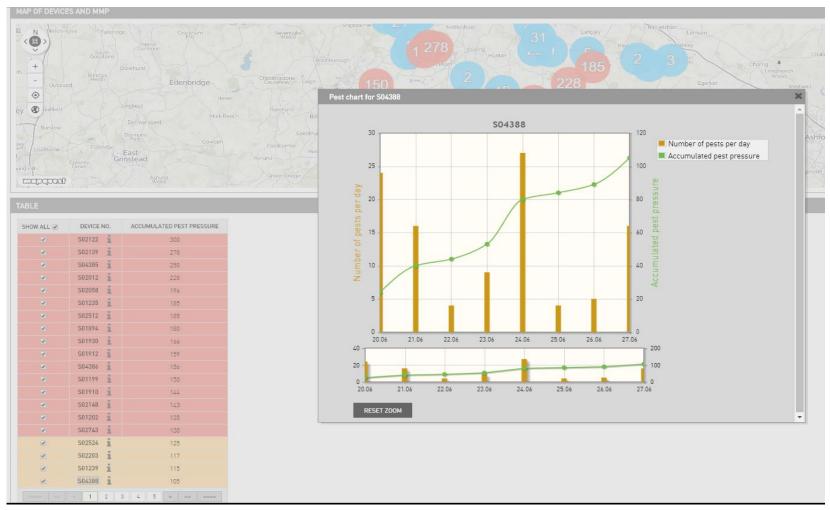
Area-wide overview



Population overview, accumulated pest pressure, trends,...



Area-wide overview



Population overview, accumulated pest pressure, trends,...





more sustainably grown

food for everyone.

