

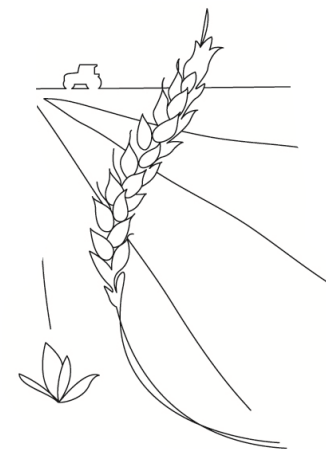
Första året med SDHI

– hur har det gått?



Europeiska jordbruksfonden för
landsbygdsutveckling: Europa
investerar i landsbygdsområden

Anders Lindgren



Ett antal frågor att ställa sig

Vad är rätt dos?

Tidpunkter?

Blandningar?

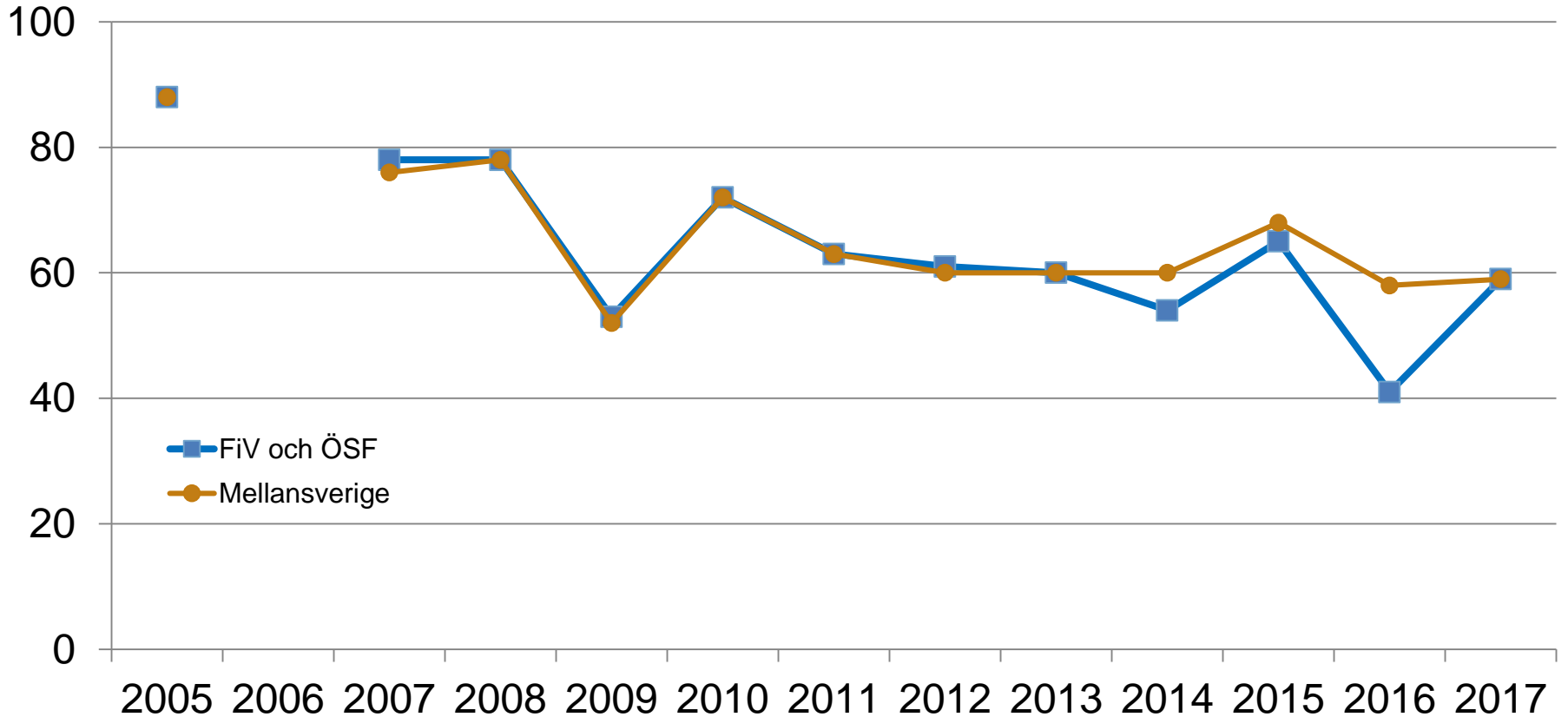
Resistensstrategier?

Kan årets försök och erfarenheter ge mer information?

Proline – effekt mot Septoria

½ dos DC 47-51

% effekt



2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017

Antal försök 1 0 10 3 4 4 4 5 7 5 7 6 3
 angrepp bl 2 26 56 11 27 13 18 31 25 39 31 17 13**
 ** blad 3

Mode of Action of Fungicides

FRAC classification on mode of action 2016 (www.frac.info)

A: Nucleic Acid Synthesis

A1: RNA polymerase I
4: Polymiglucoside (Benzyl)imidazole

A2: adenosine-deaminase
6: hydroxy (benzimidazolyl)pyridinone

A3: DNA: RNA synthase (prop.)
22: heterocyclic

A4: DNA topoisomerase type II (prop.)
21: carbonyl succinimide

B: Cytoskeleton and motor proteins

B1: β -tubulin assembly in mitosis
16: MIC fungicide
(N-Methyl Glucosaminyl-carbamate)

B2: β -tubulin assembly in mitosis
13: benzimidazole

B3: o β -tubulin assembly in mitosis
22: heterocyclic

B4: cell division (prop.)
28: phenylamine

B5: delocalisation of spectrin-like proteins
42: benzimidazole

B6: actin/myosin motor function
e.g. in vesicle trafficking
17: carbonyl succinimide

C: Respiration

C2: inhibition of complex II: succinate-dehydrogenase
7: SDHI (Quinone Dithioneinase inhibitor)

C: Respiration

C1: inhibition of complex I: NADH: Cytochrome-b_L reductase
28 pyridinobenzimidazole pyridone-SDCI

C4: inhibition of complex II: cytochrome-b_L(ubiquinone reductase) & Cyt b_L
21 Carbonyl succinimide (Quinone dithioneinase inhibitor)

C6: inhibition of complex III
6: quinone hydroxylamine succinimide
4: hydroxy pyridinobenzimidazole

C5: inhibitors of oxidative phosphorylation, ATP synthase
28: pyridine dione

C3: inhibition of complex III cytochrome bc_L (ubiquinol oxidase) at O₂ site (cyt b gene)
11 Carbonyl succinimide (Quinone dithioneinase inhibitor)

C7: ATP production (prop.)
28: 2,8-dihydroxy-1,4-dioxane-3-carboxamide

C8: uncoupler of oxidative phosphorylation
28

D: Amino Acid and Protein Synthesis

D1: methionine biosynthesis (cys gene) (prop.)
1: 5-oxo-1,2,4-triazole

D2: protein synthesis
23: succinimide

D3: protein synthesis
24: carbonyl succinimide

D4: protein synthesis
25: glycosyl succinimide

D5: protein synthesis
41: bicyclic amide

E: Signal Transduction

E1: Signal transduction (mechanism unknown)
13: benzimidazole

E2: Osmotic signal transduction
MAJ¹ / trehalase kinase (ow-2, Dst1)
2: diuretic

E3: Osmotic signal transduction
MAJ¹ / trehalase kinase (ow-2, HOG1)
14: phenylglyoxal (2,8-dioxane)

F: Lipid Synthesis and Membrane Integrity

F2: phospholipid biosynthesis
methyltransferase
3: carbonyl succinimide & diuretic

F3: lipid peroxidation (prop.)
14: aromatic hydrocarbon & heterocyclic dione

F4: cell membrane permeability, fatty acids (prop.)
28: carbonyl succinimide

F5: microbial disrupter of pathogen cell membrane
4: carbonyl succinimide (Quinone dithioneinase inhibitor)

F7: cell membrane disruption (prop.)
28: carbonyl succinimide

I: Melanin Synthesis in Cell Wall

I1: reduces in melanin biosynthesis
14: 2,8-dihydroxy-1,4-dioxane-3-carboxamide
14: 2,8-dihydroxy-1,4-dioxane-3-carboxamide
14: 2,8-dihydroxy-1,4-dioxane-3-carboxamide

I2: dehydrase in melanin biosynthesis
14: 2,8-dihydroxy-1,4-dioxane-3-carboxamide
14: 2,8-dihydroxy-1,4-dioxane-3-carboxamide

I3: polyketide synthase in melanin biosynthesis
14: 2,8-dihydroxy-1,4-dioxane-3-carboxamide
14: 2,8-dihydroxy-1,4-dioxane-3-carboxamide

G: Sterol Biosynthesis in membranes

G1: C14-demethylase in sterol biosynthesis (erg11/tyo21)
3: Diaminopyridine (Diaminopyridinone inhibitor)
(SDI: Class I)

G2: Δ^14 -reductase and Δ^7 - Δ^8 -isomerase in sterol biosynthesis (erg2, erg 24)
3: amine/terephthalate (SDI: Class II)

G3: Holo reductase in C4-demethylation (erg27)
17: SDI (Class III)

G4: Squalene epoxidase in sterol biosynthesis (erg3)
9: SDI (Class IV)

H: Cell Wall Biosynthesis

H4: chitin synthase
9: Polyamide

H5: cellulose synthase
46: Carbonyl succinimide (Cellulose synthase inhibitor)

Unknown Mode of Action

FRAC class 100: 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000.

M: Multi Site Action

FRAC class 100: 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 92

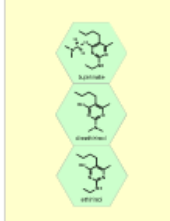
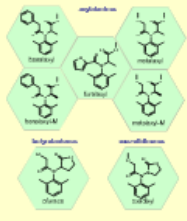
Mode of Action of Fungicides

FRAC classification on mode of action 2016 (www.frac.info)

A: Nucleic Acid Synthesis

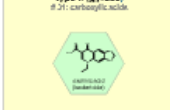
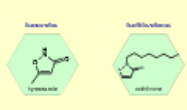
A1: RNA polymerase I

A2: adenosine-deaminase



A3: DNA / RNA synthase (prop.)

A4: DNA topoisomerase type II (gyrase)



B: Cytoskeleton and motor proteins

MBC Topsisin

M1: β -tubulin assembly in mitosis

M2: α -tubulin assembly in mitosis

M3: actin/myosin motor function

M4: cell division (prop.)

M5: delocalisation of spectrin-like proteins

M6: actin/myosin motor function

C: Respiration

SDHI

Aviator Xpro
Siltra Xpro
Ascra Xpro
Elatius Era/Plus
Priaxor
Propulse

C2: inhibition of complex II: succinate-dehydrogenase

C: Respiration

C1: inhibition of complex I

C2: inhibition of complex II

C3: inhibition of complex III

C4: inhibition of complex IV

C5: inhibition of cytochrome b5 reductase

C6: inhibition of cytochrome b5 reductase

C7: A11 production (prop.)

C8: uncoupler of oxidative phosphorylation

D: Amino Acid and Protein Synthesis

Anilino-pyrimidiner Kayak Stereo

D1: protein synthesis

D2: protein synthesis

D3: protein synthesis

D4: protein synthesis

D5: protein synthesis

E: Signal Transduction

Okänd Talius

E1: Osmotic signal transduction

E2: Osmotic signal transduction

F: Lipid Synthesis and Membrane Integrity

F1: phospholipid biosynthesis

F2: lipid peroxidation (prop.)

F3: cell membrane permeability, fatty acids (prop.)

F4: cell membrane permeability, fatty acids (prop.)

F5: microbial disrupters of pathogen cell membranes

F6: cell membrane disruption (prop.)

I: Melanin Synthesis in Cell Wall

I1: reduction in melanin biosynthesis

I2: dehydroase in melanin biosynthesis

I3: polyketide synthase in melanin biosynthesis

G: Sterol Biosynthesis in membranes

DMI (t.ex. triazolol)

Armure/Tiro
Tilt/Bumper/Bolt
Proline, Stereo
Delaro

Morfoliner Tern Forbel

G1: Δ^14 -reductase and Δ^7 - Δ^8 -isomerase in sterol biosynthesis

G2: Δ^14 -reductase and Δ^7 - Δ^8 -isomerase in sterol biosynthesis

G3: HMG CoA reductase

G4: Squalene epoxidase in sterol biosynthesis

H: Cell Wall Biosynthesis

H1: chitin synthase

H2: cellulose synthase

P: Host Plant Defence Induction

P1: salicylic pathway

P2: jasmonic pathway

P3: ethylene pathway

M: Multi Site Action

Multisite Folpan

M1: inhibition of complex II

M2: inhibition of complex II

M3: inhibition of complex II

M4: inhibition of complex II

M5: inhibition of complex II

M6: inhibition of complex II

M7: inhibition of complex II

M8: inhibition of complex II

M9: inhibition of complex II

M10: inhibition of complex II

M11: inhibition of complex II

M12: inhibition of complex II

M13: inhibition of complex II

M14: inhibition of complex II

M15: inhibition of complex II

M16: inhibition of complex II

M17: inhibition of complex II

M18: inhibition of complex II

M19: inhibition of complex II

M20: inhibition of complex II

M21: inhibition of complex II

M22: inhibition of complex II

M23: inhibition of complex II

M24: inhibition of complex II

M25: inhibition of complex II

M26: inhibition of complex II

M27: inhibition of complex II

M28: inhibition of complex II

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M85: inhibition of complex II

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M87: inhibition of complex II

M88: inhibition of complex II

M89: inhibition of complex II

M90: inhibition of complex II

M91: inhibition of complex II

M92: inhibition of complex II

M93: inhibition of complex II

M94: inhibition of complex II

M95: inhibition of complex II

M96: inhibition of complex II

M97: inhibition of complex II

M98: inhibition of complex II

M99: inhibition of complex II

M100: inhibition of complex II

Unknown Mode of Action

Okänd Flexity Upstream

U1: unknown mode of action

U2: unknown mode of action

U3: unknown mode of action

U4: unknown mode of action

U5: unknown mode of action

U6: unknown mode of action

U7: unknown mode of action

U8: unknown mode of action

U9: unknown mode of action

U10: unknown mode of action

U11: unknown mode of action

U12: unknown mode of action

U13: unknown mode of action

U14: unknown mode of action

U15: unknown mode of action

U16: unknown mode of action

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U33: unknown mode of action

U34: unknown mode of action

U35: unknown mode of action

U36: unknown mode of action

U37: unknown mode of action

U38: unknown mode of action

U39: unknown mode of action

U40: unknown mode of action

U41: unknown mode of action

U42: unknown mode of action

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U100: unknown mode of action

NC: Not Classified

NC: Not Classified

NC1: unknown mode of action

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NC100: unknown mode of action

Legend:

C: Respiration

C1: inhibition of complex I

C2: inhibition of complex II

C3: inhibition of complex III

C4: inhibition of complex IV

C5: inhibition of cytochrome b5 reductase

C6: inhibition of cytochrome b5 reductase

C7: A11 production (prop.)

C8: uncoupler of oxidative phosphorylation

NC: Not Classified

NC1: unknown mode of action

NC2: unknown mode of action

NC3: unknown mode of action

NC4: unknown mode of action

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NC96: unknown mode of action

NC97: unknown mode of action

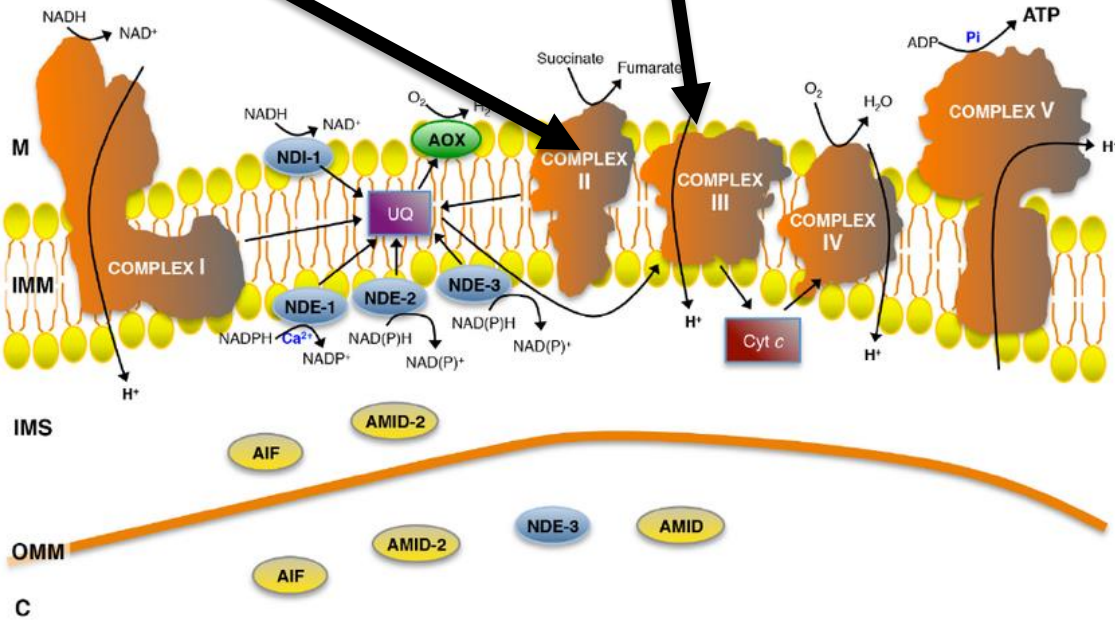
NC98: unknown mode of action

NC99: unknown mode of action

NC100: unknown mode of action

SDHI

strobiluriner

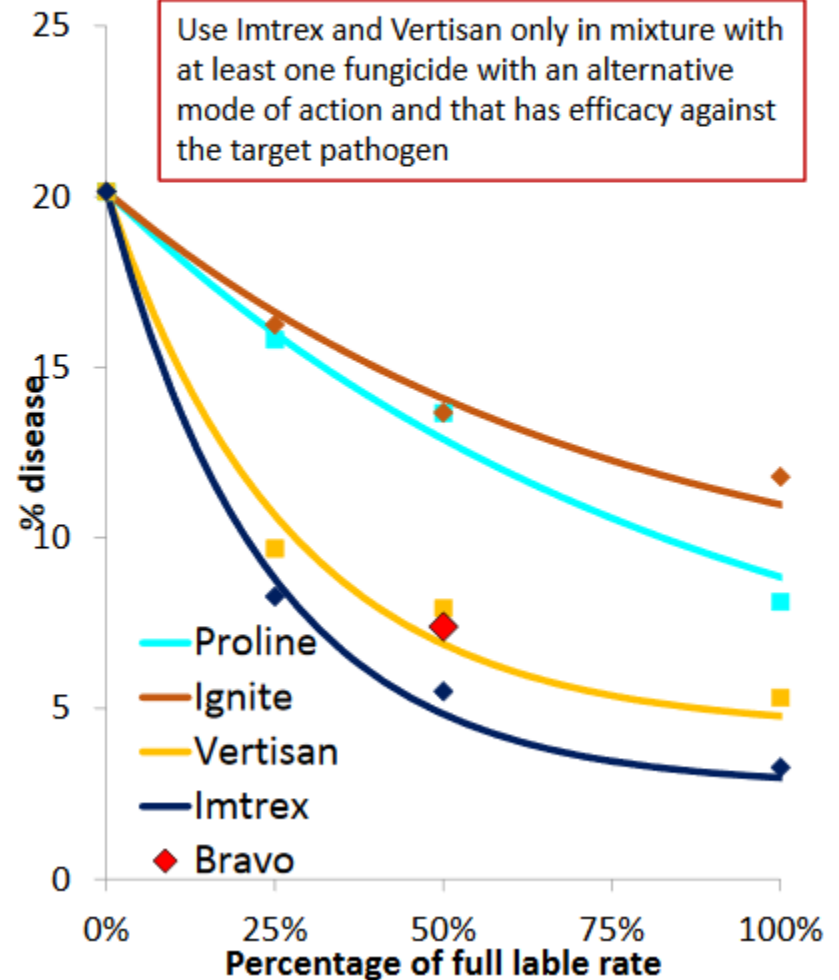
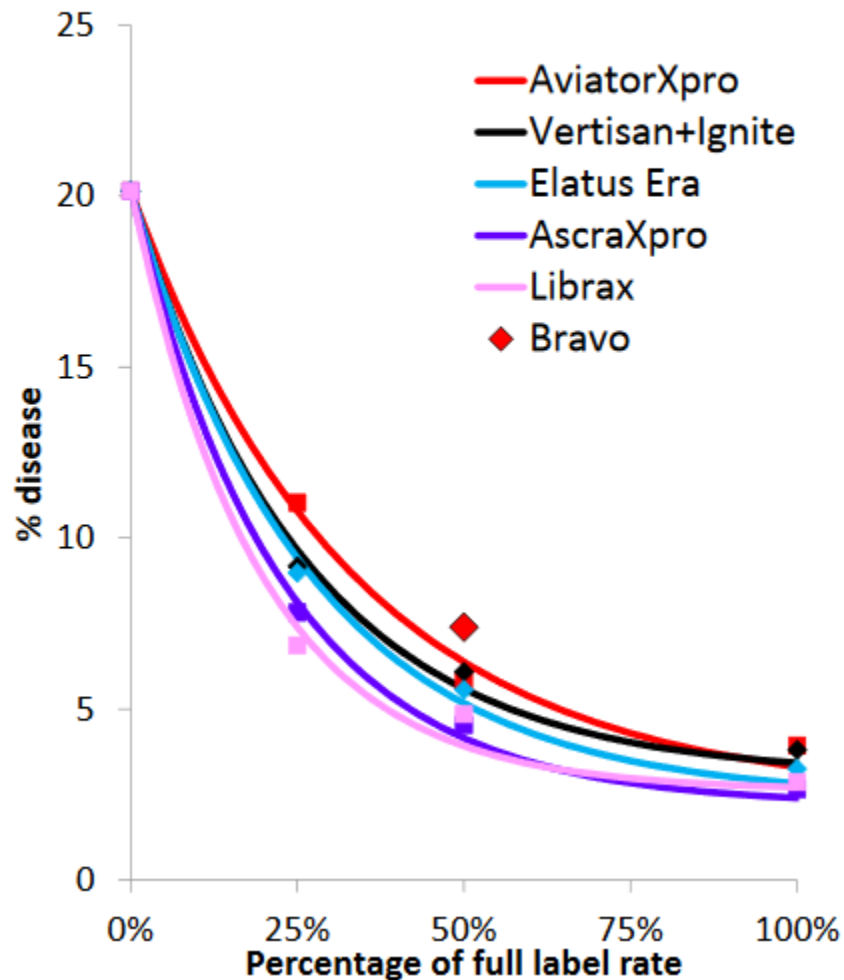


L9-1010 Strategi mot *Septoria tritici* i höstvetete i Mellansverige.

Led	Preparat	Verknings sätt	Dos kg, l/ha och behandlingstidpunkter			Finansiär	Kommentar
			DC 37-39	DC 47-51	DC 55-59		
1	Obehandlat					Region	
2	Ascra Xpro	DMI + SDHI	0,5			Region/VSC	Sydsvenskt led
3	Ascra Xpro + Talius	DMI + SDHI + azanaftalener	0,75 + 0,25			Du Pont	
4	Ascra Xpro	DMI + SDHI		0,5		Region/VSC	Dosstege Ascra Xpro
5	Ascra Xpro	DMI + SDHI		0,75		Region/VSC	Dosstege Ascra Xpro
6	Ascra Xpro	DMI + SDHI		1,0		Bayer	Dosstege Ascra Xpro
7	Elatus Era	DMI + SDHI		0,75		Syngenta	Dosstege Elatus Era
8	Ascra Xpro + Folpan	DMI + SDHI + multisite		1,0 + 1,5		ADAMA	
9	Proline + Comet Pro	DMI + QoI		0,4 + 0,3		Region/VSC	"Gammal" standard
10	Elatus Plus + Amistar + Proline	SDHI + QoI + DMI		0,5 + 0,25 + 0,4		Syngenta	
11	Ascra Xpro & Armure	DMI + SDHI & 2 x DMI	0,5		0,4	Syngenta	
12	Ascra Xpro & Siltra Xpro	SDHI + DMI & SDHI + DMI	0,75		0,5	Bayer	
13	Elatus Plus + Armure	SDHI + 2 x DMI		0,55 + 0,45		Syngenta	
14	Elatus Era	DMI + SDHI		0,5		Region/VSC	Dosstege Elatus Era

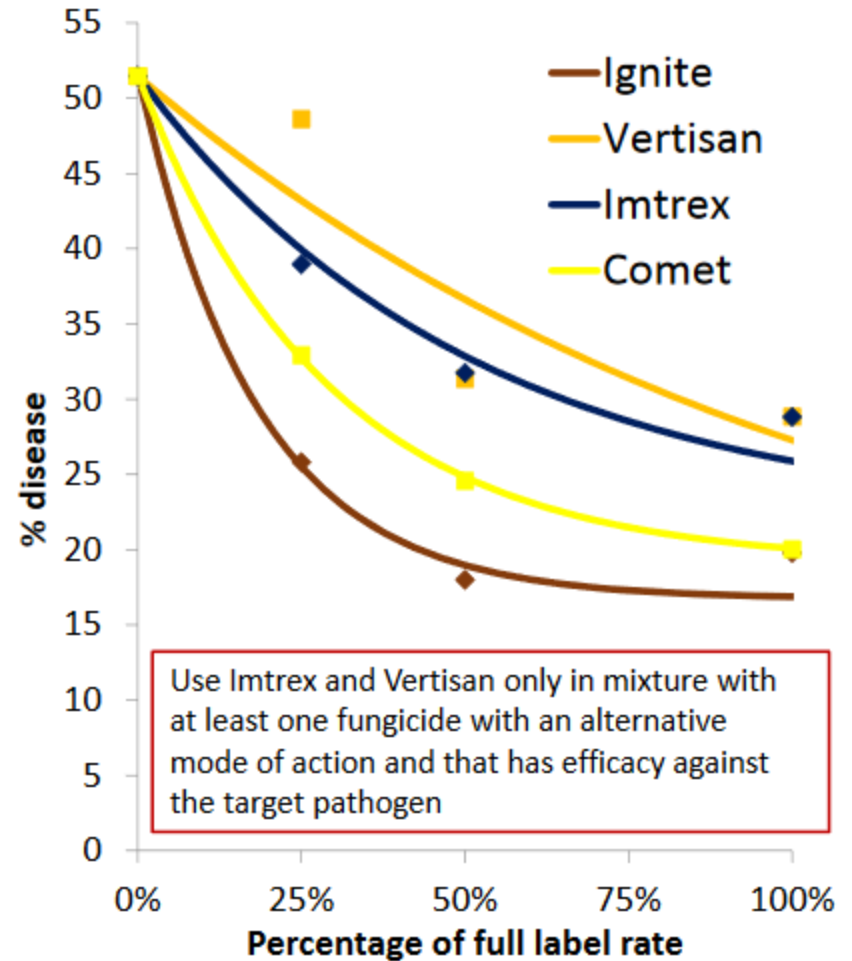
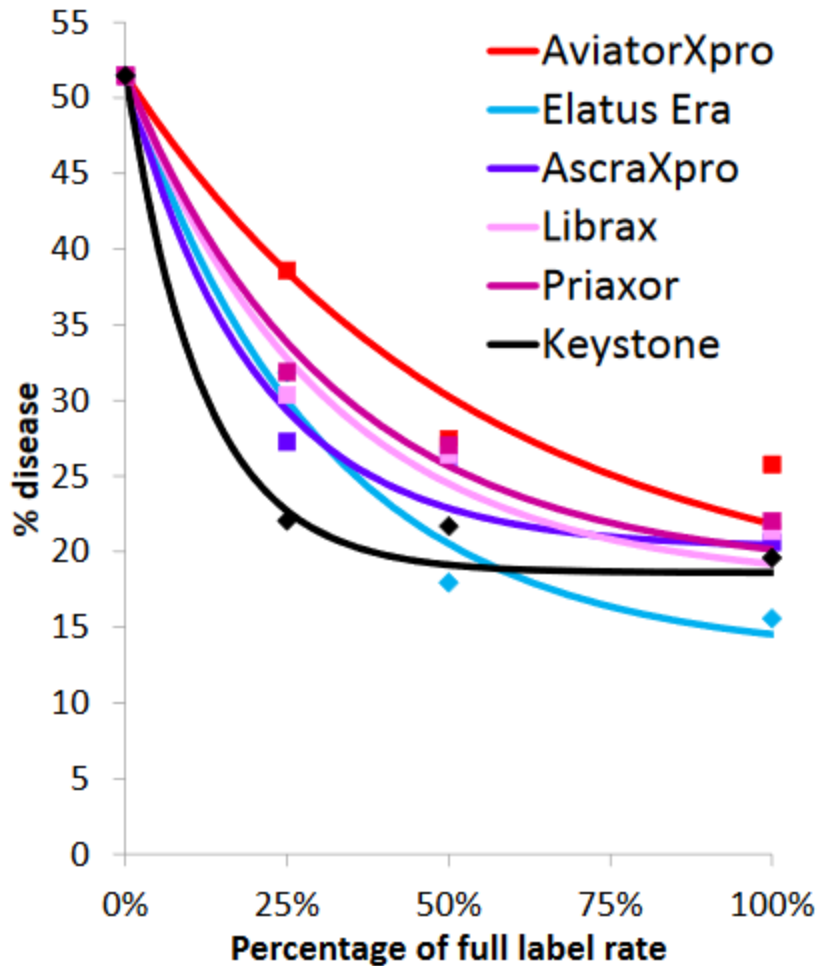
**SDHI i 12 av 13 behandlade led! (alla "marknadsled")
DMI alltid en blandningspartner**

Septoria protection 2015/16/17 (over trial)

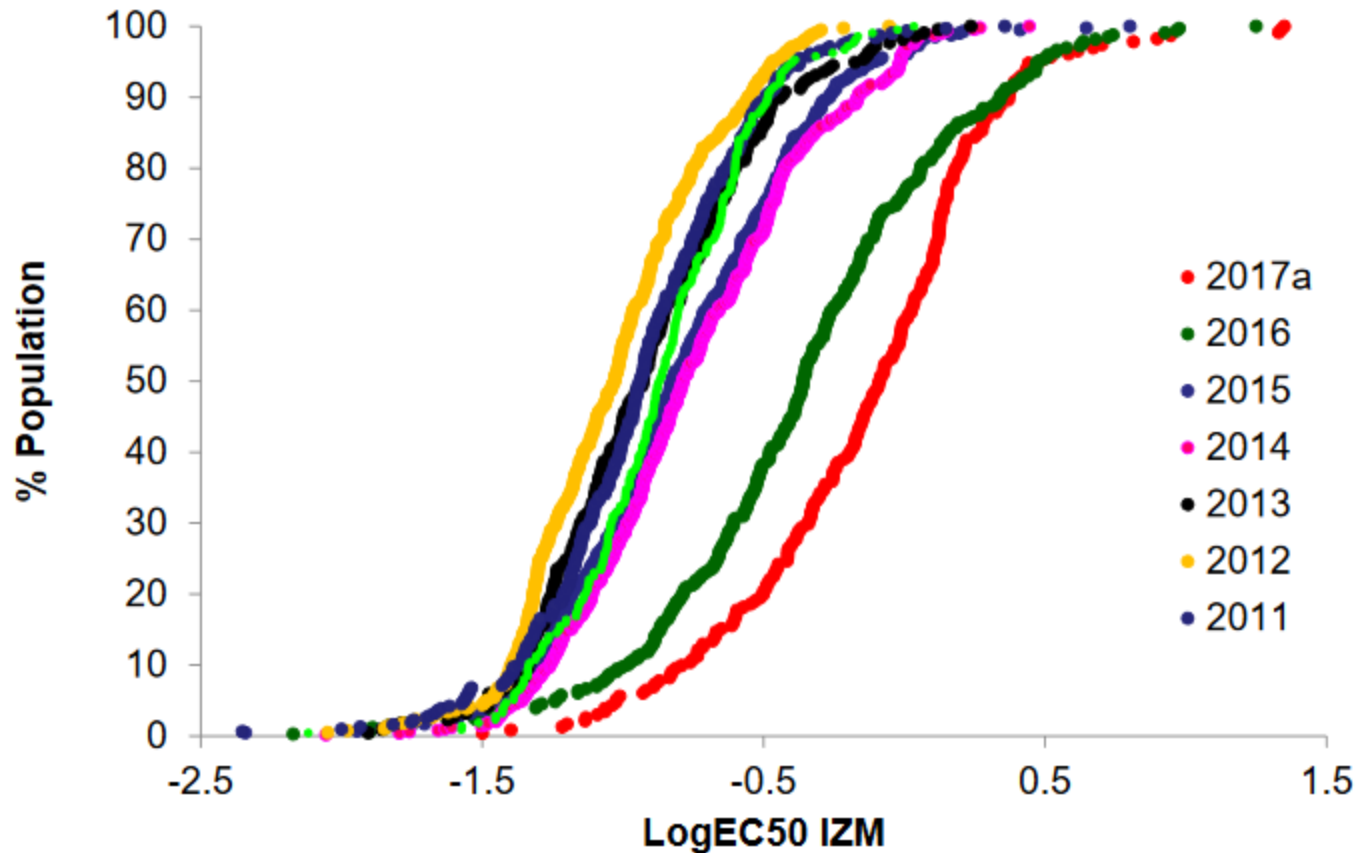


Yellow rust efficacy

Three-year mean (2015 to 2017)



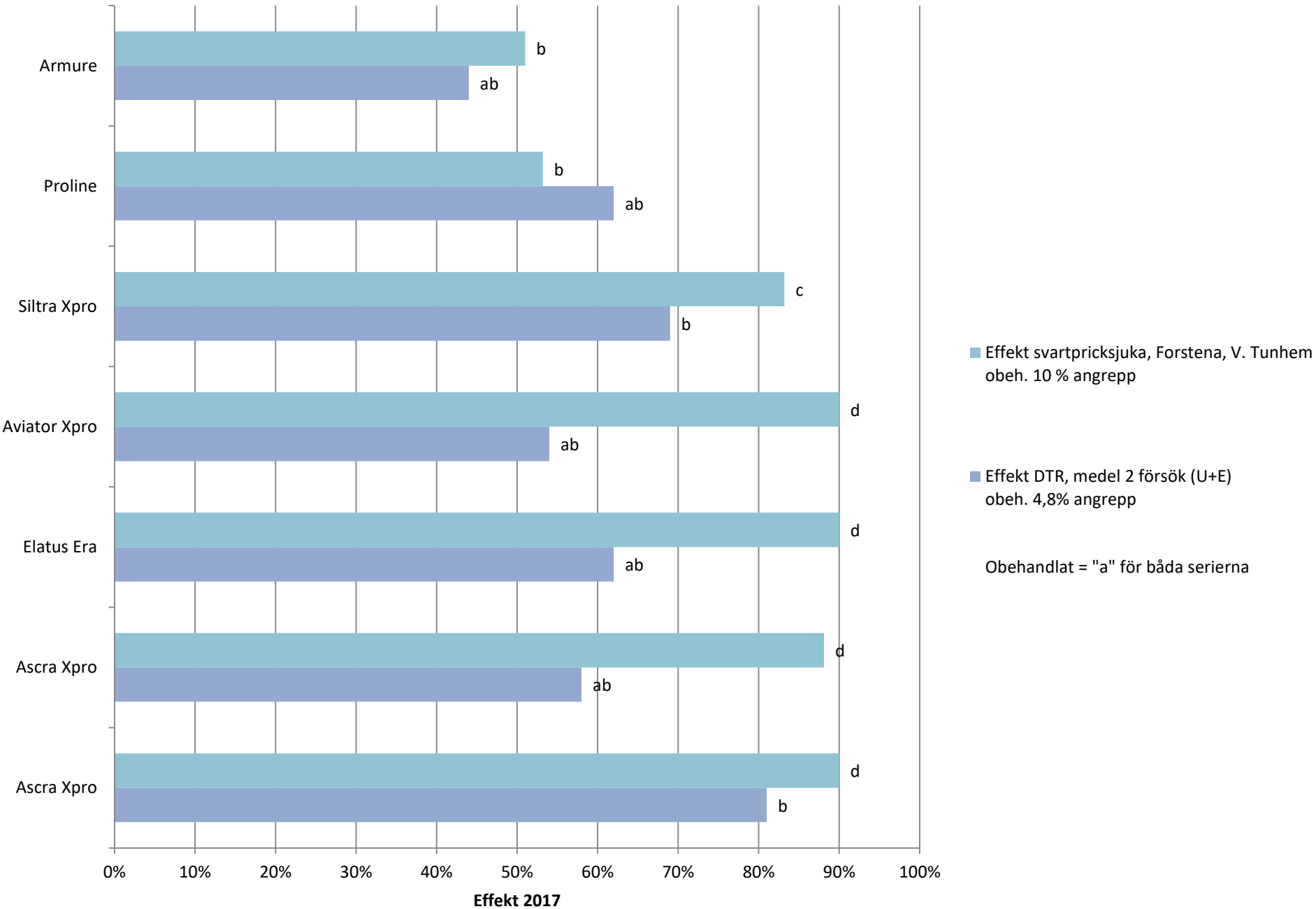
SDHI sensitivity (laboratory) Ireland 2011 to 2017



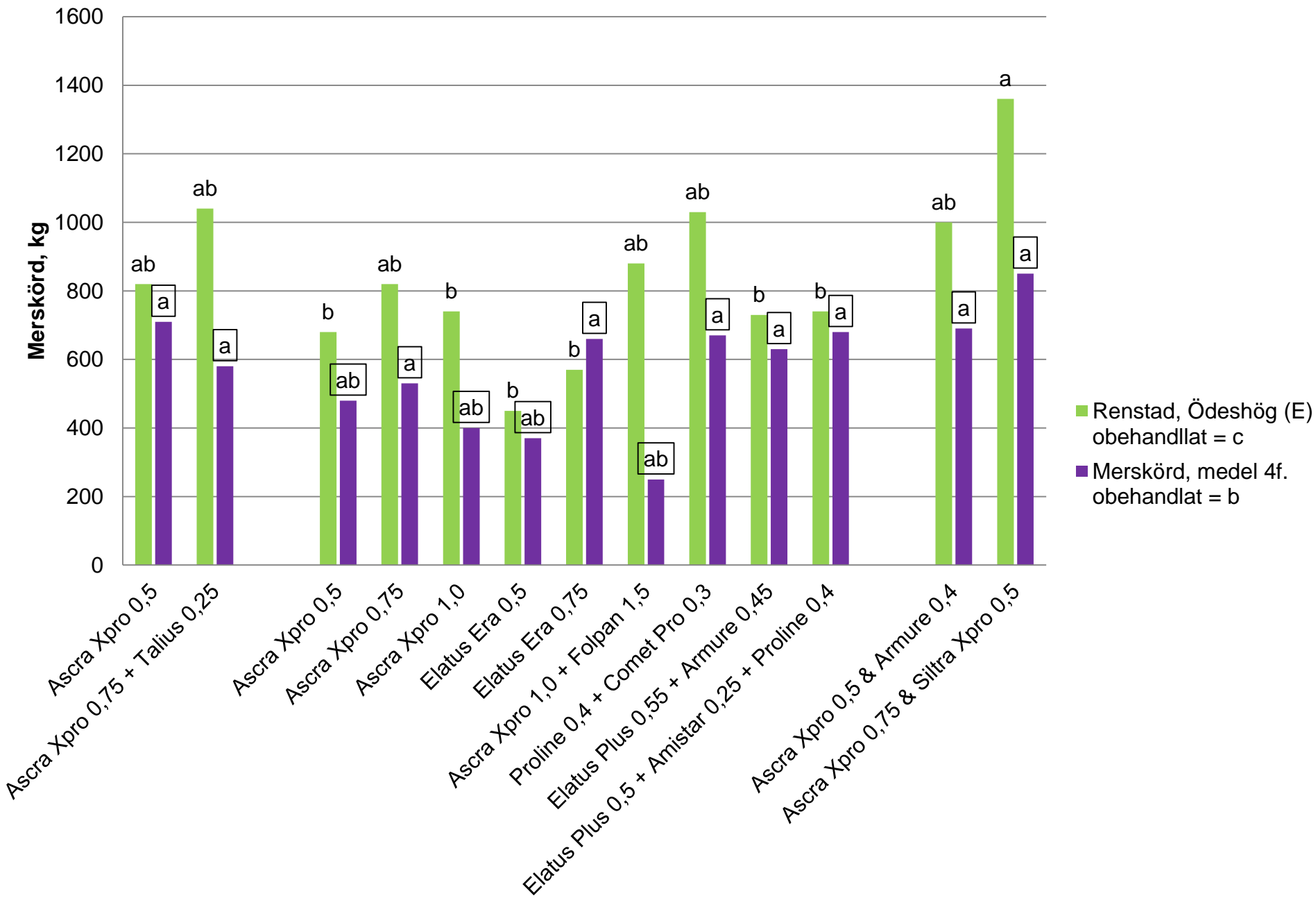
Data courtesy of S. Kildea, Teagasc



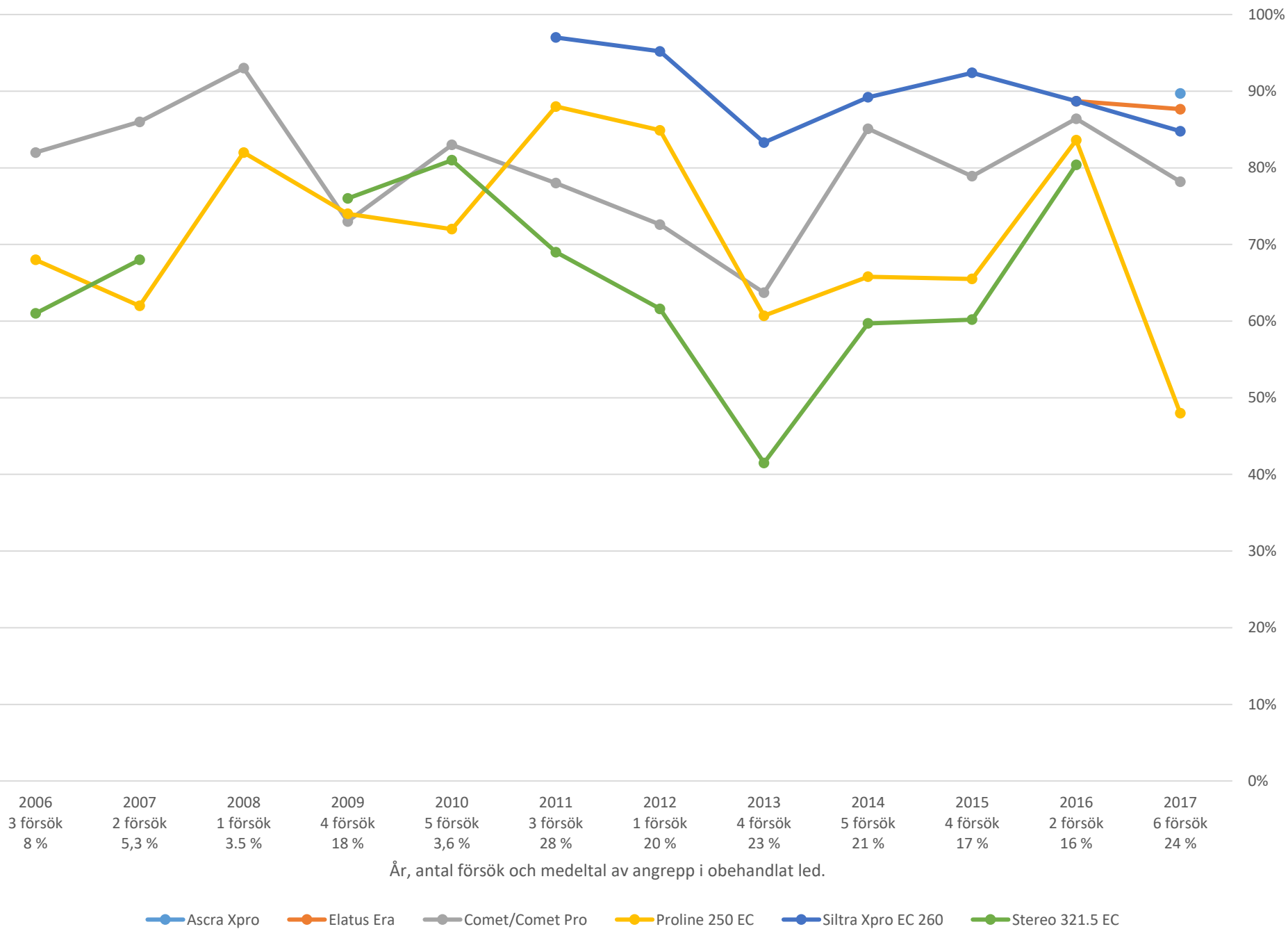
L9-1040 Effekt och förändring hos fungicider i höstvetete



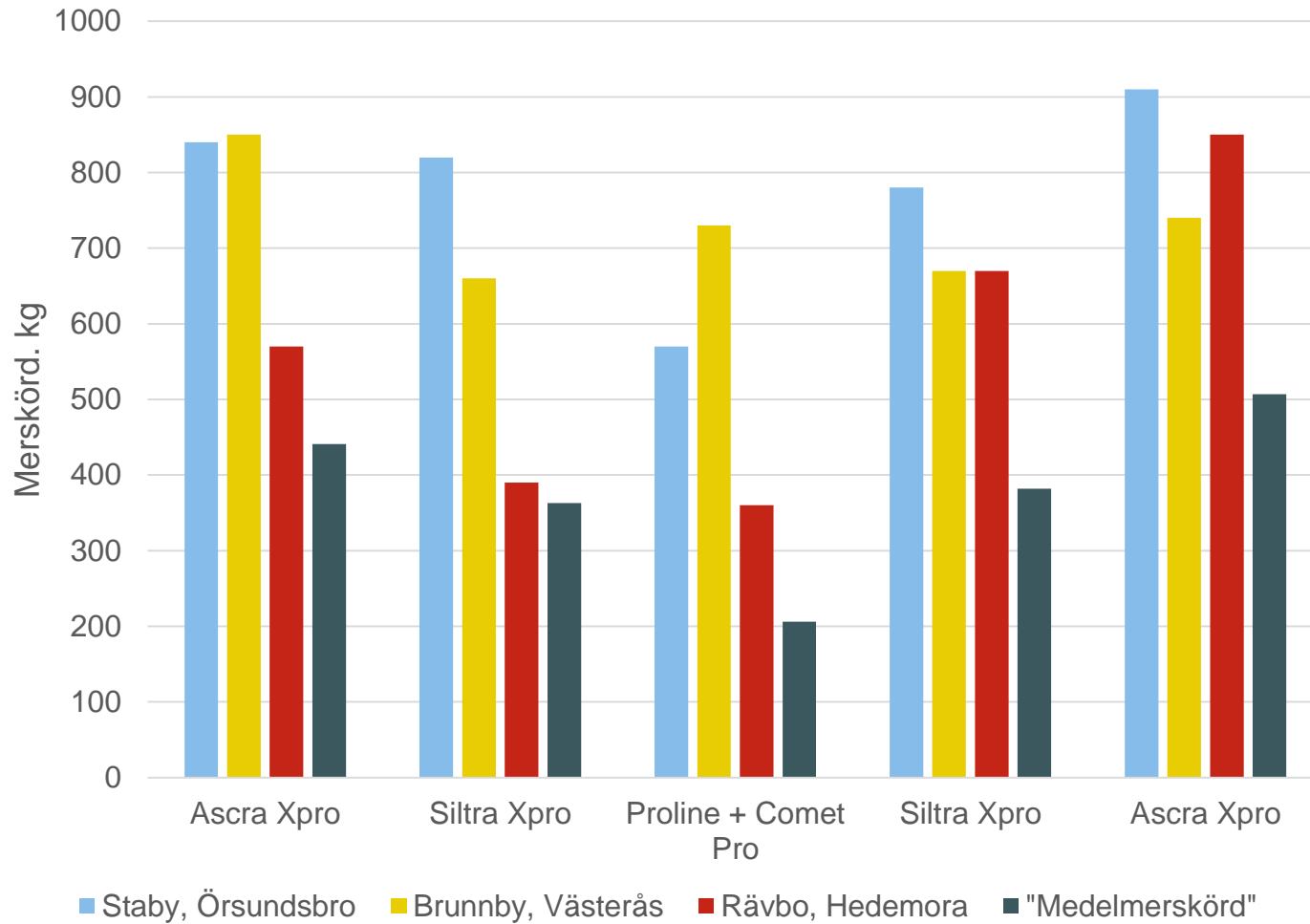
L9-1010 Strategi mot *Septoria tritici* i höstvetet i Mellansverige



Effekt mot kornets bladfläcksjuka, procent



L9-4041 Referensförsök vårkorn



Resistensrisk

Risken för resistens beror både på sjukdomen (patogenen) och fungiciden, vilket åskådliggörs i figuren nedan.

Fungicidgrupper (grupp enl FRAC)	Exempel på preparat	Bedömd risk för fungicid	Kombinerad risk		
MBC-fungicider (1) Fenylamider (4)	Topsin Ridomil, Epok	Hög = 3	3	6	9
QoI-fungicider (11) (strobiluriner)	Amistar, Acanto, Comet				
SDHI (Karboxamider) (7)	Cantus, Armure, Proline, Tilt, Sportak	Medium = 2	2	4	6
DMI-medel (3) Anilinopyrimidiner (9)	Unix				
Multi-site (M3) Multisite (M5)	Maneb, mankozeb Bravo	Låg = 1	1	2	3
Namnlös (29)	Shirlan				

Bedömd risk hos patogenen >>>>>	Låg = 1	Medium = 2	Hög = 3
Patogengrupper	Fröburna sjukdomar t ex Pyrenophora spp. och Ustilago spp. (sot) Jordburna sjukdomar Fusarium spp. Rostsvampar Rhizoctonia sp. Brunfläcksjuka	Stråknäckare Sköldfläcksjuka Kornets bladfläcksjuka Svartpricksjuka Bomullsmögel Cercospora sp. (t ex bladfl i sockerbetor)	Mjöldagg Grämögel Penicillium spp. Potatisbladmögel

Källa: Modifierat efter Brent, K.J. & Hollomon, D.W. 1998. Fungicide Resistance: The Assessment of Risk. FRAC Monograph no 2.

Se www.frac.info

Vad vi behöver veta mer om?

Mellansvenska förutsättningar:

- Tidpunkter?
- Doser?

- I dagsläget ser halv dos ut att räcka gott
- Inga effektskillnader i tidpunkt
- SDHI likvärdiga mot svartpricksjuka och kornets bladfläcksjuka
- Proline + Comet Pro behåller effekt m.a.p. skördeökning

- Fler försök och försöksupplägg 2018, 2019...

Summering

- SDHI har bra effekter
 - Septoria, rost, DTR
 - Sköldfläcksjuka, kornets bladfläcksjuka, Ramularia
- *Mycket* viktigt att ha en god resistensstrategi
- Använd *alltid* i blandning (flesta färdigformulerade med DMI)
- SDHI max en gång per säsong
- DMI har fortfarande bra skördeeffekter
- Behovsanpassning – tillfälle och dos
- Behandling i tidig axgång
- Använd hela IPM-verktygslådan

BENSTRÄCKARE!



Vetedvärgsjuka 2017





Blå: observerade WDV-symtom
Röd: virus i testade plantor
Grön: ej virus i testade plantor
Gul med plus: virus i testade stritar
Gul utan plus: ej virus i testade stritar





Erfarenheter från drabbade fält 2017

- Snabb (=tidig) uppkomst hösten 2016
- Varma dagar i september
- Glest bestånd mest utsatt
- Vissa fält där "allt stämmer" för sjukdomen – övriga fält ok
- 1 000 kg i värsta fälten, men andra fält på gården ok (8000+)
- Kraftiga froster under maj störde symptombild. Påverkade epidemiologin?
- Gräsmarker i närheten
- Skörderester – förfrukt höstvetete och ärter dominerar + ogräs
- Minimerad bearbetning
- Både tidiga och sena sorter
- Höstbehandling med pyretroid gjordes i vissa fall – trots det skador
- Skador av fritflugor

Risikfaktorer bekräftas

- Tidigare angrepp i området
- Vete som förfrukt
- Mycket växtrester efter förfrukten
- Minimerad bearbetning
- Tidig uppkomst (första halvan av september)
- Varmt (>15 °C) och torrt väder efter uppkomst
- Närhet till smittkällor (spillvete, rajgräs, vitgröe)

Antal stritar
per gulskål

Stritfångster i gulskål. Medeltal v 37, 38 och 39 (sept.)

