Autosomal male determination in a spinosad-resistant housefly strain from Denmark.

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Houseflies - drug effects - genetics
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Abstract: The housefly, Musca domestica L., is a global pest and has developed resistance to most insecticides applied for its control. The insecticide spinosad plays an important role in housefly control. Females of the Danish housefly strain 791spin are threefold more resistant to spinosad than males in this strain. The factor responsible for spinosad resistance in the strain is unknown, but previous studies suggest a role of cytochrome P450s for detoxification of spinosad. Sex determination in the housefly is controlled by a male-determining factor (M), either located on the Y chromosome or on one of the five autosomes (I to V).

The authors performed a series of crosses and backcrosses, starting with cross of 791spin and the susceptible reference strain aabys (bearing morphological mutations on each autosome). These flies were evaluated for gender and bioassayed to determine levels of resistance to spinosad. Sex determination in 791spin is due to a male factor on autosome 3.

The most likely explanation for the differentiation of spinosad resistance between males and females is a recessive spinosad resistance factor on autosome III.

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A comparative study of P450 gene expression in field and laboratory Musca domestica L. strains.

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Cytochrome P-450 Enzyme System - biosynthesis - genetics
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Insecticide Resistance - genetics
Insecticides - metabolism - toxicity

Abstract: The housefly is a global pest that has developed resistance to most insecticides applied for its control. Resistance has been associated with cytochrome P450 monooxygenases (P450s). The authors compare the expression of six genes possibly associated with insecticide resistance in three unselected strains: a multiresistant strain (791a), a neonicotinoid-resistant strain (766b) and a new field strain (845b).

CYP4G2 was highly expressed throughout the range of strains and proved to be the one of the most interesting expression profiles of all P450s analysed. CYP6G4 was expressed up to 11-fold higher in 766b than in WHO-SRS. Significant differences between expression of P450 genes between F1 flies from 845b and established laboratory strains were shown. In general, P450 gene expression in 845b was 2-14-fold higher than in the reference strain (P

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The formation and design of the TRIAGE study--baseline data on 6005 consecutive patients admitted to hospital from the emergency department.

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Abstract: Patient crowding in emergency departments (ED) is a common challenge and associated with worsened outcome for the patients. Previous studies on biomarkers in the ED setting has focused on identification of high risk patients, and and the ability to use biomarkers to identify low-risk patients has only been sparsely examined. The broader aims of the TRIAGE study are to develop methods to identify low-risk patients appropriate for early ED discharge by combining information from a wide range of new inflammatory biomarkers and vital signs, the present baseline article aims to describe the formation of the TRIAGE database and characterize the included patients.

We included consecutive patients ≥ 17 years admitted to hospital after triage staging in the ED. Blood samples for a biobank were collected and plasma stored in a freezer (-80 °C). Triage was done by a trained nurse using the Danish Emergency Proces Triage (DEPT) which categorizes patients as green (not urgent), yellow (urgent), orange (emergent) or red (resuscitation). Presenting complaints, admission diagnoses, comorbidities, length of stay, and 'events' during admission (any of 20 predefined definitive treatments that necessitates in-hospital care), vital signs and routine laboratory tests taken in the ED were also included in the database.

Between September 5th 2013 and December 6th 2013, 6005 patients were included in the database and the biobank (94.1 % of all admissions). Of these, 1978 (32.9 %) were categorized as green, 2386 (39.7 %) yellow, 1616 (26.9 %) orange and 25 (0.4 %) red. Median age was 62 years (IQR 46-76), 49.8 % were male and median length of stay was 1 day (IQR 0-4). No events were found in 2658 (44.2 %) and 158 (2.6 %) were admitted to intensive or intermediate-intensive care unit and 219 (3.6 %) died within 30 days. A higher triage acuity level was associated with numerous events, including acute surgery, endovascular intervention, i.v. treatment, cardiac arrest, stroke, admission to intensive care, hospital transfer, and mortality within 30 days (p...
Cabbage stem flea beetle (CSFB), *Psylliodes chrysocephala* L. (Coleoptera: Chrysomelidae) is a major early season pest of oilseed rape throughout Europe. Pyrethroids have been used for controlling this pest by foliar application, but in recent years control failures have occurred, particularly in Germany due to the evolution of knock-down resistance (kdr). The purpose of this study was to investigate the incidence and spread of pyrethroid resistance in CSFB collected in Germany, Denmark and the United Kingdom during 2014. The level of pyrethroid resistance was measured in adult vial tests and linked to the presence of kdr genotypes.

Although kdr (L1014F) genotypes are present in all three countries, marked differences in pyrethroid efficacy were found in adult vial tests. Whereas Danish CSFB samples were in general susceptible to recommended label rates, those collected in the UK mostly resist such rates to some extent. Moderately resistant and susceptible samples were found in Germany. Interestingly, some of the resistant samples from the UK did not carry the kdr allele, which is in contrast to German CSFB. Pre-treatment with PBO, prior to exposure to ?-cyhalothrin suggested involvement of metabolic resistance in UK samples.

Danish samples were mostly susceptible with very low resistance ratios, while most other samples showed reduced sensitivity in varying degrees. Likewise, there was a clear difference in the presence of the kdr mutation between the three countries. In the UK, the presence of kdr genotypes did not always correlate well with resistant phenotypes. This appears to be primarily conferred by a yet undisclosed, metabolic-based mechanism. Nevertheless our survey disclosed an alarming trend concerning the incidence and spread of CSFB resistance to pyrethroids, which is likely to have negative impacts on oilseed production in affected regions due to the lack of alternative modes of action for resistance management purposes.

Notes:

Cites: Annu Rev Entomol. 2007;52:375-40016968206
Cites: Pest Manag Sci. 2003 Sep;59(9):1057-912974359
Cites: Insect Biochem Mol Biol. 2014 Feb;45:18-2924316412
Cites: Genet Anal. 1999 Feb;14(5-6):143-910084106

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[No evidence that formalized triage is superior to informally structured triage].

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        Triage - standards

Abstract: Formalized triage has been implemented in all Danish emergency departments. The validation behind formalized triage has focused on investigating predictive validity, i.e. correspondence between triage category and different outcome measures. Reliability is primarily investigated in terms of inter-rater reliability on written patient cases, and several studies have methodological limitations questioning their clinical relevance. Currently, there is no evidence establishing that formalized triage is superior to informally structured triage with regards to clinical end points.

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Susceptibility of spinosad in Musca domestica (Diptera: Muscidae) field populations.

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Research Support, Non-U.S. Gov't
Species Specificity

Abstract: The toxicity of spinosad was determined in one susceptible and five insecticide-resistant laboratory strains of house fly, Musca domestica L. Spinosad was relatively slow-acting, but highly toxic to house flies. In a feeding bioassay, spinosad LC50 at 72 h was 0.51 microg of spinosad per gram of sugar, making it 6.3- and 3.5-fold more toxic to house flies compared with azamethiphos and methomyl, respectively. In topical application bioassay, the LD50 at 48 h of spinosad in susceptible house flies was 40 ng per 20 mg of house fly, making spinosad less toxic than the pyrethroid bioresmethrin synergized by piperonyl butoxide and the organophosphate dimethoate. The insecticide-resistant laboratory strains had resistance factors to spinosad at LC50 in feeding bioassay from 1.5 to 5.5 and at LD50 in topical application bioassay from 2.5 to 4.7, indicating that in house fly cross-resistance to the major insecticide classes will not initially be of major concern for the use of spinosad for house fly control. The toxicity of spinosad was also evaluated against 31 field populations of house flies collected from livestock farms across Denmark. The field populations were 2.2- to 7.5-fold resistant to spinosad at 72 h in feeding bioassay, but based on steep slopes in the bioassay and the limited variation of spinosad toxicity against the various field populations, we consider the field populations to be spinosad-susceptible. We propose a diagnostic dose of 12 microg of spinosad per gram of sugar in feeding bioassay with impregnated sugar for determination of resistant house flies, which is 10x the LC95 of the susceptible strain WHO and approximately = 2x the LD95 of the field populations. Spinosad showed no substantial cross-resistance to the pyrethroid bioresmethrin synergized by piperonyl butoxide, the anticholinesterases dimethoate, azamethiphos, methomyl, and spinosad in house fly field populations.

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Vitamin D Status and Muscle Function Among Adolescent and Young Swimmers.

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Impaired muscle function has been coupled to vitamin D insufficiency in young women and in elderly men and women. Those living at Northern latitudes are at risk for vitamin D insufficiency due to low sun exposure which may be more pronounced among elite swimmers because of their indoor training schedules. We aimed to examine vitamin D status among young elite swimmers and evaluate the association between vitamin D status and muscle strength. Twenty-nine swimmers, 12 female and 17 male (16-24 years) residing at latitude 55-56°N were studied in March and April. Blood samples were analyzed for serum 25-hydroxyvitamin D (s-25(OH)D) and hand-grip strength was measured as marker of muscle strength. Subjects’ vitamin D and calcium intake were assessed by food frequency questionnaire and sun exposure and training status by questionnaires. Mean (± SD) s-25(OH)D was 52.6 ± 18.3nmol/L among all swimmers. In 45% of the swimmers s-25(OH)D was below 50 nmol/L. Female swimmers had higher s-25(OH)D concentration than male swimmers (61.7 ± 17.5 nmol/L vs. 46.2 ± 16.5 nmol/L, p = .026). Among male swimmers, those with sufficient vitamin D status had higher hand grip strength than those with insufficient vitamin D status (50.6 ± 6.4 kg vs. 41.1 ± 7.8 kg, p = .02). Among Danish elite swimmers 45% had an insufficient vitamin D status during the spring; the prevalence being higher among male swimmers. Muscle strength was significantly higher in male swimmers with sufficient vitamin D status.