

Mites Living in Hay: An Important Allergen Source?

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Fifty-two farmers and 21 non-farmers with symptoms related to hay contact were investigated. Skin prick tests (SPT) and RAST were performed with an extract made of barn dust (BDE) consisting of hay remnants. At microscopy, the barn dust was found to contain large amounts of dead mites, most of them identified as *Lepidoglyphus destructor* and *Acarus siro*. Twenty-one patients (9 farmers and 12 non-farmers) had positive RAST to BDE, with a good correlation to the case histories. Other allergies, especially to *Dermatophagoides pteronyssinus*, pollens, and animal danders were also common among patients. However, there was no correlation between positive SPT and RAST to BDE and any other allergen tested. This indicates that BDE contains distinct allergens, most likely of mite origin.

Key words: allergy; farmers; hay; IgE; mite.

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A number of farmers with symptoms of allergic rhinitis and/or asthma when handling hay and with high levels of IgE were seen at the allergy clinic. Some of them were negative in skin tests and radioallergosorbent test (RAST) for animals, pollens, house dust mite (*Dermatophagoides pteronyssinus*, DPT), and various moulds. However, they had a strong positive skin prick test (SPT) to an extract made from barn dust (BDE), which prompted a further investigation.

MATERIAL AND METHODS

Patients

All consecutive farmers referred to the clinic during 1979 and 1980 ($n = 52$) were tested with RAST and 10 of them were also skin prick tested. In addition, 21 non-farmers with history of allergy to hay were investigated with RAST and nine also with SPT to common allergens and BDE. Finally, a control group of 69 persons not fulfilling the criteria of the above groups had SPT made against BDE with RAST

against BDE tested if the SPT was strongly positive.

Allergen preparations

The barn dust was collected from the barn of a farmer who gave a very suggestive history of hay allergy and reacted strongly against his own barn dust. A 1/10 w/v allergen extract was prepared by mixing 10 g of this dust with Coca's solution (Kal.phosph. 36.3 mg, Natr. phosph. 71.2 mg, NaCl 0.5 g, Phenol 0.4 g, aqua ster. ad 100 ml) and used undiluted for SPT. 5 ml of the extract was coupled to 100 CNBr-activated filter paper discs (3). No significant non-specific binding of IgE was noted.

Microscopic examination was performed on the dust. Dead mites were mounted in lactic acid and identified.

SPT was also made on the forearm with a tuberculin needle with commercial extracts of animal danders (cat, dog, horse, cow), pollens (birch tree, timothy grass), moulds (*Aspergillus*, *Alternaria*, *Penicillium*) and house dust mite

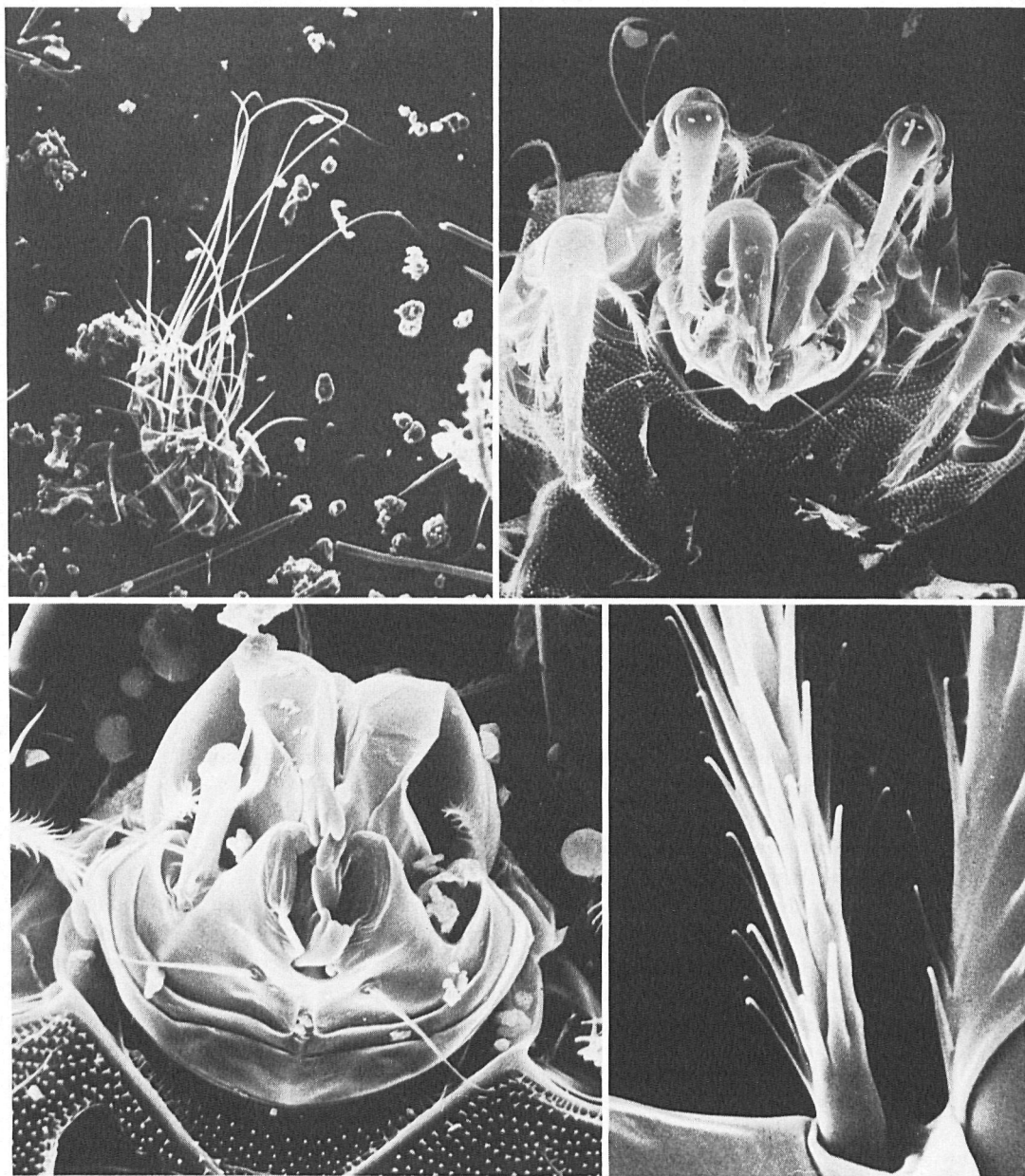


Fig. 1. SEM photography of contents of hay dust: A: dry mite with long body "hairs". B and C: close-ups of frontal view. D: close-up of "hair". Actual size of mite approx. 0.3 mm.

(DPT). Reactions more than 2 mm were regarded as positive. RAST was performed with Phadebas (Pharmacia diagnostics) allergen discs for the same type of allergens as used in SPT.

RESULTS

The most common mites in the barn dust were *Lepidoglyphus destructor* (Schrank) (earlier name: *Glycyphagus d.*) (Fig. 1) and *Acarus siro* L, which were present in large numbers.

Table 1

RAST to BDE (barn dust extract) in farmers with or without symptoms of immediate allergy to barn dust and in other persons with such allergy

		RAST against BDE		
		Positive	Negative	
Farmers (<i>n</i> = 52)	immediate symptoms from hay (<i>n</i> = 22)	Diagnosis		
		animal allergy	1	11
		pollen allergy	2	—
	no immediate symptoms from hay (<i>n</i> = 30)	no other allergy	6	2
		perennial rhinitis	—	7
		endogenous asthma	—	13
		pollen allergy	—	9
		farmer's lung	—	1
Non-farmers with immediate symptoms from hay (<i>n</i> = 21)	pollen allergy	8	3	
	animal allergy	3	5	
	Other or no allergy	1	1	

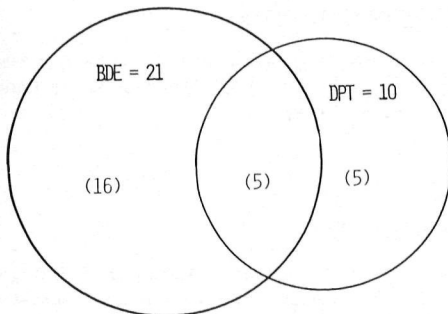


Fig. 2. Distribution of positive RAST tests to barn dust extract (BDE) and a house dust mite (DPT) extract. Number of tests representing a section of a circle is given in brackets. Thus, five out of the 26 patients were positive both to BDE and DPT.

Patients

Of the 52 farmers, 22 reported immediate allergic symptoms when handling hay or visiting barns. Nine of them had a positive RAST to BDE. Of these 22, six had SPT against BDE and all were positive. Eight of the 22 had no other clinically evident allergy (i.e. positive history or tests) than to hay, and of these six had strongly positive RAST to BDE.

Of the 21 non-farmers with history of hay allergy, 12 had positive RAST against BDE. Nine were tested with SPT against BDE and all were positive (Table 1).

In the control group of 69 consecutive patients tested with SPT against BDE 25 were

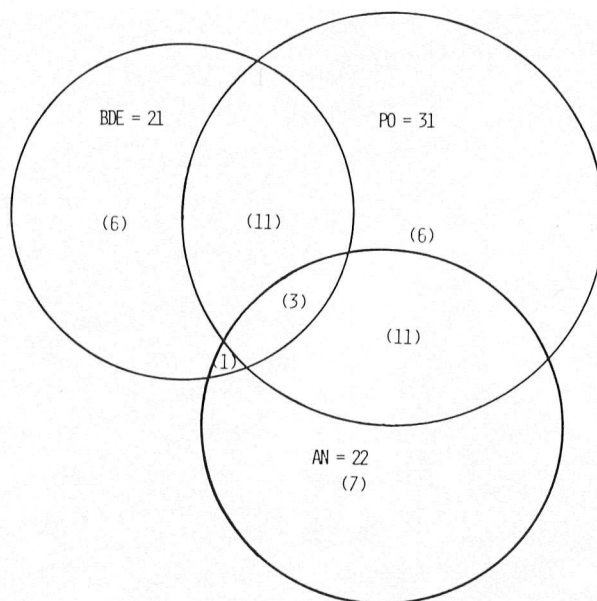


Fig. 3. Distribution of positive RAST tests to barn dust extract (BDE), pollen allergens (PO) and animal allergens (AN). For details, see Fig. 2. Note that the combination PO and BDE is not more common than PO and AN.

positive, 11 of whom had a reaction of 4 mm or more. The sera of the six strongest reactors were all negative in RAST against BDE.

Cross reactions with other allergens

Five of the 21 positive RAST reactors towards BDE were also positive against DPT, and there were another five positive DPT-reactors among the 52 farmers and non-farmers with negative RAST to BDE. The case histories in those reacting for both extracts were in accordance with allergy to both BDE and DPT. Thus, the two extracts contain specific, non-cross reacting allergens. Most of the patients allergic to BDE had other allergies as well, but there was no correlation between the various antigens (Figs. 2 and 3). For moulds, positive reactions were rare, and again there was no correlation with the reactions towards BDE or any other allergen.

DISCUSSION

"Barn allergy" due to hypersensitivity towards "storage mites" have been described from the

Orkney Islands (1, 2) and in other settings (4). It seems likely that the here described reactions have the same cause. This kind of allergy seems to be fairly common and tests for these mites should be included among the standard tests, especially among farmers. Culturing the mites for further studies are now in progress.

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