

Hirstia domicola sp. n. from house dust in
Japan and Surinam
(Acarina: Sarcoptiformes, Pyroglyphidae)

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Abstract: The new species described here has been found in the dust of several houses in Japan and in two houses in Surinam.

This new species differs from the single valid species of the genus *Hirstia*, *H. chelidonis* Hull, 1931 (= *Dermatophagoides passericola* Fain, 1964), in both sexes by the smaller size of the body and of the posterior legs; in the male by the relatively greater size of leg IV compared to leg III; in the female by the distinct sclerotization of the cuticle of the posterior region of the dorsum, especially around the *d* 5 and *l* 5 setae and immediately in front of the latter.

In 1950 and 1951, Sasa found from the sputum and urine of patients one female and one male mites, which were identified as *Dermatophagoides* sp. and *D. saitoi* (Sasa, 1947), respectively. It is presumed, however, that they are identical with the new species described in this paper.

In 1967 and 1970, Oshima found the fact that the mites of the present species abounded in house dust in Japan. The number of these mites ranged from 9% to 18% of total mites those existed in the house dust. In 1968, he described the present species and identified it with *Mealia passericola* (Fain, 1964) [= *Hirstia chelidonis* Hull, 1931]. Recently van Bronswijk also detected the present species in two houses in Surinam (Bronswijk, 1972).

It was clarified, however, that the present species was distinguished from *H. chelidonis* which materials are preserved in British Museum, and was new species.

We agreed with the opinions that the genus *Hirstia* should be maintained (Gaud, 1968; Fain and Lowry, 1974), although *Hirstia* had been synonymized with *Dermatophagoides* by Fain (1967a).

Genus *Hirstia* Hull, 1931

Hirstia Hull, 1931: 146, Fain, 1967a: 204; Gaud, 1968: 292; Fain and Lowry, 1974 (in press)

This genus is distinguished from the genus *Dermatophagoides* Bogdanov, in both sexes by the structure of the cuticular striations which are more closely together, the complete absence of sclerotized apical processes (=ongles) on tarsi I and II, and distinct inequality of legs III-IV; in the male by the presence of two spines on tarsus III (instead of simple setae in *Dermatophagoides*), the denticulate aspect of the sclerotized perianal ring and the anterior situation of the genital suckers, in front of the aedagus.

Type species: *Hirstia chelidonis* Hull, 1931
(= *Dermatophagoides passericola* Fain, 1964)

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Fain (1967a) synonymized the genus *Hirstia* with *Dermatophagoides*, but recently (Fain and Lowry, 1974) we accepted the opinion of Gaud (1968) who proposed to maintain this genus.

***Hirstia domicola* sp. nov.**

Mealia passericola Oshima, 1968: 178
(Figs. 13-17) (nec Fain, 1964)

Male (Figs. 1-2, 5-6)

Idiosoma 249 μ long in the holotype and its maximum width 165 μ . In three paratypes from Japan these measurements are 240 \times 151 μ , 252 \times 161 μ and 258 \times 161 μ . Cuticular striations very close to each other. The number of longitudinal striation between the two *d 2* setae is 78, and the distance *d 2-d 2* is 58 μ . It is therefore not possible to put these striations in a general drawing of the mite.

Dorsum: Propodosomal shield well developed with a median area more sclerotized. Laterally and in front of each *l 1* seta there is a small punctate area. Opisthosoma bearing a punctate shield having an irregular anterior margin and extending laterally to the ventral surface of the body. This shield is more strongly sclerotized around the *d 5* and *l 5* setae.

Venter: All epimera free. Coxae I to IV with punctate shields. No sclerotization between the epimerae I. Male organ poorly developed. Perianal ring oval, adanal suckers well developed. There is a punctate area around a large part of the perianal ring. Legs I and II subequal, rather short and thick. Tarsi I and II without apical processes (=ongles). Leg III inflated, wider and longer than leg IV. Legs III and IV are 108 μ and 69 μ long respectively, ratio 1.56 (from base of femurs to tip of tarsi, without pretarsi).

Chaetotaxy: The *sc e*, *h*, *d 5* and *l 5* setae are long, other setae much shorter. Tarsi I-IV with 8-8-6-5 setae; tarsus IV with three simple and two modified, sucker-like setae. Tarsus III bearing two unequal spines (modified setae). Genu I with two very unequal solenidions.

Female (Figs. 3-4, 7-9)

Idiosoma 306 μ long and 197 μ in maximum

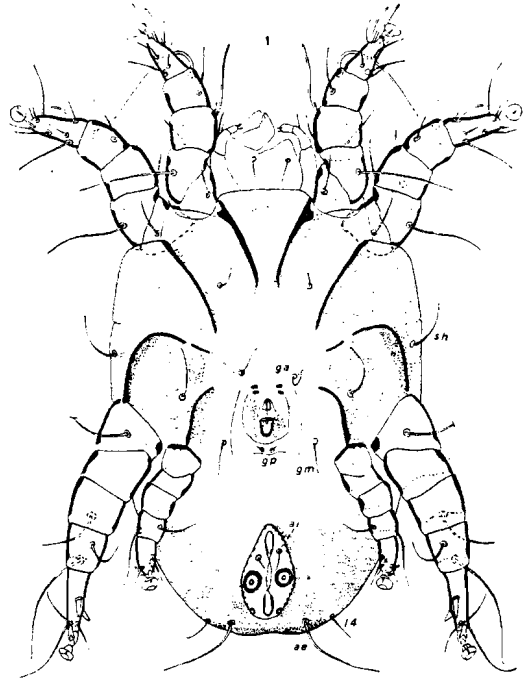


Fig. 1 *Hirstia domicola* sp. n. Holotype male, ventral view. Setae of the idiosoma: *s* *h* subhumeral; *ga*, *gm* and *gp* anterior, median and posterior genitals; *ai* and *ae* internal and external anals; *l 4* 4th lateral.

width in the allotype; in two paratypes from Japan these measurements are 360 \times 252 μ (in a strongly flattened specimen) and 298 \times 190 μ , respectively.

Dorsum: Propodosoma as in the male. There is no true hysterosomal shield, but the posterior region of dorsum is more distinctly sclerotized and partly punctate. This sclerotized punctation is specially well marked around the *d 5* and *l 5* setae. The striations are very close to one another as in the male. The distance between the *d 3* setae is 72 μ and there are about 70 striations. Genital papilla small, round, not sclerotized, opening dorsoterminally.

Venter: Epimera free. Coxal shields less developed than in the male. Epigynium slightly curved and not bearing the *ga* setae. Leg III distinctly longer and wider than leg IV. Length of legs III and IV 123-129 μ and 87-90 μ , respectively, and ratio 1.42 to 1.50 (measurements made as for the male).

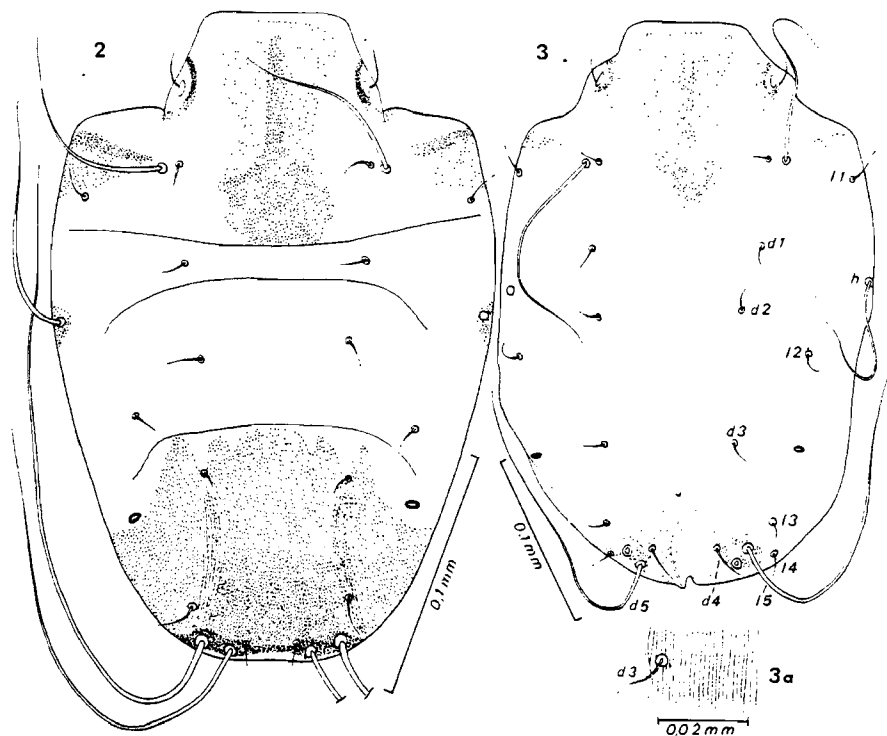


Fig. 2-3 *Hirstia domicola* sp. n. Fig. 2: Holotype male. Fig. 3: Allotype female, dorsal view. Fig. 3a: Striations near the *d3* seta in the female (to the left). Setae of the idiosoma: *d1* to *d5* dorsals; *l1* to *l5* laterals; *h* humeral.

Dorsal chaetotaxy and solenidia on legs I and II as in the male.

Habitat

1) A female mite of the present species was collected from the sputum of an asthmatic patient by Sasa (1950) and a male mite was collected from the urine of a patient three years old by Sasa (1951). It is not certain, however, whether these cases were true acariosis or these findings were due to the contamination of the mites to apparatus used for the examination.

2) In all eight homes of an apartment building examined the present species was found in February, 1964 in Yokohama, Japan. Numerically the composition ranged from 2.2% to 38.1% (averagely 17.8%) of the number (averagely 536.4) of the mites isolated from the house dust (Oshima, 1967).

3) There was no exception that the present species was not found in the survey of nine samples of house dust collected from

Japan and Taiwan (Oshima, 1970). The composition of the mites of the present species was 8.7% of averaged number of mites isolated (1,054.3).

4) From three samples of the mattress dust which were collected in May and June, 1971 in Bangkok, the present species was found by Oshima. The numbers of the mites of this species out of total mites of all groups were 11 out of 3,848, 2 out of 1,690 and 3 out of 1,220, respectively.

5) In Columbus, Ohio, of six samples of mattress dust examined, one sample contained the present species and this mite density was 2 out of 2,854.

6) In house dust of several houses in the following localities in Japan: Urashima apartment building in Yokohama, 19 and 20 June 1964, 18°C, 69% relative humidity (allotype and 2 paratype females), 29 June 1967 (paratype male); Tokyo, 4 July 1967 (1 paratype male); Tohoku district, Northern Japan, 29 and 30 June 1967 (2 males and 1

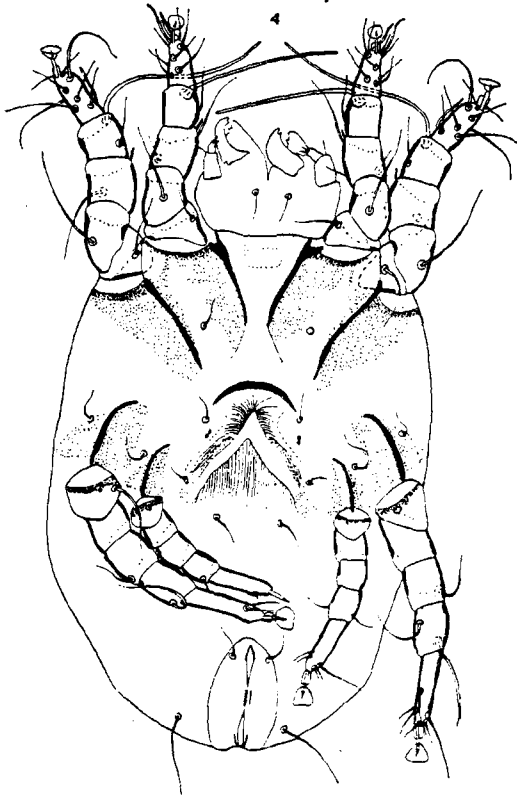


Fig. 4 *Hirstia domicola* sp. n.: Allotype female, ventral view.

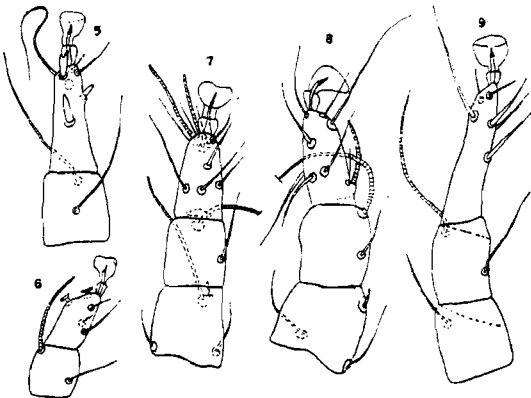


Fig. 5-9 *Hirstia domicola* sp. n. Figs. 5-6: Tibiae and tarsi III and IV in the male. Figs. 7-9: Genua, tibiae and tarsi I, II and III in the female.

female, paratypes), 5 September 1967 (holotype male and 1 paratype female), Coll. S. Oshima.

7) In dust of two houses in Surinam, 27

November, 1972 (1 female paratype) and 27 November, 1972 (1 female, paratype) Coll. van Bronswijk.

Types

The type is deposited in National Science Museum, Tokyo as the code of NSMT-Ac 8547, and the paratypes are preserved in the collections of the authors.

DISCUSSION

Differences between H. domicola sp. n. and *H. chelidonis*

In the size of idiosoma *H. chelidonis* is larger than *H. domicola* sp. n.; in the male, the former is 1.2 times as the latter and 1.5 times as wide as the latter; in the female, 1.1 times as long and wide as the latter.

In the male of *H. domicola* sp. n. the ratio of length of leg III to IV is 1.56. In one male specimen of *H. chelidonis* from the house martin (specimen from Hull's Series) these measurements are 153 and 80 μ respectively (ratio 1.9). In the allotype male of *D. passericola* this ratio is 1.83.

In the female of *H. domicola* sp. n., length of legs III and IV 123-129 μ and 87-90 μ , respectively, and ratio 1.42 to 1.5. In two female specimens of *H. chelidonis* from the collection of Hull (in British Museum) these measurements are 160-170 μ and 105-114 μ , respectively and ratio 1.5

Remarks on the house-dust mites of the family Pyroglyphidae Cunliffe

Voorhorst *et al.* (1964) have shown that an unidentified mite of the genus *Dermatophagoides* Bogdanov was associated with house-dust asthma in the Netherlands. Fain (1965, 1966a) recognized that this mite belonged to the species *Dermatophagoides pteronyssinus* (Trouessart, 1897). He re-described this species and erected a lectotype among the type series of Trouessart. Fain (1967b) withdrew the genus *Dermatophagoides* from the Psoroptidae and put it into the Pyroglyphidae but in a distinct subfamily Dermatophagoidinae.

Active investigations on the house-dust in several parts of the world have proved the cosmopolitan distribution and the domestic

habitat of *D. pteronyssinus* (Fain, 1966 a and b).

The occurrence of *Dermatophagoides* spp. in Japan has been pointed out by Sasa (1948, 1950, 1951) and Oshima (1964), but at that time the true pathogenic action of this mite was unknown. More recent investigations of Oshima (1967, 1968, 1970) have revealed that a great number of the pyroglyphids inhabited in the houses of Japan.

Since the discovery of Voorhorst *et al.* (l. c.) numerous new genera and species of Pyroglyphidae have been described. The total number of genera known in this family is at present 11. If one includes the new species described here, the number of species is 26. The list of these taxa and their habitats is given in a paper of Fain and Lowry (1974). Most of these species live in house dust or in nests of birds.

The genus *Hirstia* contains two species. The first species, *H. chelidonis* Hull [= *Hirstia passericola* (Fain)], lives in nests of swallows, swifts and sparrows; the second one, *H. domicola* sp. n., is apparently restricted to house dust.

Taxonomic position of Dermatophagoides pteronyssinus (Trouessart)

When the senior author compared the mites that he found in house dust in the Netherlands and in Belgium with the type series of *Mealia pteronyssina* Trouessart, he became sure that they belonged to the same species (Fain, 1966 a). He thought, however, that as the genus *Mealia* was obviously a synonym of *Dermatophagoides* Bogdanov as already pointed out by Baker and Wharton (1952), these specimens should be called *Dermatophagoides pteronyssinus* (Trouessart) (Fain, l. c.). We attained to this opinion although the junior author Oshima have proposed that the genus *Mealia* should be maintained together with the genus *Dermatophagoides* (Oshima, 1968).

Whether this species is a synonym of the genotype species, *Dermatophagoides scheremetewskyi* Bogdanov or not could not be ascertained at that moment. Some differences in the original description and drawings by Bogdanov or in the redescription of that species by Dubinin *et al.* (1956) had led us

to the conclusion that *D. pteronyssinus* could be distinct from the species of Bogdanov. However, as the types of Bogdanov and the specimens described by Dubinin *et al.* have been lost, it has become impossible to check whether these discrepancies are real or not. Therefore the senior author (Fain, 1966 a, p. 320) proposed to conserve provisionally the two species and to reconsider the situation when new material from the type localities of *D. scheremetewskyi* will become available.

According to Gaud (1968), the species described by Trouessart (1886) under the name *Dermoglyphus (Paralges) pteronyssoides* is identical with *Dermatophagoides pteronyssinus* (Trouessart, 1897). He therefore considered that the latter should become a synonym of *D. pteronyssoides*. It is to be noted that the name "pteronyssoides" has never been used since its description in 1886. We propose therefore, in order to serve the stability of the nomenclature, to consider the name "pteronyssoides" as a *nomen oblitum*, according to the Art. 23, b of the International Code of Zoological Nomenclature (XV International Congress of Zoology). This article stipulates "that a name that has remained unused as a senior synonym in the primary zoological literature for more than fifty years is to be considered a forgotten name (*nomen oblitum*)".

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REFERENCES

- Baker, E. W. and G. W. Wharton (1952): An introduction to acarology, 374-375, MacMillan Co., New York.
- Bogdanov, A. (1864): Deux acariens trouvés par M. Scheremetewsky sur l'homme. *Bull. Soc. Nat. Moscou*, 37(1): 341-348.
- Bronswijk, van J. E. M. H. (1972): Parasitic mites of Surinam. X. Mites and fungi associated with house-floor dust. *Entomol. Ber.* 32: 162-164.
- Dubinin, V. B., M. I. Guselnikova and I. M. Raznatovsky (1956): Discovery of skin ticks (*Dermatophagoides scheremetewskyi* Bogdanov, 1864) in some human skin diseases. *Bull. Soc.*

- Nat. Moscou Biol.*, 61 : 43-50.
- Fain, A. (1964) : Notes sur le genre *Dermatophagoides* Bogdanov. Description d'une espèce nouvelle (Acarina: Psoroptidae). *Rev. Zool. Bot. Afr.*, 69 (1-2) : 201-205.
- Fain, A. (1965) : Les Acariens nidicoles et détriticoles de la famille Pyroglyphidae Cunliffe. *Rev. Zool. Bot. Afr.*, 72 (3-4) : 257-288.
- Fain, A. (1966a) : Nouvelle description de *Dermatophagoides pteronyssinus* (Trouessart, 1897). Importance de cet acarien en pathologie humaine (Psoroptidae). *Acarologia*. VIII (2) : 302-327.
- Fain, A. (1966b) : Allergies respiratoires produites par un Acarien (*Dermatophagoides pteronyssinus*) vivant dans les poussières des habitations. *Bull. Acad. Roy. Med. Belg.*, VI (6-7) : 479-499.
- Fain, A. (1967a) : Le genre *Dermatophagoides* Bogdanov, 1864. Son importance dans les allergies respiratoires et cutanées chez l'homme (Psoroptidae: Sarcoptiformes). *Acarologia*, IX (1) : 179-225.
- Fain, A. (1967b) : Deux nouvelles espèces de Dermatophagiodinae. Rattachement de cette sousfamille aux Pyroglyphidae (Sarcoptiformes). *Acarologia*, IX (4) : 870-881.
- Fain, A. and J. Lowry (1974) : A new Pyroglyphid mite from Australia (Acarina: Sarcoptiformes, Pyroglyphidae). *Acarologia* (in press).
- Gaud, J. (1968) : Acariens de la sous-famille Dermatophagoidinae (Psoroptidae) récoltes dans le plumage d'oiseaux. *Acarologia*, X (2) : 292-312.
- Hull, J. E. (1931) : A new genus and species of Analgesidae (Feather-Mites). *Vusculum*, 17 : 145-147.
- Oshima, S. (1964) : Observations of floor mites collected in Yokohama. I. On the mites found in several schools in summer. *Jap. J. Sanit. Zool.*, 15 (4) : 233-244.
- Oshima, S. (1967) : Studies on the genus *Dermatophagoides* (Psoroptidae: Acarina) as floor-mites, with special reference to the medical importance. *Jap. J. Sanit. Zool.*, 18 (4) : 213-216.
- Oshima, S. (1968) : Redescription of three species of *Mealia* Trouessart, 1897 (Acarina: Pyroglyphidae) from house dust in Japan. *Jap. J. Sanit. Zool.*, 19 (3) : 165-192.
- Oshima, S. (1970) : Studies on the mite fauna of the house-dust of Japan and Taiwan with special reference to house-dust allergy. *Jap. J. Sanit. Zool.*, 21 (1) : 1-17.
- Sasa, M. (1947) : Jintainai dani kiseisho ni kansuru shin chicken (Notes on human acariasis). *Nisshin Igaku*, 34 (3) : 167-170 (in Japanese).
- Sasa, M. (1950) : Mites of the genus *Dermatophagoides* Bogdanov 1864, found from three cases of human acariasis. *Jap. J. Exp. Med.*, 20 : 519-525.
- Sasa, M. (1951) : Further note on mites of the genus *Dermatophagoides* Bogdanov, found from human acariasis. *Jap. J. Exp. Med.*, 21 : 199-203.
- Sasa, M. and H. Shingai (1958) : Occurrence of the mite *Dermatophagoides scheremetewskyi* Bogdanov, free-living in albumine tannate stored in dispensaries. *Jap. J. Exp. Med.*, 28 : 1-10.
- Trouessart, E. (1886) : *Bull. Etud. Scient. Angers*, 16 : 119.
- Voorhorst, R., M. I. A. Spieksma-Boezeman and F. Th. M. Spieksma (1964) : Is a mite (*Dermatophagoides* sp.) the producer of the house-dust allergen? *Allergie und Asthma*, 10 (6) : 329-334.

摘 要

日本およびスリナムの室内塵から見出されたイエチリダニ (新称)
Hirstia domicola (新種)

大島 (1968) がトヤチリダニ *Mealia passericola* (Fain, 1964) として再記載した本種は、検討したところ *M. passericola* [= *Hirstia chelidonis* Hull, 1931] とは異なることがわかったので、あらためて新種として記載した。

本種は *H. chelidonis* と比較して両性において胴体部が小さく、また後脚が短小である。雄においてはⅢ脚に比しⅣ脚の発達はやや顕著であり、雌においては胴体背面の後部表皮が革質化している。

Fain (1967a) は *Hirstia* を *Dermatophagoides* のシノニムとしたが、われわれは Gaud (1968) の意見を入れ、下記の理由により再び本属を独立させた。すなわち、体表面の細線紋理が緻密であり、Ⅰ、Ⅱ脚附節は先端突起を欠き、Ⅳ脚はきわめて短小である。雄においてⅢ脚附節に2棘があり、肛門板縁に鋸歯状革質部があり、生殖吸盤が生殖器の前方に位置する。

Voorhorst et al. (1964) が *Dermatophagoides* 属のダニの病原性を証明してから、このグループの分類が進み、本種を入れるとチリダニ科 Pyroglyphidae は 11 属 26 種を含むことになった。

Dermatophagoides 属および *D. pteronyssinus* の分類学的地位につき論じた。大島 (1968) は *Mealia* を *Dermatophagoides* と独立して存続させることを主張していたが、われわれは前者を後者のシノニムとすることに意見が一致した。また *D. pteronyssinus* と *D. scheremetewskyi* の同種性に関する問題は、後者の模式産地から新しい材料が入手可能になるまで、これら両種名は保存されるべきであろう。

Dermoglyphus pteronyssoides Trouessart, 1886 は *Dermatophagoides pteronyssinus* の古参シノニムである (Gaud, 1968) が, この種名は 1886 年以来使用されていないので, 国際動物命名規約 23 条 b により遺失名 *nomen oblitum* とみなされるべきであろう.

本種の和名は, 学名にちなみイエチリダニとし, トヤチリダニは *H. chelidonis* に付属させたい. *Dermatophagoides* 属の種和名には, 前述の理由により当然ヒョウヒダニが使用されるべきであろう.