Seasonal Fluctuation of Population Density of the Tea Red Spider Mite, *Tetranychus kanzawai* KISHIDA, in the Tea Plantation

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The tea red spider mite, *Tetranychus kanzawai* KISHIDA, one of the most serious pest of tea plant in Japan is abundant particularly during the first tea plucking season (from late of April to middle of June) and their feeding causes much damage to young tea leaves.

This paper deals with the seasonal fluctuations of the mite population density in some tea plantations.

MATERIALS AND METHODS

Observations on the mite population were carried out from 1952 to 1961 in the tea plantation of the Tea Research Station at Kanaya. The mite population in tea plantations belonging to the Tea Experiment Station in Saitama, Mie, Kyōto, Nara, Kōchi, Fukuoka, Saga, Miyazaki and Kagoshima Prefectures were also investigated in 1960 and 1961. All the tea plants in the tea plantations examined were of domestic variety, and subjected to routine spray program and plant management.

Sample leaves were collected at random from the surface of tea bush at intervals of about 5 days during 1952 to 1954, but about 30 days during 1957 to 1961. The number of leaves collected were 684 in the survey from 1952 to 1953, 144 in 1953 to 1954, 600 in 1957 to 1958, 720 in 1958 to 1959 and 1960, and 500 in 1960 to 1961. Matured old leaves were collected throughout a year except for growing season of young leaves, in which same of both old and young leaves were sampled. The total number of each stage such as egg, larva, nymph, and adult on the

sampled leaves were examined immediately with the aid of a magnifying-glass.

RESULTS

Population density of the mite on tea leaves

The population density of the tea red spider mite on tea leaves from 1952 to 1961 expressed as annual averages of the mites per leaf as shown in Fig. 1. It was suggested

Fig. 1. Average numbers of the mite, *Tetranychus kanzawai* KISHIDA, per leaf of the tea plant and its variation within annual years in the experimental tea plantation at Kanaya.

that the population of the mite was inclined to increase from 1952 to 1961 at Kanaya.

Seasonal fluctuation of population density of the mite at Kanaya

Fig. 2 shows the seasonal fluctuation of population density of the mite from 1952 to

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Fig. 2. Seasonal fluctuation of population density of the tea red spider mite, *Tetranychus kanzawai* KISHIDA, in the tea plantation at Kanaya.

1961 at Kanaya. From these results, it is clear that the tea red spider mite occurs twice a year at Kanaya. The first appearance occurs from March to June, and the second from September to November. The population density was always higher in spring than in autumn throughout this long-termed observation.

Variation of seasonal fluctuation of the mite population in several tea growing areas

Fig. 3 shows the seasonal fluctuations of the mite population from 1960 to 1961 in the tea plantations in Saitama, Shizuoka, Mie, Kyōto, Nara, Kōchi, Fukuoka, Saga, Miyazaki and Kagoshima Prefectures.

The seasonal fluctuation of population density of the tea red spider mite varied among the areas under tea cultivation. The mite population density was high in spring and autumn in the tea plantations in Saitama, Shizuoka, Kyōto and Kōchi Prefectures, but it had also a peak in summer at Mie and Nara Prefectures. In the tea plantations at Fukuoka, Saga, Miyazaki, and Kagoshima Prefectures, the mite apparently occurred irregularly, so the frequency of mite occur-

rence in a year was unable to be estimated conclusively.

Among the tea plantations surveyed, with the exception of Mie and Nara Prefectures, the mite increased in spring and autumn, but its population density is higher in spring than in autumn.

DISCUSSION

Tetranychus kanzawai KISHIDA was originally described as a mulberry pest based on the specimens collected from mulberry at Yamanashi Prefecture (KISHIDA, 1927). On the other hand, so-called tea red spider mite was discovered on tea plant in the end of eighteenth century, and named as *Tetranychus japonicus* by HOTTA (ONO, 1892; HOTTA, 1928). Then, the name, *Tetranychus japonicus* HOTTA was commonly used for the tea red spider mite for a long time. However, EHARA (1956, 1960) identified *japonicus* as a synonym of *kanzawai*, and concluded that the mite living on the tea plant in Japan is *Tetranychus kanzawai*.

It is well known that the *Panonychus citri* MCG., *P. ulmi* KOCH and *Tetranychus urticae*

Fig. 3. Variation of seasonal fluctuation of population density of the tea red spider mite, *Tetranychus kanzawai* KISHIDA, in the several tea growing areas in Japan.

A : Musashi (Saitama Pref.)

B : Kanaya (Shizuoka Pref.)

C : Kameyama (Mie Pref.)

D : Nara (Nara Pref.)

E : Uji (Kyoto Pref.)

F : Asakura (Kōchi Pref.)

G : Chikugo (Fukuoka Pref.)

H : Ureshino (Saga Pref.)

I : Kawaminami (Miyazaki Pref.)

(Broken line : data of Miyazaki Agr. Exp. Sta. in 1936-1937)

J : Chiran (Kagoshima Pref.)

(Broken line : data of Kagoshima Tea Exp. Sta. in 1964-1965)

KOCH, increase their population in summer in orchards and other gardens in Japan (HIROSE, 1957; MORI, 1961; SHINKAJI, 1959). The tea red spider mite, however, occurs in spring (from March to June) and autumn

(from September to November), but not in summer season (from July to August) in the tea plantations of many tea growing areas in Japan.

It has not been determined why the tea

red spider mite living on tea leaves does not increase in number during summer. However, the results of preliminary rearing test in the laboratory showed the suitability of the tea leaves for the increase of the mite population differed with seasons, and was positively correlated to population density of the tea red spider mite in fields. In summer, a much larger number of tea red spider mites are often found on bean plants cultivated together with young tea plants. From these evidence, it is assumed that the seasonal fluctuation of population density of the tea red spider mites in tea plantation is related to the seasonal fluctuation of the suitability of tea leaves for the mites.

In the tea plantations in Mie and Nara Prefectures, the mite population density was occasionally high in the summer. Information from preliminary surveys on the mite taxonomy, cultivating conditions of the tea plant, and climatic conditions, however, cannot explain why the mite population increases in summer in Mie and Nara.

SUMMARY

Seasonal fluctuation of population density of tea red spider mite, *Tetranychus kanzawai* KISHIDA, in the tea plantation was observed. The annual average numbers of the tea red spider mite per leaf were 0.3-1.3 in 1952-1959 and 3.5-6.2 in 1960-1961 in the tea plantation at Kanaya; and the population density of the mite had a tendency to increase from 1952 to 1961.

The population density of the tea plantation varied with seasons. The mite population increased twice a year at Kanaya, the first population increase occurred from March to June, and the second from September to November. The population density was

higher in spring than in autumn.

The seasonal fluctuation of mite population varied with the tea growing areas. The mite population density was high in spring and in autumn in the most of tea growing areas, with an exception in Mie and Nara, where the mite had also high population in summer.

It seemed that the mite population in the tea plantation is controlled by the host suitability of the tea leaves for increase of the mite population.

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摘 要

茶園におけるカンザワハダニ生息密度の季節的消長

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本報は茶園におけるカンザワハダニ生息密度の季節的消長について述べたものである。

1952～1961年に静岡県金谷町の茶園で調査した結果によると、カンザワハダニの生息密度は年平均値で茶葉1枚当たりの生息数が、1952～1959年では0.3～1.3頭、1960～1961年では3.5～6.2頭であった。この結果から金谷町の調査園では1952年から1961年にむかってカンザワハダニの生息密度が上昇したことが知られた。

茶園におけるカンザワハダニの生息密度は季節によって明らかに異なる。すなわち、1952～1961年に金谷町の

茶園で調査した結果によると、カンザワハダニは年2回の発生ピークがあってその1つは3～6月の間、他の1つは9～11月の間である。そしていずれの調査年次においても春の生息密度は秋の生息密度より高かった。

しかしながらカンザワハダニの発消長はわが国の茶栽培地帯全体でみた場合には若干異なっていた。すなわち、1960～1961年にわが国の大部分の茶産地について調べた結果によると、カンザワハダニの発生はわが国の多くの茶園では春と秋に多かったが、三重県や奈良県など一部の茶園では春秋の他に夏季にも発生が多かった。

新 刊 紹 介

Journal of Stored Products Research の発刊

イギリスの Pergamon Press から新しい国際的雑誌として“Journal of stored products research”が本年から発行されることになりました。貯蔵穀物につく昆虫、ダニ、菌類などの生活史、生態、生理、行動、分類、遺伝、防除法、また貯蔵という環境の物理的・化学的状態というようなことをその内容とするそうです。1年に4回発行されますが、第1巻第1号の内容の予告を見ますと、貯蔵害虫の殺虫剤抵抗性の論文が二つ、密封貯蔵の昆虫に対する効果、アカチビヒラタムシの内的自然増加率、マメゾウムシ類の天敵目録などというように昆虫関係が多いですがバラエティーにとんでおります。第2号には桐谷博士によるコクゾウムシの生態学的研究が載るようです。

この雑誌の編集はイギリスの Slough にある Pest Infestation Laboratory の人達によって行なわれます。編集主任は所長の G. V. B. HERFORD で、副主任に殺虫剤をやっている C. E. DYTE と甲虫類の生態の専門家である L. P. LEFKOVITCH があたっています。そして編集顧問として世界各国の研究者を10数人おいています。この編集の顔ぶれから想像すれば、この雑誌

誌は国際的にも順調な発展をするだろうことが予想されます。

穀物の生産が地理的にかたまって行なわれているので穀物の備蓄が必要であると同時に移動が行なわれねばならぬこと、穀物からの第二次生産品をはじめいろいろの食料品の保存という場合が増して来たこと、このような現在の事態に直面して、この雑誌の内容とするような学問の場面はますます必要性を増して来ています。だから、いわゆる貯蔵穀物の害虫や害生菌の研究者だけでなく、食品工業や衛生学などの専門家の広い関心をもひいて来るに違いありません。また、貯蔵害虫の多くは飼育が比較的たやすいものですから、生理学、生態学や遺伝学などの実験材料としてしばしば用いられています。従ってそのような態度で書かれた論文もきっと数多く誌上に現われて来るでしょうから、昆虫生理学者、生態学者、遺伝学者などがやはり目を通さねばならぬに違いありません。

編集者は日本からも沢山のいい論文が寄稿され、また一部でも多くの雑誌が予約購読されることを望んでいます。寄稿する論文は直接上記 HERFORD 氏あてに送ること。購入は Oxford の Pergamon Press あて申込むこと。年予約価は個人用は5ポンド、団体用は10ポンドです。 (京大農 内田俊郎)