of the insect, since they spend the whole day in their burrows (90–120 cm below the sand) and come out at 2 h after sunset (personal observation). Hemocytological features seem to indicate that this strictly nocturnal activity brings about important physiological changes which induce these hematological alterations.

Increased THC from 18.00 h to 22.00 h may be due to synchronized mitosis of the undifferentiated hemocytes[16] or release of sessile hemocytes from the temporary hemocyte reservoirs (indicated by the differences in THC in normal and heat fixed specimens during the period). Effects of heat shock on THC and DHC seem to indicate that during the day a majority of the hemocytes remain out of circulation, prohemocytes and granular hemocytes comprising the bulk of these cells[17].

Hemocyte periodicity was greatly altered in decapitated insects, which is indicative of the fact that neurohormones play a key role in maintaining the rhythmicity, since with the removal of the brain neurosecretory cells are eliminated. It seems also plausible that light may be the main signal to trigger the neurosecretory cells, releasing specific hormones that bring about chemical changes in the hemolymph which in turn determine the appearance and disappearance of hemocytes in and from the circulation.

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Different response of alfalfa plants to artificial defoliation and to feeding by pea leaf weevil (*Sitona lineatus* L.)

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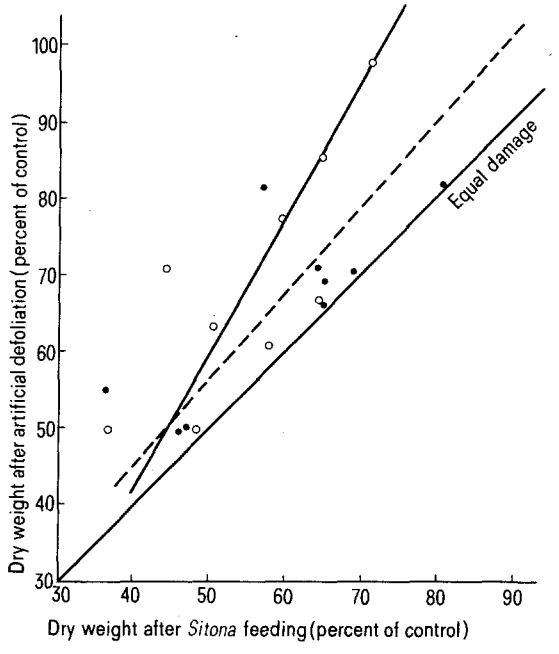
Summary. The consequences of defoliation of alfalfa seedlings by *Sitona lineatus* L. and by hand cutting of the same shape and extent were compared. Insect feeding caused (after 40 days) significantly greater decrease of plant weight (especially in roots) than artificial defoliation.

Some information concerning the toxic influence of sucking insects on plants is available in the literature[2,3]. Little is known about similar effects of chewing insects. The negative effects of these insects on plants is mostly attributed to the loss of plant tissue only. However, some recent works demonstrated that mechanical defoliation and defoliation by chewing insects evoked different responses in plants[4,5]. We compared the effect of hand defoliation with that caused by the feeding of pea leaf weevil on alfalfa plants.

In our experiments 9 strains derived from 5 cultivars of alfalfa were used. The seeds were sown into 3 pots (A–C) filled with a mixture of sand and peat. In each pot the plants were arranged in 9 parallel rows, every row containing 20 seeds of one strain. The plants were cultivated in greenhouse conditions. At the cotyledon stage, 90 starved females of pea leaf weevil (*Sitona lineatus* L.) were placed in the pot A, and allowed to feed for 3 h. Immediatelly after feeding, the plants in the pot B were mechanically defoliated by scissors so that in every individual plant the damage caused by the scissors closely resembled in position, shape and extent the damage caused by the beetles to the corresponding plant in the pot A. The plants in the pot C served as a control. All plants were harvested 40 days after sowing (at this time the control plants had reached the stage of the 6th true leaf), and the dry matter of the parts above ground and roots was weighted. The dry weight of damaged plants was expressed as a percentage of the dry weight of control plants.

In all strains the dry weight of artificially defoliated plants was higher than that of plants damaged by beetles (fig.).



The comparison of alfalfa response to artificial and *Sitona* beetle defoliation. The dry weight (expressed as percent of the dry weight of control) of plants after *Sitona* feeding (abscissa) plotted against dry wt of plants after artificial defoliation (ordinate). Mean values (of 20 plants) for above-ground parts (●, – – –) and roots (○, ——) of 9 alfalfa strains.

The dry weight of the above-ground parts of artificially defoliated plants (the average from all 9 strains) was by 14.7% greater than the dry weight of plants damaged by *Sitona* beetles. The corresponding difference in roots was 26.2%. The roots of plants defoliated by beetles reached only 55.3% of the weight of the roots of control plants.

The response of the above-ground parts and roots of plants to both types of defoliation was similar to that found in our previous work[6]. Large strain-specific differences in the response to defoliation were observed. This was perhaps due to the different abilities of tested strains to compensate in subsequent phases of development for the loss of leaf area in the seedling stage[7]. The results confirmed the conclusion of Capinera and Roltsch[5] that defoliation of plants by insects is difficult to simulate by artificial defoliation. Probably, the interaction between host plant and chewing insects is a more complex problem (similarly to the case with sucking insects[8]) than simple mechanical defoliation.

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The course of *Plasmodium berghei* infection in mice latently infected with *Toxoplasma gondii*[1]

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Summary. The course of infection with 2 different virulent strains of *Plasmodium berghei* was investigated in mice latently infected with *Toxoplasma gondii*. When given the highly virulent ANKA strain of *P. berghei* all Toxoplasma-infected mice died but the survival time was prolonged. After infection with the less virulent strain K 173 mice could survive the subsequent infection. In these cases levels of parasitemia depended upon the duration of the *T. gondii* infection. Mice infected for about 6 weeks with *T. gondii* showed maximum protection.

T. gondii can exist in a very great variety of hosts, among which are nearly all mammalian species and many birds. The high incidence of contamination in humans has raised the question of the influence of a latent *T. gondii* infection on additional subsequent parasitical infections.

It is well known that laboratory animals latently infected with *T. gondii* are immune to superinfection[2-13]. This protection is not only observed against parasites of the same species but against bacteria such as *Listeria monocytogenes* and *Salmonella typhimurium*[14], against fungi, e.g. *Cryptococcus neoformans*[15], and virus infections[16]. In contrast to these observations other authors[17] found an immundepression during the acute stage of Toxoplasmosis, so that a subsequent infection with *P. berghei yoelii* leads to a stronger parasitemia than in the control animals.

In order to clarify these contradictory statements we investigated the influence of latent *T. gondii* infection on the course of *P. berghei* parasitemia in mice.

Material and methods. The animals we used in this investigation were female NMRI mice from the Versuchstierzucht Hannover. They were fed on a commercial diet and tap water ad libitum. For *T. gondii* infection mice received i.p. 10-15 cysts of the avirulent DX strain which were isolated from the brains of mice that had been infected 14 weeks earlier. At various time intervals animals additionally received 10^3 parasites of the highly virulent ANKA strain or the less virulent K 173 strain of *P. berghei*. Parasitemia was examined daily by counting the infected red blood cells in Giemsa-stained blood smears. All data are mean values from 5-10 animals per group.

Results (fig. 1-3). In the control groups, mice infected with the highly virulent ANKA strain or the less virulent K 173 strain of *P. berghei*, parasites were found in the peripheral

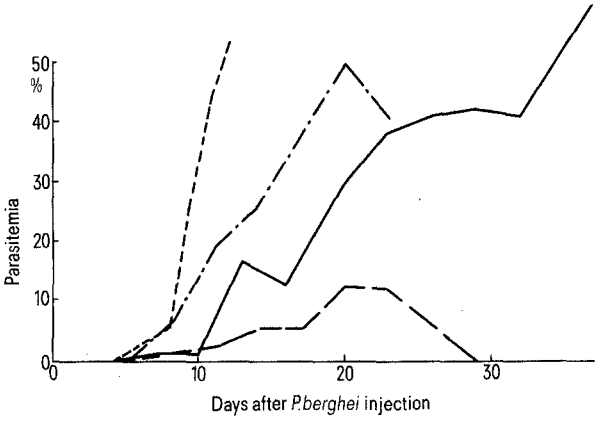

Figure 1. *P. berghei* parasitemia in mice with a *T. gondii* infection of 6 weeks duration.
P. berghei (K 173), ——; *P. berghei* (K 173) and *T. gondii*,— —; *P. berghei* (ANKA), -----; *P. berghei* (ANKA) and *T. gondii*, ·····.

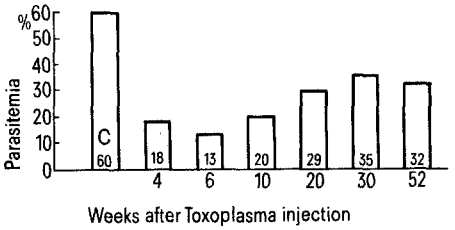

Figure 2. Maximum values of *P. berghei* (K 173) parasitemia related to the duration of the *T. gondii* infection (C = control group).