Verdunstung nachwies. Eine grössere Wasserverdunstung der bewegten (6.0 mg/h) gegenüber ruhenden (3,9 mg/h) Schaben (*Blatta*) beobachtete RAMSAY[4]. Bewegung und Bevorzugung dunkler Orte bei überhöhter Körpertemperatur berichten CREA und HEATH von *Manduca sexta* (lepidoptera).

Da die Schaukelbewegungen den Eindruck eines schwingenden Aststückes erwecken, wurde weiterhin geprüft, ob der Schutz der Stabheuschrecken durch ihr kryptisches Verhalten während des Tages dadurch nicht verloren geht. Dazu wurden Larven aller Altersstadien und Imagines von *Carausius* zusammen mit Mehlwürmern und Getreidekörnern Hühnern als Futter angeboten. Über das Futter wurden 2 verzweigte Äste gelegt, an denen sich die Stabheuschrecken zur Ruhe setzten. Die Durchmesser der Zweige entsprachen denen der Larven. Als Testtiere standen mir 6 Haushühner (je zwei der nahe verwandten Rassen: Helle Brahma, Orpington und Kreuzung aus Cochin mit Orpington) und 1 Hahn (der Rasse Helle Brahma) zur Verfügung[6]. Zur Futterauswahl wurde jeweils nur ein Huhn (Hahn) für 3–4 Tage herangezogen, da die Überwachung von mehreren Stabheuschrecken und Hühnern von 1 Beobachter nicht möglich ist. Das Futter wurde auf einer umgebauten Streckplatte, die mit einem feuchten Tuch überzogen war, angeboten. Die Temperatur konnte entsprechend erhöht werden, so dass die Stabheuschrecken auch im Hühnerstall schaukelten. Bei der Futterwahl wurden von 84 laufenden Stabheuschrecken 45 gefressen und 31 näher beäugt, aber nicht gefressen, die restlichen 8 blieben unbeachtet. Von den 19 schaukelnden Tieren wurde keines gefressen oder fixiert. Die Auswahl ist signifikant (t-Test, $\alpha = 0.01$). Damit ist gezeigt, dass die Imitation eines schwankenden Astes tatsächlich wirksam sein kann.

Es bleibt zu berücksichtigen, dass Hühner und sicherlich auch andere Räuber von *Carausius* bei ihrer Nahrungssuche ihre Beute als etwas sich Geradeaus-Bewegendes oder Schlängelndes kennen und das seitliche Schwanken eines Objektes als eine passive Verschiebung in der Umgebung nicht weiter beachten. Es erscheint mir daher in diesem Falle für angebracht, von einer Bewegungsmimikry zu sprechen. Unter Mimikry verstehe ich in Anlehnung an WICKLER[7] einen Täuschungsvorgang, bei dem der Signalsender eine für sich günstige Reaktion des massgeblichen Empfängers erreicht. Bezogen auf das Nachahmungsobjekt liegt ein Spezialfall der Peckhamschen Mimikry vor. Das Wesentliche dieser Mimikry ist nämlich nicht, wie leider durch das Synonym Angriffsmimikry suggeriert wird, der Angriff, sondern die «Harmlosigkeit» vortäuschende Bewegungsart.

Summary. Larvae and imagoes of *Carausius* execute rhythmic swinging movements with their whole body at higher temperature and high atmospheric moisture. These are used for the regulation of the body temperature.

These swinging movements are regarded as moving-mimikry, because it could be shown that walking sticks which went straight on were significantly more often found and eaten by chickens than swinging animals.

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Sex Attractant of the Larch Bud Moth Found by Electroantennogram Method

The larch bud moth, *Zeiraphera diniana* (Guenée) (Lepidoptera: Tortricidae: Olethreutinae), is a major pest of European alpine larch forests. Population dynamic studies show that there are large, but regular fluctuations in population densities in which years of high infestation are followed by periods of extremely low populations[1]. Control methods, such as the use of sex attractants, may be most effective when the moth density is at a minimum. Attempts to isolate and identify the female sex pheromone of *Z. diniana* were frustrated because male moths did not respond in the laboratory behavioral tests. We, therefore, utilized the electroantennogram technique[2–4] to find a sex attractant for this insect.

About 200 female abdominal tips were excized and extracted with 2 ml of benzene to yield a crude pheromone extract. Aliquots of this extract were injected on polar and nonpolar gas chromatography columns and the effluent collected in 12″ capillary tubes at 1-min intervals. Male antennal responses when air was puffed through the tubes showed the presence of an active component with a retention time similar to *trans*-11-tetradecenyl acetate on both columns (Table I).

Male antennal responses to a series of 12- and 14-carbon chain alcohols, aldehydes and acetates showed that the 14-carbon chain alcohols and acetates elicit the best re-

Table I. Gas chromatographic retention times of active componenta in larch bud moth extracts

GC columns	Retention times (min.)		
	trans-11-tetradecen-1-ol	*trans-11*-tetradecenyl acetate	Active component
Polar[b]	24.1	22.4	22–23
Nonpolar[c]	8.5	14.1	14–15

[a] Activity was determined by EAG analysis of GC effluent. [b] 3% cyclohexanediamethanol succinate δ 160°. [c] 3% OV-1 δ 160°.

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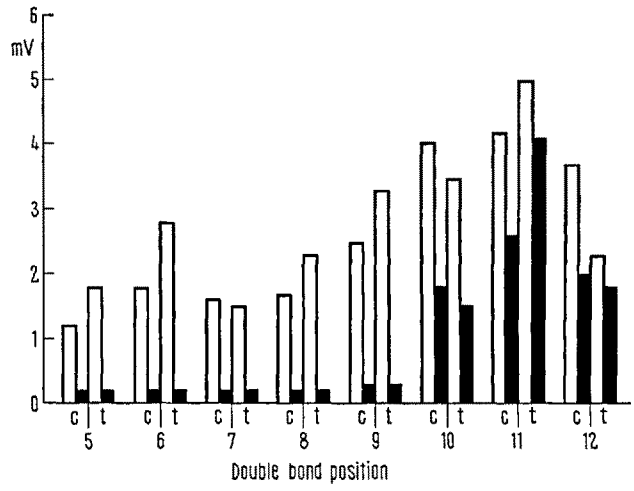
Table II. Field tests with different concentrations of the larch bud moth attractant, *trans*-11-tetradecenyl acetate, conducted in the Engadin (Switzerland)

Attractant conc. in μl[a]	No. of males trapped August		September
	13–19	13–16	16–27
1	46	–	–
10^{-1}	46	165[b]	295[b]
10^{-2}	236	147[b]	187[b]
10^{-3}	184	65[b]	134[b]/100[c]
10^{-4}	–	71[d]	90
10^{-6}	–	160[d]	213
Control[e]	125.5	174.5	–

Except for $10^{-3}/10^{-4}$ and $10^{-2}/10^{-6}$ μl, all differences between concentrations are significant at 2% level.
[a] 1 μl of attractant or acetone solution on a rubber stopper. [b] Same preparation as in August. [c] Mean of 4 replicates with fresh preparation. [d] Trap with fresh preparation. [e] Mean of the 4 best out of 10 traps containing virgin females.



Antennal responses of male larch bud moths to acetates (white columns) and alcohols (black columns) of 14-carbon chain standards with different position of double bond in *cis* (c) or *trans* (t) configuration (10 μg on filter paper, 4 replicates).

sponses. The acetate standards were more active than the corresponding alcohols, with *trans*-11-tetracedenyl acetate always producing the greatest response (Figure). The pattern of the responses obtained with the standards is similar to that of other species which use a monounsaturated acetate as a sex attractant[2,3,5]. The above data indicate that *trans*-11-tetradecenyl acetate may be similar to the main component of the sex pheromone communication system of this insect.

Field testing studies proved that *trans*-11-tetradecenyl acetate is very attractive to male larch bud moths but not for females. A test involving *cis*- and *trans*-11-tetradecenyl acetates and alcohol showed that only the *trans*-acetate is attractive, although 2 μl of chemical in a polyethylene cap did not begin to attract until it had been in the field for 40 days (living females did attract males during this period). Dilution series of the *trans*-acetate were then tested in an attempt to optimize the release rate (Table II). It became obvious that lower release rates were essential, that of 100 μg of chemical or more on a rubber stopper being too high. However, traps with 100 μg of the substance became highly attractive in the course of 1 month. The fact that, of the fresh preparations, 10 μg and 1 ng of chemical were most attractive, suggests that 2 optimum concentrations exist. The significance of this finding has to be studied during the next season. Since the fresh 1 ng trap contained only about 2 trillion molecules and since it did not lose its attraction for at least 14 days, one may conclude that a few molecules per μl of air suffice to attract the male larch bud moths.

Although it has not been rigorously proven that *trans*-11-tetradecenyl acetate is identical with the natural sex pheromone, the compound is potent enough in the field to replace living female monitoring traps and to be used in insect control experiments. This same compound has been found to serve as an attractant for several other lepidopterous species, but the most interesting point concerning its structure is that it represents the first case in which a species of the subfamily Olethreutinae apparently utilizes a 14-carbon rather than a 12-carbon chain attractant[5].

Zusammenfassung. Mit Hilfe der Antennogramm-Methode wurde *trans*-11-Tetracedenylacetat als spezifisches Attraktans für Männchen des Lärchenwicklers *Zeiraphera diniana* bestimmt. In geeigneter Konzentration ist die Attraktivität der synthetischen Substanz derjenigen virginer Weibchen ebenbürtig.

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Distribution of the Herbicides 2,4,5-T and 2,4-D in Pregnant Mice. Accumulation in the Yolk Sac Epithelium

The teratogenic action of herbicides of phenoxyacetic acid type has been the object of several investigations. When 2,4,5-T was administered to pregnant mice, malformations such as cystic kidney and cleft palate were revealed[1,2]. In the first study[1] the impurity 2,3,7,8-tetrachlorodibenzo-*p*-dioxin[3] has been suggested to have contributed to the malformations observed, but later both purified 2,4,5-T and the dioxin were shown to cause