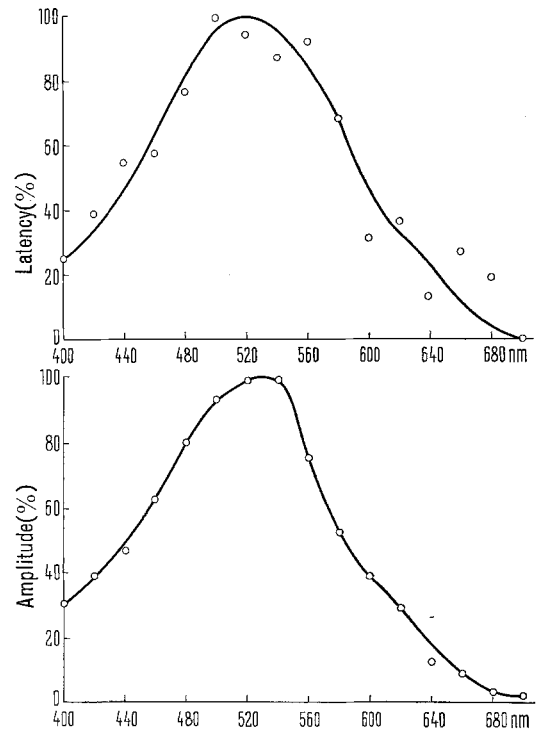
Spectral Efficiency as Function of Latency in the Visual Mechanism of Insect (*Tenebrio molitor* L.)

The range of spectral sensitivity and efficiency of the *T. molitor* eye has been reported in detail[1]. Energy-calibrated monochromatic light was used in addition to conventional optical and electronic systems. Exact amplitude and waveform of the ERG were determined with the aid of a computer of average transients (CAT 400B, TMC).

The percentage differences between the peak latency of the principal potential and minimum latency value was calculated. Since these bear an inverse relationship to amplitude values (as the stimulus become higher, the time necessary for obtaining maximal sensitivity is shorter[2]) they were subtracted from 100%. The peak was found to be between 510 and 530 nm, the curve decreasing to zero in long wavelengths and to about 25% efficiency in the short ones. This paralleled the results of amplitude studies (Figure). Latency at various wavelengths varied by 20–30%, in contrast to a 5–100% variation in amplitude; therefore, the latency factor is more stable. The relative variability among the latency values at each wavelength is greater than for amplitude values at corresponding wavelengths. Latency measurements can serve to confirm results based on calculations of amplitude.

When the response was tested at 10 nm, intervals between 500 and 560 nm, a plateau was obtained, decreasing slightly at both ends. Therefore, there is no clear-cut peak – indicating poor discrimination between wavelengths.

The amplitude is conventionally used as a measure of spectral sensitivity or efficiency; few data[3] are available on the rate of rise of the ERG in man in respect to monochromatic light, but it is of no importance in understanding the spectral sensitivity. The present work reveals the possibility of using latency as a measure of spectral sensitivity in insects.



Spectral efficiency curves for *T. molitor* based on latency and amplitude.

Zusammenfassung. Bei Untersuchungen der elektrophysiologischen Reaktion des Facettenauges beim Mehlkäfer *Tenebrio molitor* wurde die Maximalreaktion zwischen 510 und 530 nm gefunden. Latenz und Amplitude dienten als Kriterien der facettären Spektraleffizienz.

U. YINON

The Hebrew University of Jerusalem, Department of Entomology and Venomous Animals, Jerusalem (Israel), 18 February 1969.

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Association and Motivation in the Establishment of Conditioned Reflexes in Rats

It is generally admitted that one of the basic requirements in the establishment of conditioned responses is the presence of a certain level of motivation, commonly obtained by reinforcing positively or negatively the conditioned stimulus. Without discussing the strict physiological meaning of this supposed temporary state of the organism and the wider acceptance often given to it in less controlled psychological situations, it appears from quite a number of experiments that motivation is not an absolute requirement for the forming of a conditioned reflex. Thus, NARBUTOVICI and PODKOPAEV[1] and later ROKOTOVA[2,3] have shown that a simple association between neutral stimuli, e.g. light and sound, is efficient in obtaining a conditioned response. After such an association, a sound stimulus initially coupled with a light stimulus, is liable to provoke elaborate salivary responses previously elicited by light alone. The neurophysiological aspects of these purely associative conditioned reflexes have been studied by POPOV[4], GASTAUT et al.[5], GASTAUT[6],

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