Observations of fat utilization during prolonged low speed swimming would tend to support this view[5,10].

The rates of oxidation by the white muscle were found to be relatively low. Thus it is doubtful whether oxidative processes can play a major role in supplying energy during intensive bursts of activity by this muscle.

The role of glycogen in red muscle metabolism is uncertain. Higher resting levels are found in the red than in the white muscle, and during sustained swimming glycogen has been observed to fall in the red muscle[7,8]. It has been demonstrated (see Table) that red muscle has a high oxidative capacity for pyruvate, the product of glycolysis that enters the citric acid cycle. It may well be that both fats and glycogen are used as substrates by this muscle. An alternative hypothesis is that red muscle supplements the role of the liver in supplying metabolites for glycolysis to the white muscle and in oxidising its lactate[11]. The high rate of pyruvate oxidation observed in the red muscle is compatible with the view that this tissue could play a significant role in the oxidation of lactate from the white muscle.

Zusammenfassung. Sowohl in roten als auch in weissen Muskelfasern ist die Oxydationsgeschwindigkeit des Pyruvats grösser als die des Octonoats. Für rote Muskelfasern sind die Werte des ΔH: Pyruvat, 14.27 kcal; Octonoat, 6.64 kcal; und für weisse Muskelfasern: Pyruvat, 12.55 kcal; Octonoat 5.90 kcal.

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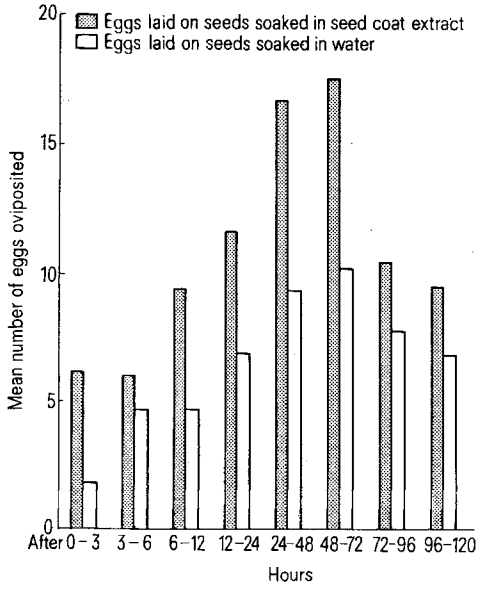
French Bean Seed Coat as an Ovipositional Attractant for the Pulse Beetle, *Callosobruchus maculatus* (Fabricius)

Several species of beetles belonging to the family Bruchidae are serious insect-pests of stored pulses and beans. At generic and specific level, these insects exhibit a high degree of specificity for their growth and development towards the various seed species of legumes. In most of the known species of bruchids, it is the ovipositing adult which performs the actual selection of the host by cementing her eggs on the seed surface during oviposition. In a mixture of many seed species of legumes, at least 4 species of bruchids are known to exhibit a distinct preference for oviposition on some seeds rather than on others[1-4]. No correlation, however, exists between the preferential oviposition by the adult for different seed species and the subsequent larval development. Some of the physical characteristics of the legume seeds, like curvature of the seed for *C. chinensis* (L.), texture of the seed coat for *C. maculatus*, C. *chinensis* and *C. analis* (F.), have been shown to be possible guiding stimuli for preferential oviposition[5,6]. The ovipositional attractant activity of soybean saponin extract for *C. chinensis* was not considered to be of any biological significance[7]. The present work for the first time reports the ovipositional attractant activity of French bean seed coat for *C. maculatus*.



Ovipositional response of *Callosobruchus maculatus* on chick pea seeds soaked in the acqueous extract of French bean seed coat and water.

Methods and results. A culture of *C. maculatus* was maintained in glass jars covered with muslin containing green gram seeds at 30 °C ± 1 °C and 55–60% relative humidity. All the experiments were also conducted at the aforesaid temperature and relative humidity.

Since the seed coat of different legume seeds comes in direct contact with the ovipositing females; these were gently removed without damaging the internal surface. For each legume, 10 seeds without seed coat and 10 with seed coat were placed together in a petridish wherein 2 pairs of newly emerged adults were released for oviposition for 96 h. The results of the experiment have been shown in Table I. It appeared that the seed coat of some legumes may contain substance(s) which induce the gravid females to lay more eggs, since the mean number of eggs laid were significantly more on the seeds having seed coat than on those without seed coat. Chickpea, however, was an exception, where the absence of seed coat did not

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affect the mean number of eggs deposited. The presence or absence of the seed coat affected the preferential oviposition by the gravid insect to a maximum extent in French bean and hence the seed coats of this legume were used in the subsequent experiments.

Ten g of finely ground French bean seed-coat was extracted with 250 ml of distilled water for 3 h. The slurry was filtered. Filter paper, which normally does not induce egg laying, and the chickpea seeds on which no significant difference was recorded for the preferential oviposition (Table I), were chosen in the subsequent experiment. The filter paper strips of 3 cm by 2 cm were made into the cylinders of about 8 mm diameter. One lot of 50 filter paper cylinders was immersed in a beaker containing the extract for 30 min and another lot of cylinders in distilled water for the same duration. These 2 lots were dried overnight at 28 °C. 5 cylinders from each lot were mixed and placed together in a petridish covered with muslin and 25 pairs of newly emerged adults were released for oviposition. The numer of eggs laid on cylinders of each lot were counted after 10 days (Table II).

Table I. Seed coat as a factor for the ovipositional preference of *Callosobruchus maculatus* (Fabricius)

Seeds	Mean number of eggs oviposited	
	Seeds with seed coat [a]	Seeds without seed coat [a]
French bean	66.40 (59–90)	5.00 (1–12)
Red gram	49.40 (31–86)	20.60 (8–31)
Cowpea	88.60 (61–115)	14.40 (1–29)
Pea	39.80 (30–62)	15.20 (10–17)
Green gram	35.60 (23–50)	24.60 (12–40)
Chickpea	26.60 (10–36)	19.00 (9–41)
Lentil	15.80 (7–33)	4.60 (1–14)

[a] Values in parentheses indicate the range of maximum and minimum number of eggs laid in the replicates. S.E. (pulses) ± 5.646; S.E. (Treatment) ± 3.018 C.D. (5%) 15.969; C.D. (5%) 8.536

Table II. Oviposition mal attractant activity of French bean seed coat extract for *C. maculatus*

Treatment	Mean No. of eggs oviposited on 5 cylinders
French bean seed coat extract	115.6
Distilled water (control)	11.3
t-value 17.200.	

A lot of 50 chickpea seeds was soaked in Freanch bean seed coat extract for 3 h, and another lot in distilled water for the same duration. The seeds from the 2 lots were then dried overnight at 28 °C. 5 seeds from each of these lots were mixed together and placed in a petridish covered with muslin and 3 pairs of newly emerged adults were released for oviposition. The number of eggs deposited were counted at various time intervals upto 120 h (Figure).

The ovipositional attractant activity in French bean seed coat for *C. maculatus* is here reported for the first time[8]. Since this insect lays very few eggs on inert surface, and significant differences exist in the rate of oviposition on seeds with and without seed caots of other legume hosts as well, it appears that the occurrence of chemical ovipositional attractants is fairly common if not universal[9]. The isolation and chemical characterization of these attractants from the host seeds, followed by breeding to eliminate or reduce these substances in the seed varieties, may provide an effective method for the control of this insect.

Zusammenfassung. Nachweis, dass die Samenhüllen gewisser Leguminosenarten die Eiablage des Bohnenkäfers *Callosobruchus maculatus* stimulieren und die Wasserextrakte attraktiver Samenhüllen die Oviposition auch auf inertem Filterpapier anregen.

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Regeneration of *Drosophila melanogaster* Male Leg Disc Fragments in Sugar Fed Female Hosts

Proliferation is a prerequisite for epimorphic regeneration. In order to test if regeneration in leg discs[1] is also dependent on proliferation, we cultured leg imaginal discs with excised end knobs (called the remainder pieces) into adult females which were kept on a protein-free sugar diet 4 days prior to receiving the implant. This environment prevents the imaginal cells from multiplying[2]. The implant was cultured for 2, 4, or 8 days in sugar fed animals and then tested for differentiation by transplanting into a larval host for metamorphosis.

The Table shows that regeneration fails when remainder fragments were cultured in starved adult hosts. However regeneration does occur frequently in well fed hosts[1]. But, the ability to regenerate is not lost irreversibly during culture under stressed conditions. If implants from starved females are injected into 72-h-old larvae the time before metamorphosis is sufficient to allow regeneration of claws in $^1/_3$ of the cases. As culture time in sugar-fed flies increases the size of the implanted fragments decreases. This is also reflected by a decrease of the bristle numbers in the proximal segments (Coxa, Trochanter and Femur). The number of these bristles increases dramatically when the cultured fragments are injected into 72-h-old larval hosts again giving them some time to grow.

Moreover, after remainder pieces were cultured for one day in flies which were fed only sugar, we brought the hosts for 2 days onto normal food and then injected the implants into old (105 h) larval hosts. In 42% ($n = 12$)

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