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# Reproductive physiology in the blood feeding insect, *Rhodnius prolixus*, from copulation to the control of egg production.

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Abstract

The study of copulation and the control of egg production in the blood-feeding insect, *Rhodnius prolixus*, continues to offer a fertile ground for the cultivation of new insights into the physiological processes associated with reproduction. We begin this paper by describing the male organs of copulation showing that the aedaegus contains a structure which may serve as part of a pumping mechanism or valve to enable the male to fully pack the vagina with his secretions. We then summarize previously published work which identifies possible sensory and chemical aids that can be used by the male as he forms a naked spermatophore within the vagina of the female. With respect to the control of egg production, published anatomical and endocrinological experiments give rise to the intriguing possibility that a vascular portal system exists in the head of this insect, and that this system explains why circulation is required for egg production. By documenting the steps taken by the male during copulation, and by providing a new paradigm to explain the control of egg production, this paper identifies some assumptions that need verification, and offers a foundation upon which future scientists can explore reproductive physiology in this incredible bug.

## 1. Introduction

Reproductive physiology for any insect species encompasses all the behavioural and physiological processes from the embryonic development of the reproductive organs through copulation to the production and ovipositioning of the fertile egg by the female. In this paper we have focussed our review of the reproductive physiology of *Rhodnius prolixus* to the events associated with copulation and sperm transfer, and the possible neural and endocrine control mechanisms governing the onset of egg production. Since the developmental hormones, ecdysone and juvenile hormone (JH), function primarily in the larval stages, and in the adult during egg