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Short Communication

Plurimatry: New Terminology for Multiple Reproductives

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The word "term" comes from the Latin *terminis*, meaning "a boundary" or "a limit." Terms are coined and defined to control extreme subjectivity and relativity in expressing meanings and to limit ambiguity and confusion in communication. Despite the importance of precisely defined terms, a number of terms are currently used to mean different things in different academic disciplines. On a purely functional basis, there is no need to be concerned about such dual usage of the same term so long as there is no need for communication between the two disciplines using the same term.

The term "polygyny" is widely used to denote a mating system in which a male mates with multiple females, while "monogamy" describes a system in which each sex has but a single mate (Emlen and Oring, 1977). "Polyandry" occurs when a female mates with multiple males. In the social insect literature, however, "polygyny" is also used to refer to "the coexistence in the same colony of two or more egg-laying queens" (Wilson, 1971; Hölldobler and Wilson, 1990). As opposed to "polygyny," the existence of a single functional queen in a colony is termed "monogyny" (not monogamy). To make matters even more confusing, "polyandry" in the social insect literature is not used as a social system term but as a mating system term to denote mating with multiple males by a single queen (e.g., Laidlaw and Page, 1984; Shermann *et al.*, 1988).

Many social insect researchers have experienced frustration in using the term polygyny during their presentations to audiences that included behavioral ecologists who study organisms other than social insects. Some of us who have

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conducted a computerized literature search using polygyny as a keyword have been bombarded with the flood of unwanted literature. Despite such inconvenience, the term has not surfaced as a major source of communicative confusion in the past, largely because few social insect researchers have had to deal with polygyny as both mating and social system in the same paper or book. Lately, however, the need to distinguish the dual usage of the term has been forced upon us as the scope of social evolution has expanded to include both mating systems and social organizations as well as the relationship between the two. Faced with this potential confusion, Ross and Matthews (1991) in their recent book, *The Social Biology of Wasps*, tentatively separated the two by adding "mating system" or "queen number" in parentheses following the word "polygyny." I think that the time has come for us to establish better communication codes.

Considering that polygyny as a mating system is recognized and used by not only biologists but also anthropologists, sociologists, and so on, it seems appropriate that a new term should replace polygyny when it is to be used as a term for a social system (i.e., a multiqueen colony). Since the term "gyne" comes from a Greek word meaning female or woman, it seems appropriate to use polygyny to mean mating with multiple females. In social hymenopterans, however, it seems dubious to use gyne to indicate a young female of the reproductive caste, when all nonreproducing workers are also females. What we need is a term that describes the occurrence of multiple reproductives in the same colony. Therefore, I echo Richards and Richards' (1951) assertion that polygyny describes mating systems only, and in addition, I propose **plurimatry** [meaning "many (*pluri*) mothers (*mater*)" in Latin] as a new term to describe the pos-

Table I. Definitions of Terms that Describe Conditions with Respect to the Number of Reproductives in a Colony

New term	Old term	Definition
Plurimatry	Polygyny	The coexistence in a colony of more than one egg-laying queen
Unimatry	Monogyny	The existence in a colony of a single egg-laying queen
Paucimatry	Oligogyny (paragyny)	The coexistence in a colony of two to several egg-laying queens that are antagonistic and thus spread out from one another but tolerated by workers
Pluripatry	None	The coexistence in a colony of more than one functional king, as found in some termites
Pleometrosis	Same	The founding of a colony by more than one queen
Haplometrosis	Same	The founding of a colony by a single queen
Pleopatrosis	None	The founding of a colony assisted by more than one functional king, as found in some termites
Haplopatrosis	None	The founding of a colony assisted by a single king, as found in some termites

session by a colony of more than one egg-laying queen (Table I). Incidentally, here I use the term "queen" in a functional rather than morphological sense (see Buschinger and Crozier, 1987; Choe, 1988; Peeters and Crozier, 1988 for distinctions).

I agree with Hölldobler and Wilson (1977), who recognized the usefulness of keeping "pleometrosis" and "haplometrosis" to describe the foundation of a colony by multiple queens and by a single queen, respectively, because multiple foundresses are often reduced to a single queen as the colony matures. The life cycle of a social insect colony can be divided into three periods: the founding stage, the ergonomic stage, and the reproductive stage (Oster and Wilson, 1978). Pleometrosis and haplometrosis are used to denote queen numbers only in the founding stage (Hölldobler and Wilson, 1977). The start of the ergonomic stage, i.e., when the first daughters of the foundress(es) emerge and take over the colony tasks, is often the time of drastic changes in social insect colonies. In most pleometrotically founded colonies, supernumerary foundresses are eliminated and only a single foundress survives to become the sole egg-layer in the colony. Such a transition is particularly common in ants and is called *secondary unimatry*. *Primary unimatry* occurs when a single foundress initiates a colony (haplometrosis) and remains as the sole egg-layer. *Primary plurimatry* has been observed in a number of tropical wasps (Itô, 1993) and at least three species of ants (Choe and Perlman, 1995), in which multiple foundresses remain as fertilized, functional egg-laying queens. More commonly, however, plurimatry is *secondary*, meaning that the colony is founded by a single queen and later becomes *plurimatrous* by adoption of new queens or fusion with other colonies. To be complete, I also suggest that *paucimatry* rather than oligogyny [or paragyny as suggested by Pamilo (1991)] be used to describe the coexistence in the same colony of two to several female reproductives. As found in *Camponotus* (Hölldobler, 1962) and *Iridomyrmex* ants (Hölldobler and Carlin, 1985), egg-laying queens in an paucimatrous colony are antagonistic to one another but tolerated by workers, thus able to coexist, though spread out, within the same colony.

Social organizations in termites add a new dimension to this scheme, because termite colonies contain kings as well as queens. Although the majority of termite species has a single pair in a colony (Nalepa and Jones, 1991), multiple queens and kings have been found in several tropical species (Roisin, 1993, and reference therein). As with pleometrosis and plurimatry, the coexistence of multiple kings in a founding colony and mature colony can be termed *pleopatrosis* and *pluripatry*, respectively. Whether all kings in a colony are able to reproduce is not clear, but they may contribute to the colony's total productivity by feeding queens and larvae from their own metabolic reserves, at least in the early phase of colony founding (Han and Noirot, 1983; Shellman-Reeve, 1990; Rosengaus and Traniello, 1991).

Plurimatry and unimatry concern mainly social insect literature, but may also be used to describe the condition in communally breeding birds (Brown, 1987) and mammals (Rood, 1986; Creel and Creel, 1991). Brown (1987) used "singular-breeding" (unimatry) or "plural-breeding" (plurimatry) to describe avian social systems in which single or multiple females breed in a social unit, respectively. While plural-breeding or plurimatry occurs on a regular basis in many communally breeding birds, among communal mammals it may occur only in lions (Schaller, 1972), hyenas (Kruuk, 1972), coatis (Russell, 1983), and banded mongooses (Rood, 1975).

It is often difficult to break an old habit, especially when the habit is so deeply entrenched as is the use of polygyny in social insect literature. Nonetheless, I humbly request my fellow students of social insects to make a small change in our habits as our need to communicate with other biologists, anthropologists, and sociologists increases.

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