Notes on *Pachliopta* species: *Pachliopta phegeus* (Hopffer, 1866) (Lepidoptera: Papilionidae)

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KEY WORDS
buraki*, homonym, *leytensis

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Some confusion has existed about the relationship between *Pachliopta phegeus* and *P. phegeus leytensis* Murayama (1978), which was considered a separate species by some authors. Both taxa occur in the Philippines, and *P. phegeus* is always present where *P. phegeus leytensis* occurs. Nowadays both are seen as forms of a single species. Formerly, *Pachliopta phegeus* was placed in the genus *Papilio*. However, there also is a misunderstanding about the nomenclature of the name *Papilio phegeus* Hopffer. That name and *Papilio phegea* Borkhausen were incorrectly declared homonyms (i.e., the same name ascribed to two species), because both *phegeus* and *phegea* were thought to be adjectives, thus male and female versions of the same word. A new name seemed to be necessary for the newer of the two names, which was *Papilio phegeus*, later *Pachliopta phegeus*, which became *Pachliopta buraki* Koçak. After that, the (older) form name *leytensis* was used in place of *buraki*. However, the names *phegeus* and *phegea* are both proper nouns and thus cannot be homonyms. This means *phegeus* is still valid and the species should be named *Pachliopta phegeus*, with the nominate form f. *phegeus* and the later described form f. *leytensis*.

Introduction

For a long time, *Pachliopta phegeus* Hopffer, 1866 was a quite unknown species, that often only was mentioned in the literature without further information (see list below). More than a century after its discovery, a new subspecies *P. phegeus leytensis* was described by Murayama (1978). However, the taxonomic relationship of this taxon with *Pachliopta phegeus* was unclear. Page & Treadaway (1997, 2003, 2004) considered both taxa as forms of a single species.

Since 1983, *Papilio phegeus* Hopffer, 1866 is considered to be a primary homonym (the same name originally used for two species) of *Papilio phegea* Borkhausen, 1788 (Koçak 1983, Bridges 1988, Page & Treadaway 1997, 2003, 2004). This had strange consequences for the nomenclature of the species, as explained below. All figured specimens are from the collection of the author, now in Naturalis Biodiversity Centre, Leiden (RMNH).

Historical review of *Papilio phegeus*

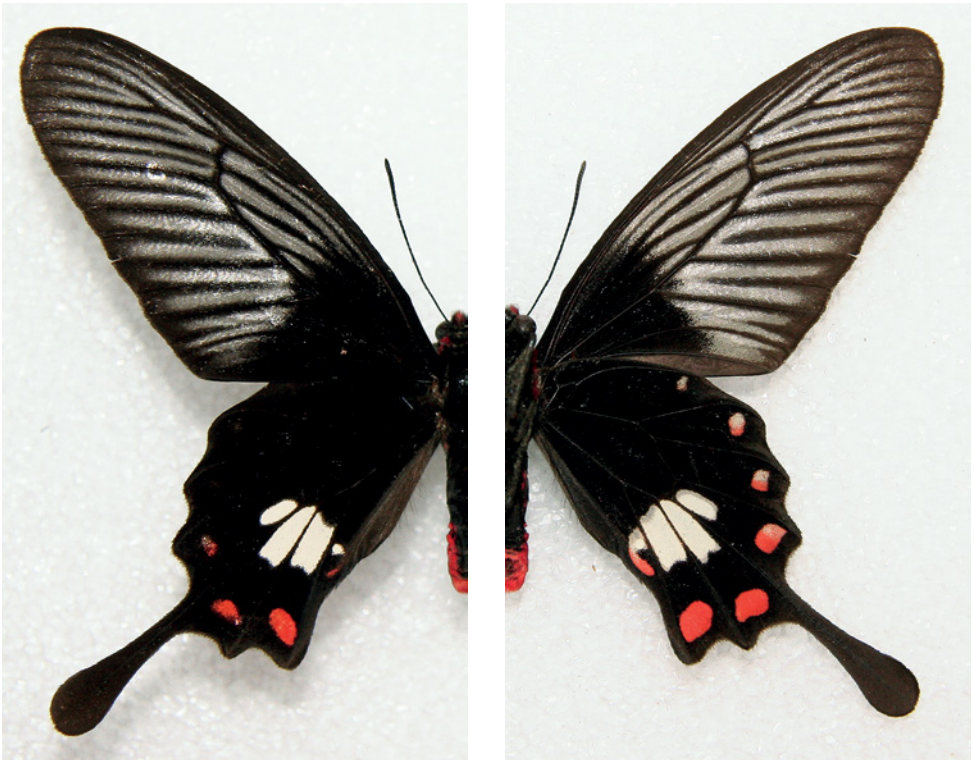
Hopffer 1866	*Papilio phegeus* Hopffer
Semper 1886-1892	*Papilio* (*Menelaides*) *phegeus* Hopffer
Rothschild 1895	*Papilio phegeus* Hopffer
Jordan 1909	*Papilio phegeus* Hopffer
Bryk 1930	*Papilio phegeus* Hopffer
Ford 1944	introduces *Atrophaneura* [for current *Parides*, *Pharmacophagus*, *Atrophaneura* and *Pachliopta*]
Munroe 1961	*Pachlioptera phegeus* Hopffer (misspelling of *Pachliopta*)
Hiura & Alagar 1971	*Pachliopta phegeus* Hopffer
Smart 1976	*Pachliopta phegeus* Hopffer
Murayama 1978	*Pachliopta phegeus leytensis* new subspecies
Igarashi 1979	*Pachliopta phegeus* Hopffer
Hancock 1980	*Atrophaneura* (*Atrophaneura*) *phegeus* Hopffer
Tsukada & Nishiyama 1980	*Pachliopta phegeus* Hopffer *Pachliopta leytensis* Murayama (with list of arguments for species status)
D'Abrera 1982	*Pachliopta phegeus* Hopffer (? = *leytensis* Murayama)
Hancock 1983	*Atrophaneura* (*Atrophaneura*) *phegeus*
Koçak 1983	*Pachliopta buraki* [as replacement for *phegeus* Hopffer, 1866 nec *phegea* Borkhausen, 1788]

Moonen 1984	*Pachliopta phegeus leytensis* Murayama (status uncertain.)
Collins & Morris 1985	*Atrophaneura* (*Pachliopta*) *phegeus* Hopffer (*leytensis* Murayama synonym)
Hancock 1988	*Atrophaneura* (*Pachliopta*) *phegeus* Hopffer
Bridges 1988 [15.iv.1988]	*Atrophaneura* (*Atrophaneura*) *leytensis* Murayama subspecies *buraki* Koçak (= *phegeus* Hopffer)
[in Annotations 28.ix.1988]	*Atrophaneura* (*Pachliopta*) *leytensis* Murayama subspecies *buraki* Koçak (= *phegeus* Hopffer)
Treadaway 1989	*Pachliopta phegeus phegeus* Hopffer f. *leytensis* Murayama
Parsons 1996	*Atrophaneura* (*Pachliopta*) [*polydorus*-group]
Page & Treadaway 1997	*Pachliopta leytensis* Murayama (syn. *P. buraki* Koçak = *P. phegeus* Hopffer) f. *leytensis* f. *buraki*
Parsons 1998	*Atrophaneura* [*polydorus* (Linnaeus)]
Page & Treadaway 2003 Plates idem as 2004 (Pl. 25, 26)	
Page & Treadaway 2004 Text	*Pachliopta leytensis* Murayama (syn. *P. buraki* Koçak = *P. phegeus* Hopffer) *P. leytensis* f. *leytensis* *P. leytensis* f. *buraki*
Häuser *et al.* 2005	*Pachliopta leytensis* Murayama
Racheli & Cotton 2010	*Pachliopta* checklist, in which *phegeus/leytensis* was unintentionally omitted (Cotton pers. com.).

Not a primary homonym

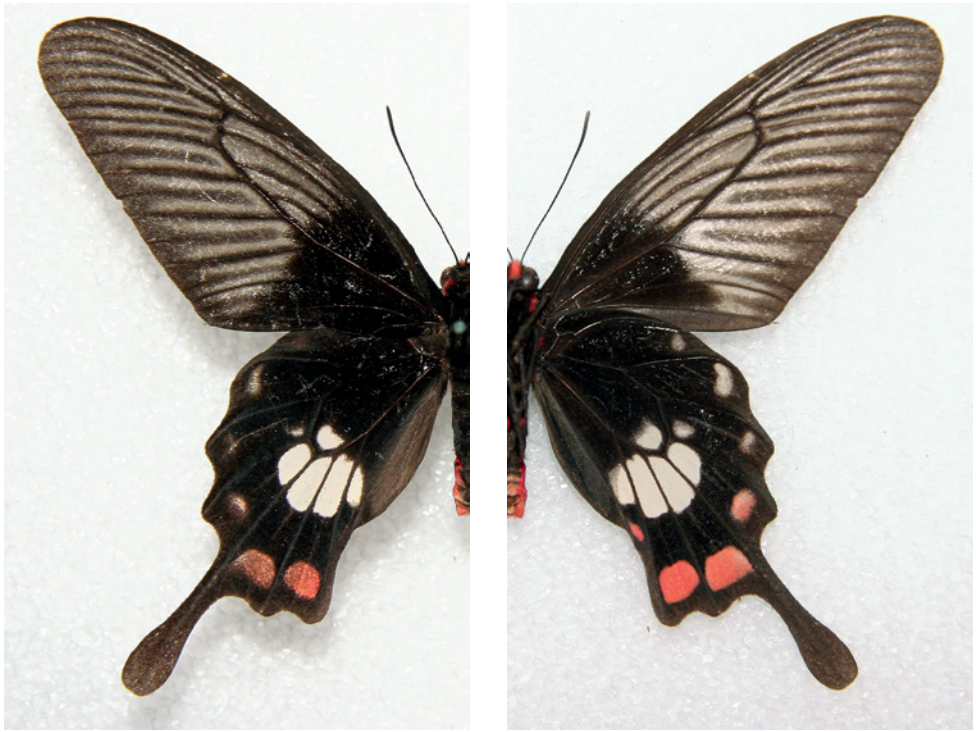
Koçak (1983) stated that *Papilio phegeus* Hopffer, 1866 is a primary homonym of *Papilio phegea* Borkhausen, 1788, a species currently known as *Protoerebia afra* (Fabricius), Nymphalidae, Satyrinae. He based his conclusion on the assumption that *phegeus* and *phegea* are both adjectives. If this was the case, *phegea* would be the female form of *phegeus* (incorrectly used because the gender of *Papilio* is male), and both words would in fact be the same. Consequently Koçak replaced the newer name, Hopffer's *phegeus*, with *buraki*. This is, however, incorrect. A thorough examination of several Greek and Latin dictionaries revealed that both are proper nouns. Phegeus (Φηγεύς) was a king of the fortified city of Psophis in Northwest Arcadia (in the centre of the Greek Peloponnese). Phegea (Φηγεα) is the earlier name of Psophis. A king and a city are clearly not the same, which means that *Papilio phegeus* Hopffer cannot be a homonym of *Papilio phegea* Borkhausen, in the same way that *Papilio helenus* Linnaeus, 1758 and *Papilio helena* Linnaeus, 1758 (now *Troides helena*) are not homonyms. Thus there is no need to replace *phegeus* by *buraki*.

There has been some disagreement in the literature as to which genus the taxon belongs in, either *Pachliopta* or *Atrophaneura* (see the list). This paper does not deal with this higher level taxonomic problem. Here, Racheli & Cotton (2010) and other authors are followed in placing *phegeus* in the genus *Pachliopta*.

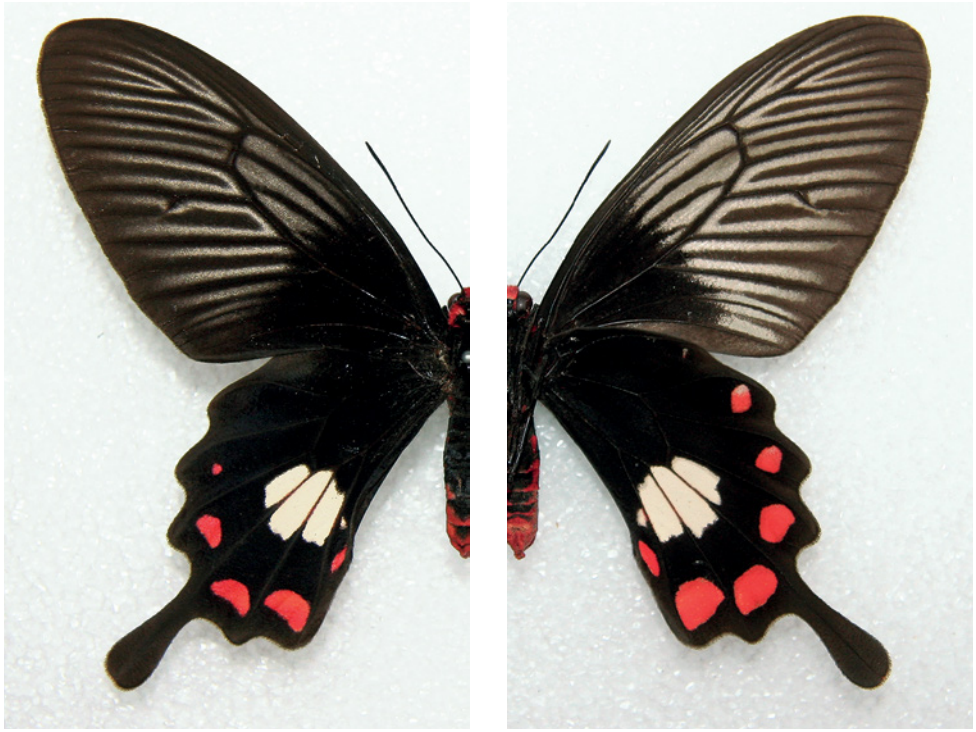


1 . ♂ *Pachliopta phegeus* f. *phegeus* Hopffer. Philippines: Southern Leyte: Sta. Cruz, St. Bernard, 4.iii.1979. Left: upperside, right: underside (length forewing 47 mm). Photo: Jan Moonen

1. ♂ *Pachliopta phegeus* f. *phegeus* Hopffer. Filippijnen: Southern Leyte: Sta. Cruz, St. Bernard, 4.iii.1979. Links: bovenzijde, rechts: onderzijde (lengte voorvleugel 47 mm).



2. ♂ *Pachliopta phegeus* f. *leytensis* Murayama. Philippines: Southern Leyte: Catmon St. Bernard, 22.iv.1979. Left: upperside, right: underside (length forewing 51 mm). Photo: Jan Moonen
2. ♂ *Pachliopta phegeus* f. *leytensis* Murayama. Filippijnen: Southern: Leyte, Catmon St. Bernard, 22.iv.1979. Links: bovenzijde, rechts: onderzijde (lengte voorvleugel 51 mm).



3. ♀ *Pachliopta phegeus* f. *phegeus* (Hopffer). Philippines: Bohol, 20.viii.1990. Left: upperside, right: underside (length forewing 54 mm). Photo: Jan Moonen
3. ♀ *Pachliopta phegeus* f. *phegeus* (Hopffer). Filippijnen: Bohol, 20.viii.1990. Links: bovenzijde, rechts: onderzijde (lengte voorvleugel 47 mm).

Variation within *Pachliopta phegeus* (Hopffer)

In 1978, Murayama described a new subspecies for *P. phegeus*: *leytensis* (figure 1-4). Tsukada & Nishiyama (1980) mentioned *Pachliopta leytensis* as a species distinct from *Pachliopta phegeus* based on partial sympatry and the apparent absence of intermediate specimens, although there are no differences in the male genitalia. Authors who followed the unjustified action of Koçak (1983), concluded that *leytensis* is the oldest available name for *Pachliopta phegeus*, so its name should be changed to *Pachliopta leytensis* instead of *Pachliopta buraki*. Some considered *buraki* to be a form or subspecies of it, or a species of its own, leading to a confusing taxonomic and nomenclatural situation.

Page & Treadaway (2004), still following Koçak (1983) and mentioning that intermediate specimens were known known, described the taxonomy of the species as follows:

Pachliopta leytensis Murayama, 1978		
	f. *leytensis* Murayama, 1978	[S. Leyte, E. Mindanao, Samar, Siargo]
	f. *buraki* Koçak, 1983	(= *phegeus* Hopffer, 1866 nec *phegea* Borkhausen, 1788) [Bohol, Cebu, Dinagat, S. Leyte, S.-C. & E. Mindanao, Panaon, Samar, Siargo]

4. ♀ *Pachliopta phegeus* f. *leytensis* Murayama. Philippines: Southern Leyte: Hinunangan, 4.ii.1992. Left: upperside, right: underside (length forewing 50 mm). Photo: Jan Moonen

4. ♀ *Pachliopta phegeus* f. *leytensis* Murayama. Filippijnen: Southern Leyte: Hinunangan, 4.ii.1992. Links: bovenzijde, rechts: onderzijde (lengte voorvleugel 47 mm).

Taking the foregoing into account, the taxonomy/nomenclature has to be corrected to its original situation:

Pachliopta phegeus (Hoppfer, 1866) [status revised]
- f. *phegeus* (Hoppfer, 1866) (= *buraki* Koçak, 1983) [status revised]
- f. *leytensis* Murayama, 1978 [status revised]

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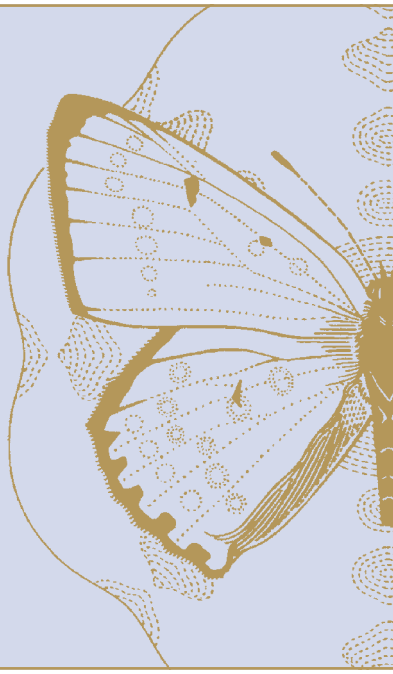
Samenvatting

Notities over *Pachliopta*: *Pachliopta phegeus* (Hopffer, 1866) (Lepidoptera: Papilionidae)
Er was enige verwarring over de relatie tussen *Pachliopta phegeus* en de pas in 1978 beschreven *Pachliopta phegeus leytensis* Murayama, die door sommige auteurs als aparte soort werd beschouwd. Beide vlinders komen in de Filippijnen voor. Waar *leytensis* vliegt, komt ook altijd *phegeus* voor. Nu beschouwt men beide als vormen (forma's) van één soort. Echter, er bestond ook een misverstand over de nomenclatuur van de soort waar beide vormen onder vallen. *Pachliopta phegeus* was oorspronkelijk beschreven in het genus *Papilio*. Onterecht waren *Papilio phegeus* (Hopffer) en *Papilio phegea* Borkhausen tot homonymen (dezelfde naam voor twee soorten) verklaard, ervan uitgaande dat *phegeus* en *phegea* de mannelijke en vrouwelijke vorm van hetzelfde bijvoeglijk naamwoord waren. Een nieuwe naam, *buraki* Koçak, leek nodig te zijn voor de jongste van de twee namen: *P. phegeus* werd *P. buraki*. Intussen was er een ondersoort van *P. phegeus* beschreven: *P. phegeus leytensis*. Daarmee werd *leytensis* de oudst beschikbare naam voor de soort: *P. buraki* werd van toen af *P. leytensis*. De namen *phegeus* en *phegea* zijn echter beide zelfstandige naamwoorden en zijn dus geen homonymen van elkaar. Dat wil zeggen dat *phegeus* zijn geldigheid terug heeft en de soort weer *Pachliopta phegeus* heet, met de nominaatvorm f. *phegeus* en de later beschreven vorm f. *leytensis*.



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