

The Lepidoptera collections of deceased Portuguese entomologists

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Synopsis

Examination of Lepidoptera collections made by various entomologists in Portugal between approximately 1880 and 1990, combined with study of the relevant literature, has produced results that considerably improve our knowledge of the Portuguese Lepidoptera fauna. Eighty-five species can be deleted from the fauna because they are based on certain or very probable misidentifications; 10 species were listed for Portugal on the basis of misidentified material, but reliable recent records exist as replacements; 13 species are added to the fauna which have never been recorded before, or were previously overlooked or treated as doubtful; 15 species must be deleted from the fauna because they are based on more or less questionable material that has suffered destruction by insect pests and therefore cannot be verified; 43 species that have never been found by recent workers in Portugal are confirmed from old specimens.

Key words: Lepidoptera, Portuguese collections, deceased Portuguese lepidopterists.

Introduction

In March 1989, I visited Portugal for the first time, staying for a week in Algarve with my family; during the time I collected some Lepidoptera and subsequently began the task of identifying them. The following year I returned with my wife in October and many more visits followed. In the first few years we only visited Algarve, but gradually we have extended our visits to all parts of the country.

For identification of the Lepidoptera, I have received much help from Barry Goater and from staff in the Microlepidoptera section of the Department of Entomology, Natural History Museum (BMNH), London, as well as from a number of individuals in several countries of Europe. One of my first requirements was a check-list of Portuguese Lepidoptera. Knowing which species are present in a country is a major aid to identification. Over the next few years, several lists were obtained, including those by Zerkowitz (1946), Vives (1994) and Karsholt & Razowski (1996), together with those of Cruz & Wattison (1934; 1935), Cruz & Gonçalves (1977), Gómez Bustillo & Arroyo Varela (1981), which treat Macrolepidoptera only, and that of Vives (1992), which treats the Microlepidoptera only.

Comparison of these lists showed that none was of very great reliability. It had already become clear that the Portuguese Lepidoptera, especially the

Microlepidoptera, were very incompletely known. Every trip to Portugal added new records of species for the country, therefore all previous lists were incomplete. Furthermore, there are two fundamental problems with check-lists. Those that are new are normally built on earlier ones, thus propagating any errors in the earlier lists. The second problem is that in the vast majority of cases the presence or absence of a species in a list is unexplained.

There is a variety of sources of error in the existing check-lists. These can be placed under nine main headings.

Misidentification. Incorrectly identified species have been included.

Taxonomic change. New species have been discovered, but Portuguese specimens collected before the description of the new species have not been revised.

Nomenclatural confusion. Species have been incorrectly included through misinterpretation of the nomenclature of an earlier record. Also, the elevation of a form or subspecies to full species status has occasionally resulted in the name of the typical form incorrectly remaining listed in place of or in addition to the previously subordinate taxon.

Incomplete literature search. Papers recording new species for Portugal have been overlooked. Conversely, the correction of a previously misidentified species has been published, but the misidentification remains in subsequent lists.

Uncritical acceptance of records. Early records of species now known to require genitalia examination, which could not have been reliably identified at the time, have been accepted, even in recent lists. This is particularly a problem in genera such as *Cnephasia* Curtis and *Coleophora* Hübner.

Imaginative mapping. Gómez Bustillo & Fernández Rubio (1976; 1979) mapped, and subsequently Gómez Bustillo & Arroyo Varela (1981) listed, many species as occurring in Portugal, apparently on the assumption that as they are widespread species in Spain, they must therefore occur in Portugal. In a few cases this assumption is correct, but all too often, the first assumption that they are widespread in Spain is itself erroneous. At the time, knowledge of distributions in Spain was very patchy, particularly for the western half of the country. This problem has recurred more recently in certain volumes of *Noctuidae Europaeae*, notably those by Ronkay, Yela & Hreblay (2001) and Hacker, Ronkay & Hreblay (2002).

Misinterpretation of earlier lists. Some early records were published with clear indications that the identification was questionable, but later lists have treated them as reliable.

Typographical error. Species have been lost or gained through typing or other computer error. This is a particular problem in the Vives Moreno lists (1992; 1994) where presence in Portugal is indicated with a prefixed 'P.', presence in Spain and Portugal with 'E.P.', but presence in Spain alone has no prefix. This system appears to have generated many errors, mainly resulting in the apparent loss of well-documented Portuguese species.

Unauthenticated inclusion. Species have been listed as present in Portugal with no indication of the origin of the record and apparently not based on any earlier publication. These may be good records, as there is undoubtedly

Portuguese material present in some museum collections in Europe, yet to be studied, but there is no way of distinguishing them from several of the sources of error listed above. I have therefore treated them as erroneous. If they are in fact present, no doubt they will eventually be re-found and can be reinstated.

I came to the conclusion that if I wanted a Portuguese check-list, I would have to compile it myself and I have been working on one since 1994. Because of the uncertainties that derive from other lists, the entry for each species in my list is accompanied by the data from the first published record and an indication if it has been re-found in recent times.

The main sources of error that still affect my list derive from the fact that some of the older records are probably based on misidentifications. It is therefore necessary to examine the specimens on which the old records were based and to reassess the original identifications. Over the last ten years I have made a start on this work and some sort of examination (often all too brief) of several of the major collections involved.

In the present paper, I consider the major deceased collectors and some minor ones, and give the results that have so far come from my researches into their collections. Some misidentifications cannot be published yet, because another collector has recorded the same species. Further work will undoubtedly add more results.

The collectors

After each collector's name, I give his or her date of birth and death, if known, followed in square brackets by the number of species which he or she added to the Portuguese list. This number is the number of species remaining to the credit of the collector, after known misidentifications have been corrected.

Here it is appropriate to clarify the conventions governing the use of Portuguese family names and how they are applied in scientific papers. The family name of the father (patronymic) follows that of the mother (the reverse of the convention in Spain). In bibliographic references the patronymic name is the key word, without any preceding possessive preposition (de, do, da, d'). Thus *J. Passos de Carvalho* is cited as *Carvalho* in the text and as *Carvalho, J. Passos de* in the list of references. Some authors have chosen to join the matronymic and patronymic names with a hyphen, resulting in the matronymic plus patronymic together forming the key word (e.g. *Carneiro-Mendes*). There is an anomaly in the case of Cândido Mendes, who appears to have adopted the Spanish convention. In his papers, Mendes gave his name as Cândido Mendes, or Cândido Mendes d'Azevedo. However, Luisier (1944), in his obituary of Mendes, gave his name as Cândido de Azevedo Mendes, in the normal Portuguese form, and in his home town of Torres Novas (Ribatejo) there is now a Rua Padre Cândido Azevedo Mendes named in his honour.

The earliest Lepidoptera records for Portugal are short lists by Baptista (1789) from Coimbra and by Vandelli (1797) from 'Lusitania'. Domenico Agostino Vandelli (1735–1816) was an Italian who lived much of his life in

Portugal, where he arrived in 1764, later teaching at the University of Coimbra and producing the first professional Portuguese naturalists. He corresponded with Linnaeus and sent him specimens, but there is some uncertainty as to whether these specimens were collected in Portugal. Manuel Dias Baptista was one of Vandelli's students. There were 14 species in Baptista's list and 32 in Vandelli's. The Rhopalocera in these lists can mostly be equated with familiar species, but the nomenclature of some of the Heterocera is problematic and others are not known in Portugal at present or only known from parts of the country far from Coimbra, which casts doubt on the identifications. It is not known if there are any specimens extant on which these lists were based. Because of these uncertainties I have excluded both Baptista's and Vandelli's records from further consideration here.

Manuel Paulino D'Oliveira (1837–1899) [3 species] had wide entomological interests but appears to have only collected a few Lepidoptera, mainly near Coimbra. Emile Ragonot named some of these and also described new species. The types are in MNHN, Paris, and I have seen two of them. Other material is in the Museum of the University of Coimbra, which I have not studied.

Reverend Alfred Edwin Eaton (1845–1929) [126 species] visited Portugal in 1880, travelling from Lisboa south to Algarve, then northwards almost as far as Gerês, between April and June. His main interest was in aquatic insects, but he collected a number of Lepidoptera. These were sorted by Henry Stainton, who named the Microlepidoptera, apart from Tortricidae, Pterophoridae and Pyralidae, which were sent to Ragonot in Paris. The Rhopalocera and Macrolepidoptera were sent to Staudinger in Berlin. Eaton's account of his journey (Eaton, 1880), and the identification of his collections were all published shortly afterwards (Ragonot, 1881; Stainton, 1881; Staudinger, 1881).

I have not been able to find the Eaton material seen by Ragonot, either in Paris or London. That named by Staudinger was apparently returned to BMNH, but I have so far only located two specimens. The specimens named by Stainton are also present in BMNH, where I have examined them. Unfortunately they are unset and often poorly pinned with brass pins, which tend to exude verdigris. The material is therefore difficult to examine and removal of abdomens for genitalia examination would be hazardous to the specimen. For this reason, the identity of a number of specimens remains uncertain.

Fernando Mattozo Santos [60 species] collected in Beira Litoral and Serra da Estrela. The species he added to the Portuguese fauna (Santos, 1882; 1884; 1895) are well known, particularly the Rhopalocera. I do not know if he left a collection and if he did, where it is, but examination of his collection is not a high priority.

Theodor Seebold (1832?–1915) [2 species] collected in several parts of Spain and Portugal (Seebold, 1898). His paper lists Microlepidoptera collected in Algarve and around Lisboa, but data are unsatisfactory. The month of collection is given for some species, but Algarve and Lisboa records are not separated. I have therefore treated his records as unlocalized, and

excluded him as the first recorder for species found subsequently by others. Two species have been reported from Portugal only by Seebold.

Cândido Mendes d'Azevedo (1874–1943) [688 species] was a Jesuit, working mainly in the College at São Fiel, Beira Baixa. His contribution to the knowledge of the Portuguese Lepidoptera fauna was immense. From São Fiel and the surrounding area, from 1894 to 1902, and then from 1907–1910 (year of capture is very rarely given in his papers, and most of the specimens lack dates) he recorded more than 800 species (Mendes, 1902–1903; 1904–1905; 1912–1913), and others were added as a result of brief visits to other places (Mendes, 1910*c*; 1910*d*) or, in the case of Torres Vedras, a longer spell at Barro during 1906 and 1907 (Mendes, 1910*b*). He also named material collected by others, notably by Julio de Moraes [24 species] from Minho (Mendes, 1909*b*) and by J. da Silva Tavares (see below). In 1910, revolution in Portugal toppled the monarchy and resulted in the expulsion of the Jesuits. Mendes fled to Spain, never returning to Portugal, leaving his collection behind. Tavares, Zimmerman, Vieilledent and Rebimbas (mentioned below) were also expelled (Cockerell, 1911). Mendes' collection is in the Zoological Museum of the University of Coimbra; I have yet to examine this material.

Mendes probably identified the majority of the Macrolepidoptera himself, but difficult specimens and Microlepidoptera were sent to J. de Joannis in Paris. Specimens sent to Paris had a label with only a number, but no other data. From my examination of the L. and J. de Joannis collection in Paris, it is evident that Joannis was allowed to keep duplicate material, but where only a single specimen is mentioned in Mendes' papers, there is no specimen in Paris, so these were presumably returned. The specimens retained in Paris are labelled 'Soalheira', or sometimes 'Lardosa', in Joannis' handwriting. There is no evidence that the specimens were collected at either of these sites. They are the two nearest railway stations to São Fiel, and the parcels probably bore the names as postmarks. A few specimens undoubtedly collected at Torres Vedras, according to the literature, are labelled 'Soalheira'. A number of specimens, mainly leaf miners reared by Mendes, have full data on the labels in Mendes' own handwriting. Mendes developed a special interest in leaf miners, and both he (Mendes, 1910*a*; 1910*e*) and Joannis (1902) described new species based on Mendes' collections. The Mendes material in Paris has provided a source for several experts and has been used in the description of new species, including *Symmoca serrata* Gozmány, 1985, *Pleurota gallicella* Huemer & Luquet, 1995 and *Homoeosoma soaltheirellum* Roesler, 1965 (the species name is a misspelling derived from 'Soalheira' on the label).

Joaquim da Silva Tavares (1866–1931) [21 species] was a colleague of Mendes' at São Fiel, specializing in gall-forming insects. Together with Mendes and Carlos Zimmerman, he founded the journal *Brotéria* in 1902. After expulsion from Portugal, he went to Brazil. Tavares' Beira Baixa records, based mainly on specimens identified by Mendes, were published along with Mendes' own records and are here considered with the Mendes specimens. He also collected in Gerês, his material again being named by Mendes (1914).

P. Vieilledent [103 species], like Mendes, was a Jesuit. He published a list of the Lepidoptera of the Setúbal area (Vieilledent, 1905). His list includes

species recorded from the area by M. Rebimbas, before Vieilledent arrived at Setúbal in 1902. I have included Rebimbas' records under Vieilledent. Vieilledent was evidently influenced and encouraged by Mendes who may have named some of his specimens. Like Mendes, he sent specimens to Joannis for naming, and there are some specimens in the Paris Museum corresponding to the records in his paper, labelled 'Setubal' in Joannis' handwriting. Apart from these specimens, which I have seen, the location of his collection is unknown to me.

Nathaniel Charles Rothschild (1877–1923) [9 species] visited Sintra in April 1909 (Rothschild, 1909). I see no reason to question the identity of any of the species that he was the first to record for Portugal, so I have not attempted to see this material.

Heinrich Ernst Karl Jordan (1861–1959) was one of the greatest entomologists of all time (Riley, 1960). From 1893 he worked in Walter Rothschild's Zoological Museum at Tring, Hertfordshire, England, mainly on Coleoptera, Lepidoptera and Siphonaptera. He is not remembered as a field entomologist, nevertheless in the BMNH there are a number of Lepidoptera collected by him at Sintra and Serra de Monchique in April and May 1910, the year after Charles Rothschild, with whom he often collaborated, visited Portugal. As far as I am aware, the Lepidoptera records from this visit were never published.

John Thomas Wattison (1884–1974) [9 species, mainly Rhopalocera, but probably a number of Macrolepidoptera also]. Wattison published his Macrolepidoptera records jointly with Cruz and which of them actually collected the first specimen is only possible to discover from the specimens themselves. This is a very time consuming task which I have yet to attempt. He was an Englishman who lived in Portugal, where he was manager of a pottery factory, for 26 years up to 1936. Besides a collection of fossils, he amassed a large collection of Lepidoptera, now incorporated into the BMNH collections. I have examined some specimens there. He was particularly interested in Rhopalocera, publishing a work on the Portuguese species (Wattison, 1928; 1929; 1930), which was illustrated by a prisoner convicted for forging bank notes. He also collected numerous Macrolepidoptera and some Pyralidae. He collaborated with Cruz in a large work 'Heteróceros de Portugal' (Cruz & Wattison, 1934; 1935) and some other shorter papers (Cruz & Wattison, 1929; 1931). He collected mainly in various localities in Douro Litoral and Minho, particularly in Gerês.

Maria Amélia da Silva Cruz (1896–1978) [191 species, but this includes some that were probably first found by Wattison] was the dominant figure in Portuguese Lepidoptera studies for nearly 50 years, publishing numerous papers, at first mainly in collaboration with Wattison (see under Wattison, above), later with Gonçalves (see under Gonçalves, below). She collected Rhopalocera and Macrolepidoptera in many places in the north of the country (Cruz, 1935; 1971) but one paper (Cruz, 1967) lists the Lepidoptera of Abrantes (Ribatejo). She certainly collected some Microlepidoptera also, but did not attempt to name them. Identifications of Macrolepidoptera were made primarily using Seitz (1921–1938). She did not normally send specimens to

experts overseas. From what I have seen of the collection, which is in the Natural History Museum of the Sciences Faculty of Porto, there is a significant number of misidentifications. Since these often relate to the only record of a species from the country, a number of her species records must be deleted from the Portuguese list. Unfortunately, a substantial part of the collection, including much of the Geometridae (Geometrinae, Sterrhinae and Larentiinae) has been devastated by museum beetle (*Anthrenus*), mainly during the last 15 years. Many species recorded by Cruz are now represented just by pins and labels. At present the Rhopalocera are in moderately good condition, but the rest of the collection is still at risk of further damage.

While it could be assumed that all those species which have not been found by other lepidopterists have probably been misidentified, it is evident from the rest of the collection that many species that have not been re-found by recent workers are correctly named. But because of the uncertainty, this cohort of species without surviving specimens should be treated as unconfirmed and omitted from the Portuguese list. If they are present in the country, they will probably be re-found eventually. There are a few Wattison and Gonçalves specimens in the Cruz collection. So far just one Cruz specimen has been found in BMNH among Wattison material, but there may be others and the possibility remains of confirmation of lost Cruz records in other collections.

Timóteo Gonçalves (died 1983) [27 species] collected in north and north central Portugal, including Serra da Estrela. He collaborated with Cruz in many papers, the most important being their study of the Lepidoptera of the Alto Douro (the port wine district) (Cruz & Gonçalves, 1974*b*) and the Lepidoptera Catalogue (Cruz & Gonçalves, 1977), but several other papers added many new species to the Portuguese fauna (Cruz & Gonçalves, 1943; 1946; 1955; 1961; 1966; 1974*a*). I have not seen his collection, but there is a significant number of his specimens in the Cruz collection, quite a number of these being misidentified. I consider any species recorded by Gonçalves and no one else as suspect. Examination of his collection, which is currently in the hands of his son, in Porto, is a high priority.

Orazio Querci (1875–1967) [5 species of Rhopalocera, one of which is doubtful] collected in Portugal in 1927–1928, particularly in Serra da Estrela and around Alcácer do Sal, in Baixo Alentejo. He published a paper on Rhopalocera (Querci, 1931–1932), but he also collected Macrolepidoptera and there are a significant number of specimens in BMNH. Since he did not publish on this material, there are no misidentifications in the literature. There is a possibility of additions to the Portuguese fauna, or confirmation of doubtful records being found here, but so far none has been discovered.

The collection of Albert Zerkowitz (died 1964) [13 species] is in MNHN, Paris, and was the subject of an earlier paper (Corley, 2002). Corrections to the Portuguese Lepidoptera list given in that paper are not included in the present paper.

Fernando Carneiro-Mendes [10 species] was active in the late 1940s in the area around Sintra, publishing an important paper on his findings (Carneiro-Mendes, 1951). I have doubts concerning the identification of one of the species he added to the Portuguese list, but have not yet had the opportunity

to examine his collection which is in the Centro de Zoologia, Instituto de Investigação Científica e Tropical, Lisboa (ICT).

Teodoro Monteiro (1919–1995) [174 species] was a Benedictine monk. His early career was in Angola, but from about 1950 until his death, he was resident at the Mosteiro de Singeverga, Santo Tirso, north of Porto. He collected both Macro- and Microlepidoptera, and had a particular interest in Psychidae (Monteiro, 1954; 1958). While much of his fieldwork was in the Santo Tirso area, he also travelled elsewhere, making interesting collections from Montalegre and other parts of the north-east of the country (Monteiro, 1976; Monteiro & Maravalhas, 1987) and from Algarve, which he visited many times, resulting in the first major paper on Algarve Lepidoptera (Monteiro & Carvalho, 1984). He published a number of papers, adding many species to the Portuguese fauna (Monteiro, 1956; 1957; 1959; 1962*a*; 1962*b*; 1975; 1985; Guerra & Monteiro, 1978). He enlisted the help of H. G. Amsel (Amsel, 1955; 1957; 1959) to name some of his micros, and some Macrolepidoptera were determined in Paris by Dufay and others. Monteiro also sent Psychidae to Bourgogne, who published papers based on his material (Bourgogne, 1954*a*; 1954*b*). He acquired the early volumes of *Microlepidoptera Palaearctica*, possibly from Amsel who was the instigator of the series. He was the first Portuguese lepidopterist to examine genitalia as an aid to identification. With the aid of Bleszyński (1965) he revised the Portuguese Crambinae (Monteiro, 1971*b*; 1982*a*; 1982*b*), and other groups were also revised (Monteiro, 1961; 1971*a*). Where he had access to good literature with genitalia figures, his identifications were of a very high standard. But for groups where no such literature was available, many of his identifications were pure guesswork. As a result many of his Algarve identifications are questionable.

Monteiro's collection is still at the Mosteiro de Singeverga, near Santo Tirso, where it is well conserved. I have spent a little time there. Surprisingly it includes some named species which have never been published for Portugal.

José Passos de Carvalho (1937–2003) [171 species] was a professional entomologist. He worked for 12 years in Angola, returning to Portugal in 1975, after the revolution that resulted in the collapse of Portuguese control of the colonies. He worked for the Ministério da Agricultura, Pescas e Alimentação at Oeiras right up to his death in 2003. He was extremely active in the late 1970s and early 1980s, collecting Lepidoptera in many parts of the country (Carvalho, 1978*a*; 1980; 1984; 1986) and amassing a large collection, which also contains many specimens collected at this time by others, notably Artur Moniz Serrano, Luis de Camões and António J. L. Contente. He also did important work in Açores, Madeira and the Cabo Verde Islands. After 1985 he was increasingly involved with non-lepidopterous pest species, particularly of citrus crops, and after about 1990 he collected few Lepidoptera. Identification of Noctuidae was mainly his own, but other groups were often referred to experts overseas, including, in Paris, C. Herbulot (1975; 1979; 1991) and L. Bigot (Bigot & Carvalho, 1983), and in London, J. D. Bradley and D. S. Fletcher. Much of his Algarve material appears to have been named by Monteiro and this has resulted in a number of misidentifications,

particularly among the Microlepidoptera. A. Vives Moreno (Madrid) also named quite a lot of Microlepidoptera. This was very early in Vives' career and there are a number of misidentifications here also. I met Carvalho at his mother's house in Algarve in 1991 and several times afterwards. I was able to identify a number of his unnamed Microlepidoptera and we published a joint paper on additions to the Algarve Lepidoptera (Carvalho & Corley, 1995). Regrettably there were a number of misidentifications in this work, many attributable to me. He was in favour of only including new species for Portugal that had been verified by an expert. I opposed this view, as I had by that time discovered a substantial number of misidentifications by those we had assumed to be more expert than ourselves. All known misidentifications were corrected in subsequent papers and are not repeated here. Our final collaboration was published after his death (Corley, Maravalhas & Carvalho, 2006), including a number of species new for Portugal which I found in his collection and which are also not repeated here. His collection remains in the possession of his widow Umbelina, at their house in Oeiras; a permanent home for it is still to be found.

Abbreviations

BMNH	Natural History Museum, London.
MNHN	Muséum National d'Histoire Naturelle, Paris.
IZPC	Natural History Museum of the Sciences Faculty of Porto.

Results

A substantial number of corrections to the Portuguese list and verifications of old records can be made as a result of the museum work that has been done so far. These are given below under five headings. Published information on species distribution outside Portugal has sometimes been used to reinforce the decision to exclude a species. This decision is occasionally based on examination of material in some, but not all collections, when there is very strong reason to suppose that all material is likely to be misidentified.

Many corrections resulting from the study of material in some of the above collections have already been published by Corley *et al.* (2000), Corley (2002; 2005; 2007), Corley, Maravalhas & Carvalho (2006), and Corley, Marabuto & Pires (2007).

Since I have seen almost all the Macrolepidoptera in the Cruz collection, I have been able to link this material with the relevant publications, allowing evaluation of nearly all the records attributable solely to her.

In each of the lists that follow, the order of species follows that in Karsholt & Razowski (1996), but some names have been updated.

The spelling of place names is brought into line with modern usage in the lists that follow, except where the actual data on specimen labels are quoted. All dates are given in the same format, including those on labels.

Species to be deleted from the Portuguese list as a result of study of museum and other collections***Lecithocera nigrana*** (Duponchel, 1836)

Recorded (as *luticornella* Zeller, 1839) from Silves, Algarve, 16.v.1880, by Eaton (Stainton, 1881). Specimen in BMNH not dissected but appears to be *Eurodachtha canigella* (Caradja, 1920). Mendes (1904) also recorded *L. luticornella* from three sites in Beira Baixa, specimens not seen. *E. canigella* is a very common species in Portugal.

Eteobalea gronoviella (Scopoli, 1772)

Recorded by several authors, often as *E. serratella* (Treitschke, 1833). The earliest record is from São Fiel, Beira Baixa (Mendes, 1904). Larvae were found by Tavares in the roots of *Anarrhinum bellidifolium*. This is the foodplant of *Eteobalea intermediella* (Riedl, 1966) which is the only common *Eteobalea* species in Portugal. Tavares' material has not been seen, but specimens collected by Zerkowitz and Carvalho have been dissected and found to be *E. intermediella*.

Ptocheusa inopella (Zeller, 1839)

Recorded from between São Bartolomeu de Messines and Silves, Algarve, 14.v.1880, by Eaton (Stainton, 1881). Specimen in BMNH not dissected but appears to be *P. paupella* (Zeller, 1847). The latter species is common in Portugal but *P. inopella* has not been found.

Bryotropha similis (Stainton, 1854)

Recorded by Mendes (1913) from São Fiel, Beira Baixa. Specimen in MNHN labelled 'Soalheira', determined by Walsingham as *B. similis*, is *B. pallorella* Amsel, 1952.

Bryotropha basaltinella (Zeller, 1839)

Recorded by Mendes (1904) from São Fiel, Beira Baixa. Specimen in MNHN labelled 'Soalheira' is *B. dryadella* (Zeller, 1850).

Scrobipalpa gallicella (Constant, 1885)

Recorded from Monchique, Algarve, by Monteiro (Monteiro & Carvalho, 1984). There are three specimens under this name in the Monteiro collection. One is very worn and without abdomen, so cannot be named. The other two appear to be *Ptocheusa campicolella* (Mann, 1857).

Cnephasia abrasana (Duponchel, 1842)

Recorded by Vieilledent (1905) from Setúbal. I was unable to find any Portuguese *Cnephasia* specimens in MNHN, but this species could not have been reliably named without genitalia examination and has not been re-found. It cannot be accepted as a Portuguese species.

Endothenia oblongana (Haworth, 1811)

Recorded by Vieilledent (1905) from Setúbal. Specimen in MNHN is *E. marginana* (Haworth, 1811).

Pelochrista sordicomana (Staudinger, 1859)

Recorded from Almodôvar, Baixo Alentejo, 6.v.1880, by Eaton (Ragonot, 1881). This specimen not seen but one in MNHN labelled 'Soalheira', collected at Paradanta, Beira Baixa, by Mendes (1904), is *Cydia strigulatana* (Kennel, 1899) as also are Algarve specimens mentioned by Monteiro & Carvalho (1984). This appears to be a long-persisting misidentification in the Portuguese fauna.

Gypsonoma dealbana (Frölich, 1828)

Recorded by Mendes (1904) from São Fiel, Beira Baixa. Specimen in MNHN labelled 'Soalheira' is *G. minutana* (Hübner, 1799).

Cydia nebritana (Treitschke, 1830)

Recorded from Monte de São José, Beira Baixa (Mendes 1904). Specimen in MNHN labelled 'Soalheira' is *C. gemmiferana* (Treitschke, 1835).

Cydia microgrammana (Guenée, 1845)

Recorded by Vieilledent (1805) from Monte de São Filipe, Setúbal. Specimen in MNHN is *Cydia ulicetana* (Haworth, 1811).

Cydia pactolana (Zeller, 1840)

Recorded by Mendes (1910c) from Vale de Rosal, Estremadura, under the name *C. pinetana* (Schläger, 1847). Specimen not seen, but it would have been named by Joannis. A specimen from Aix, France, in the Joannis collection in MNHN is *C. coniferana* (Saxesen, 1840), so Joannis was using the name *pinetana* (usually considered to be a synonym of *pactolana*) for *C. coniferana*. This is a fairly common species in Portugal and as there is no evidence that any of the other conifer-feeding *Cydia* species occurs there, I have no doubt that Mendes' record belongs here.

Tebenna bjerkanndrella (Thunberg, 1784)

Recorded from Castelejo, Beira Baixa, by Mendes (1904). Specimen in MNHN labelled 'Soalheira' is *T. micalis* (Mann, 1857). Zerkowitz material in MNHN named *T. bjerkanndrella pretiosana* (Duponchel, 1842) is also *T. micalis*, which is a common species in Portugal. There is no reason to suppose that *T. bjerkanndrella* occurs in Portugal.

Asalebria venustella (Ragonot, 1887)

Recorded from Almêlo, Setúbal, by Vielledent (1905) and from São Fiel, Beira Baixa, by Mendes (1913). Specimens in MNHN labelled 'Setubal' and 'Soalheira' are *A. florella* (Mann, 1862).

Euchromius superbellus (Zeller, 1849)

Recorded from Cadriceira, Torres Vedras, by Mendes (1910). This has not been seen, but in MNHN there is one labelled 'Setubal', although Vieilledent (1905) did not publish a record of this species, and another from Coimbra in the Ragonot collection, presumably collected by Oliveira, which have both been re-determined as *E. gozmanyi* Bleszyński, 1961, by R. J. Schouten. There is no recent record of *E. superbellus*, so Mendes' record is here considered to be too doubtful to be maintained.

Malacosoma franconica ([Denis & Schiffermüller], 1775)

Cruz & Wattison (1934) list this species from Almodôvar, Baixo Alentejo, and from Agolada, based on material in the Laboratório de Biologia Florestal. The Cruz collection in IZPC contains specimens from Agolada and Cascalheira, both in Ribatejo, which are *M. alpicola* Staudinger, 1870. The presence of this species in the southern half of Portugal is surprising. It is present in Trás-os-Montes with records from Montalegre by Gonçalves (Cruz & Gonçalves, 1961) and Miranda do Douro (Corley, unpublished). The nearest records for *M. franconica* are in north-east Spain.

Phyllodesma ilicifolia (Linnaeus, 1758)

Recorded from Gerês by Cruz & Wattison (1929). There is no material from Gerês in the Cruz collection in IZPC, but several specimens labelled *P. ilicifolia* are all *P. kermesifolia* (Lajonquière, 1960). There is no reason to suppose that *P. ilicifolia* occurs in Portugal.

Ennomos autumnaria (Werneberg, 1859)

Listed for Portugal by Cruz & Gonçalves (1977), but no record was ever published. No specimens in IZPC. It has not been accepted in other more recent lists.

Rhopalognophos glaucinaria (Hübner, 1799)

Recorded from Abrantes, Ribatejo, by Cruz (Cruz & Gonçalves (1974*a*). Various specimens in IZPC are *Euchrognophos mucidaria* (Hübner, 1799).

Dyscia fagaria (Thunberg, 1784)

Recorded by Mendes (1903) from São Fiel and Serra da Gardunha, in Beira Baixa. Nine specimens in MNHN labelled 'Soalheira' under this name are *Isturgia miniosaria* (Duponchel, 1829). Mendes was well aware that *I. miniosaria* was extremely variable (Mendes, 1909*a*), but nevertheless both he and Joannis failed to identify these particular specimens. Carvalho (1984) recorded *D. fagaria* (Thunberg, 1784) from Sarilhão, near Gerês, but his specimens are *D. penulataria* (Hübner, 1819). Cruz specimens in IZPC labelled *D. fagaria* are also *D. penulataria*.

Dyscia lentiscaria (Donzel, 1837)

Recorded from Abrantes, Ribatejo, by Cruz (1967). Specimens in IZPC are *D. distinctaria* (A. Bang-Haas, 1910).

Chlorissa viridata (Linnaeus, 1758)

Recorded from Gerês by Cruz & Wattison (1929), and there are 13 other localities in Cruz & Wattison (1935). No material from Gerês or any other locality has been found, but in BMNH there are 37 specimens of *C. cloraria* (Hübner, 1813) collected by Wattison, mostly from Senhora da Hora, Douro Litoral. In IZPC there are no undamaged specimens under *C. viridata*. Neither Cruz nor Wattison recorded *C. cloraria*, so their records of *C. viridata* doubtless all refer to *C. cloraria*. There are two records of *C. viridata* from Algarve (Monteiro & Carvalho, 1984), but these are also likely to be misidentifications, perhaps of *Phaiogramma* species. Hausmann (2001) places a '?' in North Portugal for both *C. viridata* and *C. cloraria*.

Scopula virgulata ([Denis & Schiffermüller], 1775)

Recorded from Carvalhelhos, Trás-os-Montes, by Cruz & Gonçalves (1955). One undamaged specimen in IZPC is *Idaea subsericeata* (Haworth, 1809). Hausmann (2004) questioned the presence of *S. virgulata* in Portugal.

Idaea allardiata (Mabille, 1869)

Listed for Portugal by Cruz & Gonçalves (1977), but no record was ever published. There was a specimen under this name destroyed by insects in IZPC with typed label 'Turcifal' (probably collected by Gonçalves). It has not been accepted in other more recent lists. This is a North African species closely resembling *I. sericeata* (Hübner, 1813).

Idaea typicata (Guenée, 1857)

Recorded from Pinhão, Trás-os-Montes (Cruz & Gonçalves, 1974*a*). No specimen found in IZPC. Hausmann (2004) questions the presence of this species in the Iberian Peninsula. It is externally similar to several other *Idaea* species, including *I. cervantaria* (Millière, 1869) and *I. alyssumata* (Millière, 1871).

Idaea consolidata (Lederer, 1853)

Recorded from Praia do Moledo, Minho (Cruz & Wattison, 1935). Three undamaged specimens in IZPC, the earliest labelled 'Vila do Conde, vii.1939, Silva Cruz' are *Scopula marginepunctata* (Goeze, 1781). *Idaea consolidata* is a species of the eastern Mediterranean area (Hausmann, 2004).

Idaea seriata (Schrank, 1802)

First recorded from Lisboa, 12.vi.1880, by Eaton (Staudinger, 1881). This specimen has not been seen. Specimens collected by Mendes, Vieilledent and

Zerkowitz (all in MNHN) are all *I. minuscularia* (Ribbe, 1912) which, for many years, was treated (under various names) as no more than a variety of *I. seriata*. No material matching *I. seriata* has been found.

Idaea emarginata (Linnaeus, 1758)

Recorded from Guimarães, Minho, leg. J. de Moraes, determined by Mendes (Mendes, 1909), specimen not seen, and from Carvalhelhos, Trás-os-Montes, and Lanhelas, Minho, by Cruz, both specimens in IZPC destroyed by insects. Hausmann (2004) considers *I. emarginata* to be absent from the Iberian Peninsula, where it is replaced by *I. simplicior* (Prout, 1934) and *I. dromikos* Hausmann, 2004. Only a single recent collection of the *emarginata*-group exists (Corley, Maravalhas & Carvalho, 2006), which is *I. simplicior*. In the present limited state of knowledge, it is best to assume that all the records refer to *I. simplicior*.

Cleta perpusillaria (Eversmann, 1847)

Recorded from Vila do Conde, Douro Litoral, by Cruz (Cruz & Gonçalves, 1974a). Specimens in IZPC destroyed by insects, but were presumably *C. ramosaria* (Villers, 1789). According to Hausmann (2004), Iberian records are erroneous and the nearest localities for the species are in European Turkey.

Lampropteryx suffumata ([Denis & Schiffermüller], 1775)

Listed for Portugal by Cruz & Gonçalves (1977), but no record was ever published. No specimens in IZPC. It has not been accepted in other more recent lists apart from that of Gómez Bustillo & Arroyo Varela (1981).

Perizoma obsoletata (Herrich-Schäffer, 1838)

Recorded from Sousanil, Douro Litoral, by Cruz (Cruz & Gonçalves, 1966). This is a very improbable record as the foodplants are alpine *Gentiana* species, which would not occur in this locality. There is a destroyed specimen in IZPC labelled 'Souzanil, x.1963'.

Eupithecia schiefereri Bohatsch, 1893

Listed for Portugal by Cruz & Gonçalves (1977), but no record was ever published. No specimens found in IZPC.

Lithostege farinata (Hufnagel, 1767)

Recorded from Elvas, Alto Alentejo, April, by Cruz (Cruz & Gonçalves, 1955). Treated as questionable by Cruz & Gonçalves (1977). See notes under the following species.

Lithostege cinerata Turati, 1924

Listed by Cruz & Gonçalves (1977). A single specimen under this name in IZPC labelled 'Elvas, iv.1943' destroyed by insects. This must be the same specimen referred to as *L. farinata* by Cruz & Gonçalves (1955). So in Cruz & Gonçalves (1977) this single specimen was the origin of the 'good' record of *L. cinerata* and the doubtful one of *L. farinata*! *Lithostege cinerata* is a North African species, not known in Europe.

Minoa murinata (Scopoli, 1763)

Listed for Portugal by Cruz & Gonçalves (1977) and in later lists, but no record was ever published. No specimens found in IZPC.

Ptilodon capucina (Linnaeus, 1758)

Cruz & Gonçalves (1955) mention an unlocalized specimen that was donated to one of them. The species is not listed by Cruz & Gonçalves (1977). There may have been doubts as to its provenance.

Pechipogo strigilata (Linnaeus, 1758)

Recorded from Vila do Conde, Douro Litoral (Cruz & Wattison, 1935). An

unlabelled specimen under this name (IZPC) is *Zanclognatha tarsipennalis* (Treitschke, 1835).

Polygogon tentacularia (Linnaeus, 1758)

Listed for Portugal by Cruz & Gonçalves (1977) and in later lists, but no record was ever published. No specimens found in IZPC.

Lygephila pastinum (Treitschke, 1826)

Recorded from São Fiel, Beira Baixa, leg. L. M. Alves Correia (Mendes, 1903). This specimen was not seen, but one specimen in IZPC labelled 'São Fiel, 1904, Tavares' is *L. craccae* ([Denis & Schiffermüller], 1775). Tavares was a close associate of Mendes, so it is extremely likely that the latter named both these specimens. Mendes never recorded *L. craccae*, which is a widespread species in Portugal. It would appear that he consistently mistook it for *L. pastinum*, which has never been recorded by subsequent workers.

Pseudeustrotia candidula ([Denis & Schiffermüller], 1775)

Recorded from Abrantes, Ribatejo, by Cruz (Cruz & Gonçalves, 1966). No specimen found in IZPC. Treated as questionable by Cruz & Gonçalves (1977). This is not a south-west European species.

Eublemma amoena (Hübner, 1803)

Recorded from Vizela, Minho, by Cruz & Wattison (1931) as *E. respersa* ([Denis & Schiffermüller], 1775). No specimen found in IZPC. Treated as questionable by Cruz & Gonçalves (1977).

Eublemma pallidula (Herrich-Schäffer, 1856)

Recorded from Abrantes, Ribatejo, by Cruz (Cruz & Gonçalves, 1966). Specimen in IZPC labelled 'Abrantes, vii.1958' is *E. pura* (Hübner, 1813). The record had previously been rejected by Yela & Sarto i Monteys (1990) as a probable misidentification of *E. pura*.

Cucullia artemisiae (Hufnagel, 1766)

Recorded from 'North of Portugal' by Gonçalves (Cruz & Gonçalves, 1966), and from Ucanha, Trás-os-Montes, by Gonçalves (Cruz & Gonçalves, 1974*b*). No specimen found in IZPC. Treated as questionable by Cruz & Gonçalves (1977).

Cucullia lactucae ([Denis & Schiffermüller], 1775)

Recorded from Abrantes, Ribatejo, and Pinhão, Trás-os-Montes, by Cruz (Cruz & Gonçalves, 1974*a*). There are 12 specimens in IZPC, some dissected by T. Monteiro, now under the name *C. chamomillae* ([Denis & Schiffermüller], 1775). Most, if not all, are *C. calendulae* Treitschke, 1835.

Shargacucullia scrophulariae ([Denis & Schiffermüller], 1775)

Recorded from Pinhão, Trás-os-Montes, by Cruz (Cruz & Gonçalves, 1974*a*). No specimen found in IZPC. Treated as questionable by Cruz & Gonçalves (1977).

Calophasia lumula (Hufnagel, 1766)

Recorded from Vizela, Minho, by Cruz & Wattison (1931), but not listed by Cruz & Wattison (1935) or Cruz & Gonçalves (1977). *Calophasia hamifera* Staudinger, 1863, is given for Vizela in Cruz & Wattison (1935), so the record was presumably transferred to this species.

Metopoceras khalildja Oberthür, 1884

Recorded from Pinhão, Trás-os-Montes, by Cruz (Cruz & Gonçalves, 1974*a*). A specimen in IZPC, labelled 'Pinhão, v.1968', is a heavily marked *M. felicina* (Donzel, 1844).

Caradrina vicina Staudinger, 1870

Recorded from Vieira do Minho and Ucanha, Trás-os-Montes, by Gonçalves

(Cruz & Gonçalves, 1974a). Specimens in IZPC labelled 'Vieira, 1967' and 'Ucanha, viii.1961 T.G.' appear to be worn *Paradrina clavipalpis* (Scopoli, 1763). *Caradrina vicina* is a species of the central and eastern Mediterranean.

Hoplodrina superstes (Ochsenheimer, 1816)

Recorded from Vizela, Douro Litoral (Cruz & Wattison, 1931). Five specimens in IZPC appear to be *Paradrina clavipalpis* (Scopoli, 1763).

Stilbia calberlae (Failla-Tedaldi, 1890)

Recorded from Sousanil, Douro Litoral (Cruz, 1971). Iberian records belong to *S. andalusiaca* Staudinger, 1892, according to Yela & Sarto i Monteys (1990). *Stilbia calberlae* is endemic to Sicily.

Anthracia eriopoda (Herrich-Schäffer, 1851)

Recorded from Turcifal, Torres Vedras, by Cruz (Cruz & Gonçalves, 1961). Specimen in IZPC labelled 'Turcifal, viii.1931' is *A. ephialtes* (Hübner, 1822). *Anthracia eriopoda* is a south-east European species.

Enargia abluta (Hübner, 1808)

Recorded from Gerês by Gonçalves (Cruz & Gonçalves, 1974a). Specimen in IZPC, labelled 'Gerês, vi.1960, T.G.', is *Cosmia trapezina* (Linnaeus, 1758).

Agrochola laevis (Hübner, 1803)

Recorded from Abrantes, Ribatejo (Cruz & Gonçalves, 1955). No specimens found in IZPC under this name, but it is very probable that the records are based on the same specimens recorded (also erroneously) as *A. haematidea* (Duponchel, 1827) in Cruz & Gonçalves (1966) (see below). Not listed in Cruz & Gonçalves (1977) or in other lists.

Conistra erythrocephala ([Denis & Schiffermüller], 1775)

Recorded from [Vila Nova de] Gaia in August (no year given) by Cruz (Cruz & Gonçalves, 1961). No specimen found in IZPC. Treated as questionable by Cruz & Gonçalves (1977). The month given is highly improbable for this species.

Episema glaucina (Esper, 1789)

Recorded from Setúbal by Vieilledent (1905). One specimen in NMNH labelled 'Setubal' is placed under the label *E. grueneri ramburi* Zerny, 1927. It has not been dissected, but agrees well with specimens from other countries under this name. *Episema glaucina* is also recorded from Algarve by Monteiro & Carvalho (1984). A specimen in the Carvalho collection closely resembles a dissected specimen of *E. grueneri* Boisduval, 1837, which I have from Algarve. There is no evidence that *E. glaucina* occurs in Portugal.

Cleoceris scoriacea (Esper, 1789)

Recorded from Vila do Conde, Douro Litoral, by Cruz (Cruz & Gonçalves, 1966). Of the two specimens in IZPC, one labelled 'Gaia, ix.1960' is totally destroyed by *Anthrenus* beetles, the other, labelled 'Vila do Conde, ix.1965', lacks the right wings. This specimen is certainly not *C. scoriacea*, but probably is a *Luperina* species.

Dichonia convergens ([Denis & Schiffermüller], 1775)

Recorded from Pinhão, Trás-os-Montes, by Cruz (Cruz & Gonçalves, 1974a). Three specimens in IZPC are totally destroyed, but two survive, labelled 'Pinhão, vi.1965'. One appears to be *Conisania andalusica* (Staudinger, 1859), the other *Hadena sancta* (Staudinger, 1859). According to Ronkay, Yela & Hreblay (2001), *D. convergens* is not known in the Iberian Peninsula.

Polymixis serpentina (Treitschke, 1825)

Recorded from Lindoso, Minho and Pinhão, Trás-os-Montes, by Cruz (Cruz &

Gonçalves, 1966). There were two specimens in IZPC, both totally destroyed, one labelled 'Lindoso, ii.1952', the other 'Pinhão, ix.1965'. Cruz & Gonçalves (1977) treated the species as doubtful in their check-list. Yela & Sarto i Monteys (1990) referred these records to *Melanchnra persicariae* (Linnaeus, 1761), but it is not clear why. The known distribution of *P. serpentina* does not extend west of Italy.

Polymixis rufocincta (Geyer, 1828)

Recorded from Gerês (Cruz & Wattison, 1929). No specimen found in IZPC. The record refers to *P. dubia* (Duponchel, 1836), according to Yela & Sarto i Monteys (1990). The known distribution of *P. rufocincta* does not reach the Iberian Peninsula.

Mniotype adusta (Esper, 1790)

Recorded from Vila do Conde, Douro Litoral, by Cruz (Cruz & Gonçalves, 1966). In IZPC there is a label for the species, but no specimen and no space has been allowed for a specimen. Must be considered very doubtful.

Apamea furva ([Denis & Schiffermüller], 1775)

Recorded from Ucanha, Trás-os-Montes, by Gonçalves (Cruz & Gonçalves, 1966). A single specimen in IZPC labelled 'Ucanha, v.1962' is *A. anceps* ([Denis & Schiffermüller], 1775).

Apamea zeta (Treitschke, 1825)

Recorded from Pinhão, Trás-os-Montes, by Cruz (Cruz & Gonçalves, 1974a). In IZPC there is a label for the species, but no specimen and no space has been allowed for a specimen. Must be considered very doubtful.

Apamea unanímis (Hübner, 1813)

Recorded from Serra da Estrela by Gonçalves (Cruz & Gonçalves, 1961). Specimen not seen, but in IZPC under this name are three specimens from Gaia and one from Abrantes. These are all *Mesapamea* species. Since Cruz and Gonçalves collaborated, it is very probable that Gonçalves' specimen was also a *Mesapamea*.

Apamea scolopacina (Esper, 1788)

Recorded from Pinhão, Trás-os-Montes, by Cruz (Cruz & Gonçalves, 1974a). A single specimen in IZPC is labelled 'Pinhão, x.1971'. The specimen is not in good condition, but the deep brown coloration is quite wrong for this species.

Oligia latruncula ([Denis & Schiffermüller], 1775)

Recorded from Arcas, Trás-os-Montes, by Gonçalves (Cruz & Gonçalves, 1974a). There is a single specimen in IZPC labelled 'Marão, v.1959, T.G. det. Boursin'. This still has the abdomen present, so the genitalia were probably not examined. The specimen appears to me to be *O. strigilis* (Linnaeus, 1758). There is no other Portuguese record of *O. latruncula*.

Eremohadena chenopodiphaga (Rambur, 1932)

Recorded from Arcas, Trás-os-Montes (Cruz & Wattison, 1935). Two specimens in IZPC, one labelled 'Arcas, vii.1933', the other 'Valdigem, v.1945', are both *Rhyacia simulans* (Hufnagel, 1766).

Celaena haworthii (Curtis, 1829)

Recorded from Pereiros de Baixo, v.1916, by Cruz (Cruz & Gonçalves, 1961). I have been unable to find the locality. One specimen in IZPC in rather poor condition appears to be a *Mesapamea* species.

Hadula odontites (Boisduval, 1829)

Recorded as *Scotogramma marmorosa* (Borkhausen, 1792) from Fundão, Beira Baixa, by Cruz (Cruz & Gonçalves, 1961), but considered questionable by Cruz &

Gonçalves (1977). No specimen found in IZPC. There are no other records, but it is mapped as present all over Portugal by Hacker, Ronkay & Hreblay (2002).

Lacanobia splendens (Hübner, 1808)

Recorded from Ucanha, Trás-os-Montes, by Gonçalves (Cruz & Gonçalves, 1966). Specimen in IZPC labelled 'Ucanha, iv.1965, T.G.' has the thorax and one forewing only. It is *Cerastis rubricosa* ([Denis & Schiffermüller], 1775).

Hadena tephroleuca (Boisduval, 1833)

Recorded from Vesúvio, Trás-os-Montes, by Cruz (Cruz & Gonçalves, 1955), but treated as doubtful by Cruz & Gonçalves (1977). No specimen from Vesúvio found in IZPC, but one labelled 'Abrantes, iv.1948' is *H. sancta* (Staudinger, 1859). Probably the Vesúvio specimen was re-determined as another species between 1955 and 1977.

Mythimna pallens (Linnaeus, 1758)

Recorded from Abrantes, Ribatejo, by Cruz (1967). There are two specimens in IZPC: 'Abrantes, viii.1963' has few wing scales and badly damaged abdomen, and is therefore indeterminate; 'Abrantes, viii.1966' is a worn specimen of *M. vitellina* (Hübner, 1808). There are no other records.

Orthosia munda ([Denis & Schiffermüller], 1775)

Listed for Portugal by Cruz & Gonçalves (1977), but the original record was never published. In IZPC, under the name of *O. munda*, is a single specimen of *Xestia castanea* (Esper, 1798) labelled 'Souzanil, x.1951'.

Lasionycta staudingeri (Aurivillius, 1891)

Listed for Portugal by Cruz & Gonçalves (1977), but no record was ever published. No specimen found in IZPC. This is a boreal species found in Scandinavia and northern Russia. It must be based on a misidentification.

Diarsia mendica (Fabricius, 1775)

Recorded from Gerês (Cruz & Wattison, 1935), but not listed by Cruz & Gonçalves (1977). No specimen found in IZPC.

Diarsia dahlia (Hübner, 1813)

Recorded from Venda Nova (Rabagão), Trás-os-Montes, by Cruz (Cruz & Gonçalves, 1966). Specimen in IZPC labelled 'Venda Nova, x.1950' and four others are all *Xestia xanthographa* ([Denis & Schiffermüller], 1775). According to Yela & Sarto i Monteys (1990), *D. dahlia* does not occur in the Iberian Peninsula.

Chersotis multangula (Hübner, 1803)

Recorded from Gouveia, Beira Alta, by Gonçalves (Cruz & Gonçalves, 1974a). Specimen in IZPC labelled 'Gouveia, x.1968' is *Xestia xanthographa* ([Denis & Schiffermüller], 1775).

Chersotis margaritacea (Villers, 1789)

Recorded from Pinhão, Trás-os-Montes, by Cruz (Cruz & Gonçalves, 1966), but not listed for Portugal by Cruz & Gonçalves (1977). No specimen found in IZPC. Probably the specimen was re-determined as another species between 1966 and 1977. There is no other record.

Standfussiana lucerneae (Linnaeus, 1758)

Recorded from Abrantes, Ribatejo, by Cruz (Cruz & Gonçalves, 1966). Specimen in IZPC is rather worn, but definitely not this species. It may be *Aporophyla lutulenta* ([Denis & Schiffermüller], 1775).

Xestia trifida (Fischer von Waldheim, 1820)

Recorded from [Vila Nova de] Gaia by Cruz (Cruz & Wattison, 1935). No specimen found in IZPC. Treated as questionable by Cruz & Gonçalves (1977).

Xestia sexstrigata (Haworth, 1809)

Recorded from [Vila Nova de] Gaia by Cruz (Cruz & Gonçalves, 1966). There are two specimens in IZPC under this name: one labelled 'Gaia, 2.x.1943' is *X. xanthographa* ([Denis & Schiffermüller], 1775), and one labelled 'Pinhão, ix.1967' is badly worn, but probably also *X. xanthographa*.

Agrotis mauretanic A. Bang-Haas, 1910

Recorded from Abrantes, Ribatejo, by Cruz (Cruz & Gonçalves, 1966). Specimen in IZPC labelled 'Abrantes, iv.1965' is *A. segetum* ([Denis & Schiffermüller], 1775).

Orgyia dubia (Tauscher, 1806)

Listed for Portugal by Cruz & Gonçalves (1977) and in subsequent lists, but no record was ever published. No specimen found in IZPC.

Nola cristatula (Hübner, 1793)

Recorded from Currais, Régua, Trás-os-Montes, by Cruz (Cruz & Gonçalves, 1955). There are 19 specimens under this name in IZPC from various localities in Alto Douro. All are *Nola subchlamydula* Staudinger, 1871. In Cruz & Wattison (1934), *Nola subchlamydula* is given as a synonym of *N. cristatula*. In Cruz & Gonçalves (1955), the entry for *N. cristatula* gives *N. praetexta* [sic] (i.e. *praetextula* Chrétien, 1923) as a synonym, but this is now considered to be a synonym of *N. subchlamydula*.

Spilosoma urticae (Esper, 1789)

Recorded from Gerês by Cruz (Cruz & Gonçalves, 1955). Two specimens in IZPC, one labelled 'Gerês, v.' and the other 'Gaia, vii.1961', are lightly marked specimens of *S. lubricipeda* (Linnaeus, 1758).

Species with historic records based on misidentifications, but to be retained in Portuguese list, as there are recent records

Nemapogon ruricolella (Stainton, 1859).

Listed for Portugal, based on an unlocalized Seebold (1898) record. Reliable identification was not possible at that time. A specimen in the Carvalho collection labelled *N. cloacella* f. *ruricolella* was found to be *N. nevadella* (Caradja, 1920) when dissected. Recently collected material exists and will be published elsewhere.

Monopis obviella ([Denis & Schiffermüller], 1775)

Recorded by Vielledent (1905) (as *M. ferruginella* (Hübner, 1813) from Setúbal. Specimen labelled 'Setubal' in MNHN is *M. crocicapitella* (Clemens, 1859). Recently collected material exists and will be published elsewhere.

Depressaria albipunctella ([Denis & Schiffermüller], 1775)

Recorded by Mendes (1913) from Beira Baixa, São Fiel. Specimen in MNHN labelled 'Soalheira' is *D. tenebricosa* Zeller, 1854. Recently collected material exists and will be published elsewhere.

Coleophora conyzae Zeller, 1868

Recorded by Vielledent (1905) from Setúbal. There are two specimens labelled 'Setubal' in MNHN, one is *C. solidaginella* Staudinger, 1859, the other *C. pennella* ([Denis & Schiffermüller], 1775). The species has recently been recorded by Pires (Pires & Corley, 2007) where the earlier record was erroneously ascribed to Zerkowitz.

Aethes sanguinana (Treitschke, 1830)

Recorded by Vielledent (1905) from Setúbal. Specimens in MNHN labelled

'Setubal' are *A. bilbaensis* (Rössler, 1877), determined by E. Dattin. Recently collected material exists and will be published elsewhere.

Idaea humiliata (Hufnagel, 1767)

Recorded by Vieilledent (1805) from Monte dos Carvalhos, Setúbal. Five specimens labelled 'Setubal' in MNHN are *I. bigladiata* Herbulot, 1975. Recently collected material exists and will be published elsewhere.

Eupithecia phoeniceata (Rambur, 1834)

Recorded from Pinhão, Trás-os-Montes, by Cruz (Cruz & Gonçalves, 1966). The Cruz collection contains a number of totally destroyed specimens labelled 'Pinhão'. Recent work in the Alto Douro region, where *Juniperus oxycedrus* is common, has produced abundant *Eupithecia oxycedrata* (Rambur, 1833) but no *E. phoeniceata*. It can be assumed that Cruz's *E. phoeniceata* were all *E. oxycedrata*. *Eupithecia phoeniceata* does occur in Portugal, associated with *Juniperus phoenicea* in Algarve (Carvalho & Corley, 1995).

Agrochola macilenta (Hübner, 1809)

Recorded from [Vila Nova de] Gaia by Cruz (Cruz & Gonçalves, 1966). Four specimens in IZPC labelled 'Gaia, i.1965' are *A. blidaensis* (Stertz, 1915). A new record for *A. macilenta* is given by Pires & Corley (2007).

Agrochola haematidea (Duponchel, 1827)

Recorded from Abrantes, Ribatejo, by Cruz (Cruz & Gonçalves, 1966). There are four specimens in IZPC labelled 'Abrantes', the earliest dated xi.1945, which may have been previously misidentified as *A. laevis* (see above for entry on that species). These are definitely not *A. haematidea*, as they have a grey coloration. They have not yet been identified, but could be a form of *A. lychnidis* ([Denis & Schiffermüller], 1775). The record of *A. haematidea* by Corley *et al.* (2000) as new for Algarve is thus the earliest Portuguese record.

Cardepiá sociabilis (Graslin, 1850)

Recorded from Pinhão, Trás-os-Montes, by Cruz (Cruz & Gonçalves, 1966). No specimen found in IZPC. An unlikely record for this coastal species and perhaps a misidentification of *Hadula trifolii* (Hufnagel, 1766). *Cardepiá sociabilis* is known from the Algarve coast. The earliest record is by Monteiro (1972).

Species to be reinstated or added to Portuguese list as a result of study of museum and other collections

Yponomeuta plumbella ([Denis & Schiffermüller], 1775)

There is one specimen without date in the Monteiro collection labelled 'Singeverga, T. Monteiro, det. Gibeaux'. This is the first record for this species in Portugal.

Argyresthia pruniella (Clerck, 1759)

There is one specimen without date in the Monteiro collection labelled 'Singeverga, T. Monteiro, det. Gibeaux'. This is the first record for this species in Portugal.

Eupoecilia ambiguella (Hübner, 1796)

There are five specimens in the Monteiro collection, labelled 'Singeverga, 10.v.1959, T. Monteiro'. This is the first record for this species in Portugal.

Epinotia abbreviana (Fabricius, 1794)

One specimen in Carvalho collection labelled 'Vale de Cavalos [Ribatejo], 21.vii.1976'. This species was listed by Vives (1992), but there is no published record.

Heliothela wulfeniana (Scopoli, 1763)

Three specimens in the Cruz collection in IZPC, determined as *H. atralis* by Monteiro. One from '[Vila Nova de] Gaia [Douro Litoral], 1929' and two from 'Penhas da Saúde [Beira Baixa], viii.1939'. These are the first records of this species from Portugal.

Idaea figuraria (A. Bang-Haas, 1907)

Recorded from Vizela, Minho, by Cruz (Cruz & Gonçalves, 1955) as *I. nevadata* (Wehrli, 1926), which is actually a different species. Not listed for Portugal by Vives (1994) or Karsholt & Razowski (1996), and not shown as present by Hausmann (2004). Specimens in IZPC destroyed, but likely to have been correct, as there are recent records from several localities, of which the earliest is 'Galegos, Serra de São Mamede, Alto Alentejo, 3.vi.1996. leg. Corley'.

Mesotype didymata (Linnaeus, 1758)

Recorded from Singeverga, Douro Litoral, by Monteiro (Cruz & Gonçalves, 1955), but not listed by Cruz & Gonçalves (1977). Queried by Mironov (2003). The species is common in the mountains of northern Portugal. I have 18 records, the first being 'Covão do Boi, Serra da Estrela, 4.ix.2001, leg. Corley'. I have not yet seen Monteiro's specimen, but see no reason to question the record.

Catocala oberthuri Austaut, 1879

Recorded from São João do Estoril, Estremadura, by Cruz (Cruz & Gonçalves, 1966), but not listed by Vives (1994) or Karsholt & Razowski (1996), and excluded by Goater, Ronkay & Fibiger (2003). There are two specimens in IZPC, labelled 'Abrantes, vii.1962' and 'S. João do Estoril, vii.1966'.

Xanthia togata (Esper, 1789)

Listed for Portugal in Cruz & Gonçalves (1977) but listing not based on a published record. There is a specimen in IZPC labelled 'Gerês, ix'.

Xanthia gilvago ([Denis & Schiffermüller], 1775)

Recorded from Campolide, Lisboa, by L. M. Alves Correia (Mendes, 1910*d*), but although included in Zerkowitz's (1946) list, it was not listed in subsequent lists. Campolide specimen not seen, but there are specimens in IZPC labelled 'Abrantes, xi.1945, Silva Cruz'.

Xanthia ocellaris (Borkhausen, 1792)

Recorded from Pinhão, Trás-os-Montes by Cruz (Cruz & Gonçalves, 1966). Not given for Portugal by Cruz & Gonçalves (1977), but listed by Vives (1994). There is a specimen in IZPC labelled 'Pinhão, x. Silva Cruz'.

Euxoa aquilina ([Denis & Schiffermüller], 1775)

Recorded from Silves, Algarve, by Monteiro (Monteiro & Carvalho, 1984), but not listed for Portugal by Vives (1994) or by Karsholt & Razowski (1996). There is a Cruz specimen in IZPC under the name *E. obelisca* ([Denis & Schiffermüller], 1775), which belongs here, labelled 'Turcifal [Torres Velhas], viii'.

Agrotis alexandriensis Baker, 1894

There are specimens of *A. alexandriensis*, determined by E. Marabuto, labelled 'Vila Real de Santo António, Algarve, v.1969, T. Monteiro' in the Monteiro collection at Singeverga, under the name *A. ripae* (Hübner, 1823). Records of *A. ripae* from north-west Portugal are correct.

Species recorded only by Cruz, but specimens lost due to insect damage

Records of these species must all be considered doubtful unless specimens are found in other collections, or new discoveries are made. Some records are also

doubtful on geographical grounds. For each species the original reference is given.

Cyclophora pendularia (Clerck, 1759). Cruz & Wattison (1929)

Scopula incanata (Linnaeus, 1758). Cruz & Gonçalves (1974a)

Idaea serpentata (Hufnagel, 1767). Cruz & Wattison (1931)

Catarhoe rubidata ([Denis & Schiffermüller], 1775). Cruz & Gonçalves (1955)

Nebula nebulata (Treitschke, 1828). Cruz & Gonçalves (1966)

Eulithis prunata (Linnaeus, 1758). Cruz & Wattison (1935).

Ecliptopera silaceata ([Denis & Schiffermüller], 1775). Cruz & Wattison (1935).

Almeria kalischata (Staudinger, 1870). Cruz & Gonçalves (1955)

Perizoma minorata (Treitschke, 1828). Cruz & Gonçalves (1955)

Eupithecia pyreneata Mabille, 1871. Not published by Cruz, but recorded by Mironov (2003)

Eupithecia assimulata Doubleday, 1856. Cruz & Gonçalves (1966)

Eupithecia denotata (Hübner, 1813). Cruz (1967)

Eupithecia distinctaria Herrich-Schäffer, 1848. Cruz & Gonçalves (1974a)

Eupithecia virgaureata Doubleday, 1861. Cruz & Gonçalves (1974a)

Carsia sororiata (Hübner, 1813). Not published by Cruz, but there are five pins with labels representing this species in IZPC from various localities in different months.

Species not re-found in Portugal by recent recorders but confirmed from historic collections

Phyllonorycter lautella (Zeller, 1846). Specimen in Monteiro collection.

Ethmia aurifluella (Hübner, 1810). Vieilledent specimen in MNHN.

Scythris distripennis (Haworth, 1828). Mendes specimen in MNHN.

Chionodes distinctella (Zeller, 1839). Mendes specimen in MNHN.

Synanthedon vespiiformis (Linnaeus, 1761). Wattison specimen in BMNH.

Apotomis betuletana (Haworth, 1811). Specimen in Monteiro collection.

Rhyacionia duplana (Hübner, 1813). Mendes specimen in MNHN.

Aphomia zelleri (Joannis, 1932). Specimen in Carvalho collection.

Paraponyx fluctuosalis (Zeller, 1852). Specimen in Carvalho collection.

Pyrausta acontialis (Staudinger, 1859). Mendes specimen in MNHN.

Poecilocampa populi (Linnaeus, 1758). Monteiro specimens in Monteiro collection and Cruz collection (IZPC).

Tephрина murinaria ([Denis & Schiffermüller], 1775). Specimen in Cruz collection in IZPC.

Epione repandaria (Hufnagel, 1767). Specimen in Cruz collection in IZPC.

Lomographa bimaculata (Fabricius, 1775). Specimen in Cruz collection in IZPC.

Gnophos furvata ([Denis & Schiffermüller], 1775). Specimen in Cruz collection in IZPC.

Alsophila aescularia ([Denis & Schiffermüller], 1775). Specimen in Cruz collection in IZPC.

Myinodes interpunctaria (Herrich-Schäffer, 1939). Specimen in Carvalho collection.

Hemistola chrysoprasaria (Esper, 1795). Specimen in Carvalho collection.

Epirrhoe rivata (Hübner, 1813). Specimen in Carvalho collection.

Perizoma bifaciata (Haworth, 1809). Vieilledent specimen in MNHN.

Eupithecia absinthiata (Clerck, 1759). Specimen in Carvalho collection.

Drymonia dodonaea ([Denis & Schiffermüller], 1775). Specimen in Cruz collection in IZPC.

- Cryphia raptricula* ([Denis & Schiffermüller], 1775). Mendes specimen in MNHN.
Zanclognatha lunalis (Scopoli, 1763). Specimen in Cruz collection in IZPC.
Emmelia viridisquama (Guenée, 1852). Specimens in Cruz collection in IZPC.
Cucullia gnaphalii (Hübner, 1813). Monteiro specimen in IZPC
Calophasia hamifera Staudinger, 1863. Mendes specimen in MNHN.
Caradrina ibeasi (Fernández, 1918). Specimens in Cruz collection in IZPC, as *Athetis gilva* (Donzel, 1837)
Dypterygia scabriuscula (Linnaeus, 1758). Specimen in Cruz collection in IZPC.
Rusina ferruginea (Esper, 1785). Specimen in Cruz collection in IZPC.
Polyphaenis xanthochloris Boisduval, 1840. Specimens in Carvalho collection.
Parastichtis ypsillon ([Denis & Schiffermüller], 1775). Specimen in Cruz collection in IZPC.
Dicycla oo (Linnaeus, 1758). Specimen in Cruz collection in IZPC.
Cosmia pyralina ([Denis & Schiffermüller], 1775). Specimen in Cruz collection in IZPC.
Dasytoplia templi (Thunberg, 1792). Monteiro specimen in IZPC.
Eremobia ochroleuca ([Denis & Schiffermüller], 1775). Gonçalves specimen in IZPC.
Gortyna flavago ([Denis & Schiffermüller], 1775). Gonçalves specimen in IZPC.
Polia nebulosa (Hufnagel, 1766). Gonçalves specimen in IZPC.
Rhyacia simulans (Hufnagel, 1766). Specimen in Cruz collection in IZPC.
Xestia ditrapezium ([Denis & Schiffermüller], 1775). Specimen in Cruz collection in IZPC.
Arctornis l-nigrum (Müller, 1764). Specimen in Cruz collection in IZPC.
Zobida bipuncta (Hübner, 1824). Monteiro specimens in IZPC and Monteiro collection.
Arctia festiva (Hufnagel, 1766). Specimen in Cruz collection in IZPC.

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