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CHAPTER 2

A historical review of lepidopterology in Iran*

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Introduction

The historical and cultural significance of Lepidoptera in Iran cannot be overstated. Despite this, research on the topic has been sporadic and often disjointed. The cultural fascination with Lepidoptera extends far into Iranian history. Butterfly-like motifs can often be seen on prehistoric ceramics, including those from Tapeh Sialk, Kashan (3300 BC); however, their true identity remains unclear (NAZARI 2003). Stylized butterflies are commonly illustrated on the margins of Persian miniature paintings from the Safavid (1501–1722) and later periods, or as artistic decorations on tiles, toiletry or other everyday objects now preserved in museums around the world. The familiar combination of “Sham’o Gol’o Parvaneh” (the candle, the flower and the butterfly), which is abundantly present in the poetry of HAFEZ and other giants of Persian literature, symbolizes the anguish of a soul in love.

It is unclear who collected the first lepidopteran in Iran. However, we do know that the first described species from Iran was *Zygaena cuvieri* Boisduval, [1828], collected by French physician and entomologist GUILLAUME-ANTOINE OLIVIER, who travelled to the country in 1796. This taxon was described based on a single specimen collected in “aux environs d’Amaden, en Perse”, which most probably refers to “Hamadan”, as it is mentioned on the route map of OLIVIER (1804). The “H” at the beginning of the name is unspoken in French (HOFMANN & TREMEWAN 2020: 59–61), and was likely transcribed phonetically by OLIVIER.

Over a half-century later, the first list of Iranian Lepidoptera was published by KOLLAR & REDTENBACHER (1849), based on specimens collected by the famous Austrian botanist THEODOR KOTSCHY.

Since OLIVIER collected his first *Zygaena* in the mountains of western Iran, nearly 900 authors have contributed to the study of Lepidoptera in Iran, publishing roughly 1,700 works on the topic from short communications to tome-like monographs. In this catalogue, we hope to condense and reflect this body of work.

To better understand our journey through the history of lepidopterology in Iran, we have subdivided this chapter into six chronological eras (see Fig. 1):

- I. The pioneers of Lepidoptera research in Iran (1796 to 1913)
- II. Lepidoptera research from war to war (1914 to 1945)
- III. From the end of World War II to the Islamic Revolution (1946 to 1979)
- IV. From the onset of the Islamic Revolution to the foundation of Association Lepidoptera Iranica (1980 to 2003)
- V. The rise and fall of Association Lepidoptera Iranica (2004 to 2006)
- VI. Lepidopterists currently working on the fauna of Iran

In this final section, we briefly introduce contemporary lepidopterists who are still actively studying the Lepidoptera fauna of Iran. This should serve as a reference list of modern-day specialists who have scientific authority on each given taxonomic group.

Finally, we close this chapter with a brief overview of the major published checklists of Iranian Lepidoptera.

I. The pioneers of Lepidoptera research in Iran (1796 to 1913)

The early naturalists, explorers and collectors who travelled to Iran in the 18th century either did not collect Lepidoptera or their Lepidoptera collections are lost to time. Among them was German physician and botanist SAMUEL GOTTLIEB GMELIN (1744–1774), who travelled to the northern provinces of Iran between the years 1770 and 1774 and was later known for his work on the flora of Siberia. Some other naturalists (e.g., K. E. VON EICHWALD, P. M. R. AUCHER-ÉLOY, F. DE FILIPPI and N. A. ZARUDNY) collected

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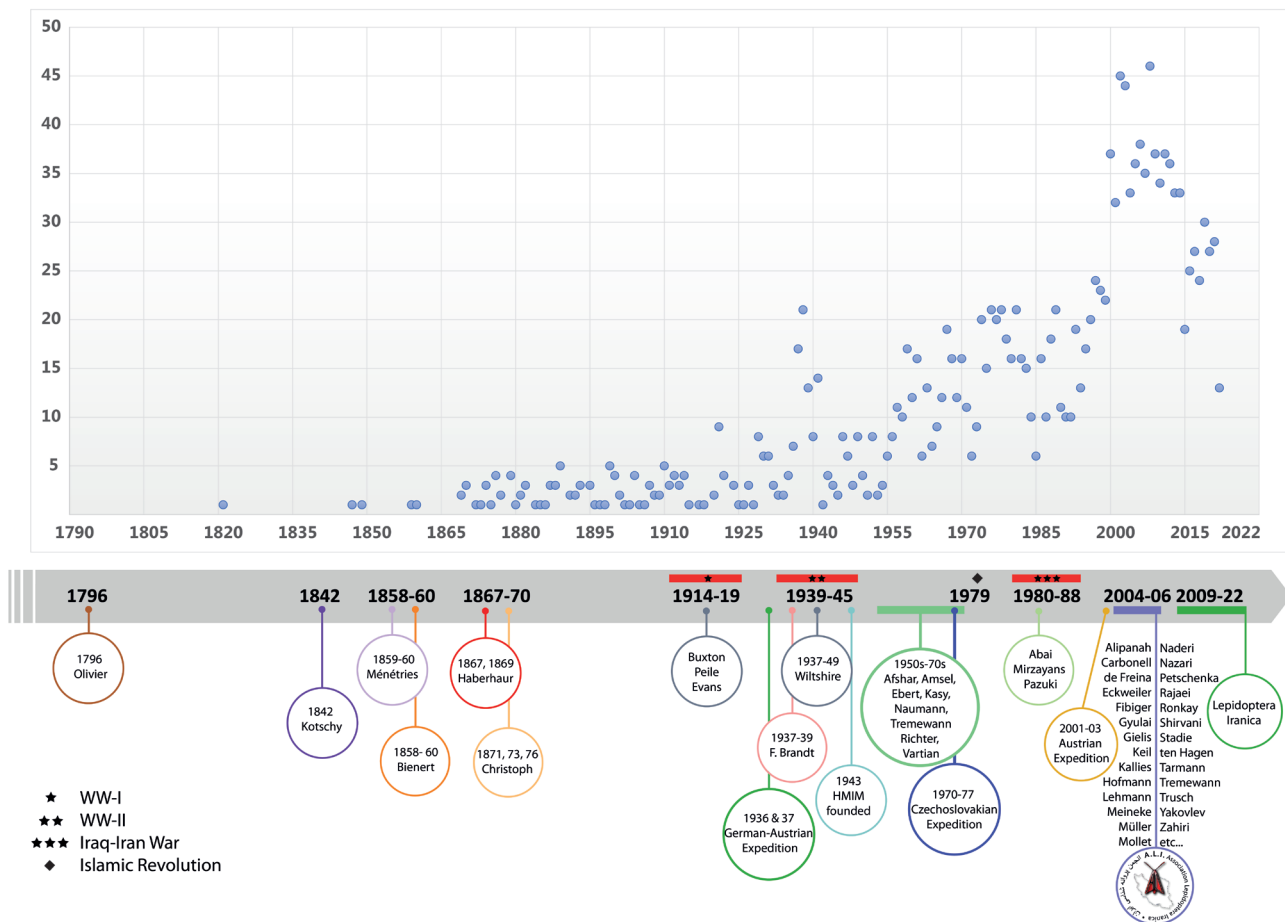


Fig. 1. Graph overlaying the number of publications on Iranian Lepidoptera and a schematic timeline of lepidopterological expeditions in the country. The number of publications clearly correlates with the number of expeditions.

insects, including Lepidoptera, but no published work based on these preserved collections is known. Many of the classical collectors who travelled to Iran in later years were motivated and funded by the Grand Duke of Russia, KONSTANTIN NIKOLAYEVICH (ROMANOV), who recruited people to collect for him and even employed some of them to work as curators in his vast collection (see below).

GUILLAUME-ANTOINE OLIVIER (*19.i.1756, Les Arcs, near Toulon – †1.x.1814, Lyon) (Fig. 4a). Originally a French medical doctor from the Montpellier Faculty of Medicine, OLIVIER solidified himself as the first confirmed entomologist to research and collect Lepidoptera in Iran. Although OLIVIER studied medicine, his passion lay in the natural sciences, which ultimately motivated him to accept the position of insect collector for JEAN-BAPTISTE-FRANÇOIS GIGOT D'ORCY, a naturalist and patron of the arts who owned a large insect collection. OLIVIER eventually found his specialty in Coleoptera, publishing his magnum opus on beetles (“Entomologie, ou, Histoire

naturelle des insectes: avec leurs caractères génériques et spécifiques, leur description, leur synonymie, et leur enluminée Coléoptères”, 1789–1808, in 6 volumes, with 363 plates). In 1792, he travelled to the Ottoman Empire, Persia and Egypt, reaching Iran in 1796. This expedition, financed by the French government as part of cultural and environmental studies on the Middle East, took six years. OLIVIER collected a large number of insects during his travels, of which a majority are deposited in the National Museum of Natural History (Muséum national d'Histoire naturelle, MNHN) of Paris, whereas smaller collections are deposited in the Museum of Edinburgh. Upon his return to France, OLIVIER published a report about his long expedition, in three volumes (OLIVIER 1801–1807). In over 1,000 pages, OLIVIER described not only his scientific observations but also many aspects of the cultural issues, lifestyle and economic condition of the Middle Eastern countries, especially within the Ottoman Empire. Two years after this expedition, OLIVIER became professor of zoology at the Alfort National Veterinary School, just

outside of Paris. Amongst the Lepidoptera specimens that OLIVIER collected in Iran, those of *Zygaena cuvieri* Boisduval, [1828], most probably collected at Alvand Mt. in Hamadan, are certainly the highlight and mark the beginning of Iranian lepidopterology. Curiously, OLIVIER himself was not the one who originally described this species. It was ultimately described as a new species by his fellow countryman and entomologist JEAN BAPTISTE ALPHONSE DE CHAUFFOUR DE BOISDUVAL (1799–1879) and named after famed naturalist GEORGES LÉOPOLD CHRÉTIEN FRÉDÉRIC DAGOBERT, BARON DE CUVIER (1769–1832), the father of comparative anatomy (see HOFMANN & TREMEWAN 2020: 59).

KARL GEORG THEODOR KOTSCHY (*15.iv.1813, Ustron, Österreichisch-Schlesien – †11.vi.1866, Vienna) (Fig. 4b). Famed Austrian botanist THEODOR KOTSCHY visited the southern parts of Iran starting on February 2nd, 1842, when from Khark Island in the northern Persian Gulf he managed to book passage with a caravan to Dalaki (prov. Bushehr) and then onward to Shiraz (Fig. 3). According to KOLLAR & REDTENBACHER (1849), the journey from Dalaki to Shiraz was fraught with both danger and dilemmas. The caravan often took remote and precarious roads to avoid the possibility of bandit attacks. This unfortunately meant that KOTSCHY was unable to collect much on the way to Shiraz. However, he was able to report about the different vegetation that he observed during the trip, such as lemon and orange plantations at Kazerun, followed by an oak forest mixed with low maple and *Amygdalus* shrubs. He also reported about the presence of numerous waterfalls in Dasht-e Arjan, reminiscent of the most beautiful landscapes in Switzerland. According to his report, in the oak forests of Dasht-e Arjan, the lions which resided in the region during the summer months were often a nuisance to the numerous grazing herds and their shepherds, as well as to passing travellers such as KOTSCHY himself. Although the main purpose of KOTSCHY's expeditions was to study the flora, he also collected insects during his trip, primarily around Shiraz. Seven years later, two Austrian entomologists, VINCENZ KOLLAR (1797–1860) and LUDWIG REDTENBACHER (1814–1876), published the first scientific paper on the Lepidoptera of South Iran (KOLLAR & REDTENBACHER 1849), based largely on the material collected by KOTSCHY. In this paper, the authors listed 48 species of Lepidoptera, including 18 new species.

THEOPHIL JOACHIM HEINRICH BIENERT (known as THEOPHIL BIENERT) (*3.iii.1833, Kandau – †5.iv.1873, Riga) (Fig. 4c). Possibly the first targeted collecting of butterflies and moths in Iran was that by THEOPHIL BIENERT, a Latvian pharmacist, botanist and entomologist who took part in an expedition to Iran and Afghanistan organized with the special interest and financial support of the Grand Duke of Russia, KONSTANTIN NIKOLAYEVICH, and led by NIKOLAI WLADIMIROVITCH CHANYKOW, the Russian geographer, orientalist and diplomat. During the journey, which began in

the winter of 1858 and lasted until the summer of 1860, the geography, geology, flora and fauna of the Northern and Eastern Iranian Plateau were studied. The group travelled from Tiflis (Georgia) via the Caspian Sea to Mazandaran and Golestan (Iran) (Fig. 3). They crossed the Alborz Mts. towards the south and visited one of the most important classical lepidopterological localities, namely Shakuh Mt. (prov. Semnan). The research team of CHANYKOW continued eastwards towards Khorasan and arrived at Mashhad after visiting Sabzewar and Binaloud (Neyshabur). Two months later, they passed Torbat-e Jaam towards Herat in Afghanistan. After a few weeks' rest in Herat, the group's naturalists broke off briefly and travelled for a few weeks to central Iran and, after visiting Tabas, came back to Herat. The reunited group again travelled through eastern Afghanistan towards Sistan and then to the Lut Desert and Kerman. The expedition continued towards Yazd, Tehran and westwards to Tabriz. The group left for Nakhichevan, ending the excursion in Tiflis on July 15th, 1859 (Fig. 3). It took ten years for BIENERT to analyze the results of his journey and finally submit a report on the expedition, along with a list of the collected Lepidoptera, as part of his Ph.D. dissertation (BIENERT [1870]). He listed the 380 Lepidoptera species known from Iran at that time and summarized their distributions as present or absent in other neighbouring territories (Turkey, Caucasus, Transcaucasus and Central Asia). He described eight new species from Iran. BIENERT's visit and later publication (BIENERT [1870]) likely motivated HUGO CHRISTOPH to go back to this hidden paradise in the 1870s, to discover a plethora of new species.

JEAN ÉDOUARD MÉNÉTRIES (*2.i.1802, Paris – †10.iv.1861, Saint Petersburg) (Fig. 4d). A French lepidopterist and coleopterist, MÉNÉTRIES was a curator at the Zoological Museum of Saint Petersburg, Russia. Although some authors (e.g., ALIPANAH 2004) have regarded MÉNÉTRIES as the first author to publish on the Lepidoptera of Iran, he studied the fauna of the Caucasus up to the borders of Iran (MÉNÉTRIES 1832). As a pioneer lepidopterist, he also studied the faunas of the Transcaucasus and other countries around Iran, and the fauna of northern Iran near the end of his life (MÉNÉTRIES 1859, 1860).

JULIUS LEDERER (*24.vi.1821, Vienna – †30.iv.1870, Vienna) (Fig. 4e). A well-known classical lepidopterist, JULIUS LEDERER was born in Vienna, Austria. During his stay in Bohemian Asch (now in Czechia), he was influenced by his mentor, a local pharmacist named HERING, and became enamoured with the world of insects, especially butterflies and moths. He finished his university studies in business, all the while continuing to expand his collection of Lepidoptera. With dreams of cataloguing all of the world's Lepidoptera, LEDERER travelled extensively outside of Europe, with many trips to the Middle East to collect exotic species (ZELLER 1871). LEDERER was a dili-



Fig. 2. Early colour plate of Iranian Lepidoptera species published by CHRISTOPH (1885), depicting four species discovered in Shakuh and described as new in 1882 or 1885. All four names are still valid at the species level: *Zygaena ecki* Christoph, 1882; *Eriogaster acanthophylli* (Christoph, 1882); *Streblote alpherakyi* (Christoph, 1885); and *Metopoplus excelsa* (Christoph, 1885).

gent and conservative taxonomist, avoiding the unnecessary description of new species when he could not find sufficiently diagnostic characters. His keen eyes and attention to species descriptions led to most of his species withstanding the test of time and synonymy. Aside from his sensitive and often irritable nature, he was an extremely generous and helpful collaborator to his peers (ZELLER 1871). He often worked with and contributed to the works of other contemporary lepidopterists such as OTTO STAUDINGER. Besides his work on the Lepidoptera fauna of the European countries, Turkey and Cyprus, his works on the material collected by Moravian lepidopterist JOSEPH HABERHAUER (1828–1902) during his 1867 trip to northern Iran (Golestan and Shakuh) are of special interest (LEDERER 1869, 1870). HABERHAUER's trip, especially to the regions around Hajiabad and Shakuh, provided a treasure trove of material for LEDERER, who identified 258 species of Lepidoptera from this area alone. Unfortunately, LEDERER died prematurely from lung disease when he was only 49 years old. After his death, his collection was merged with that of OTTO STAUDINGER.

HUGO THEODOR CHRISTOPH (*16.iv.1831, Herrnhut – †5.xi.1894, Saint Petersburg) (Fig. 4f). As a talented German lepidopterist, HUGO CHRISTOPH formed the basis for understanding the scope of the Lepidoptera fauna of Iran. CHRISTOPH was born in Herrnhut (Saxony) and moved to the Old Sarepta district (now Krasnoarmeysky, Russia) to work as a teacher in a protestant mission station of the Brothers of Herrnhut at the age of 27. In Old Sarepta, he began collecting the local fauna and joined the Entomological Society of Russia. In the 1870s, he made several expeditions to different parts of the Russian Empire, Central Asia, the Caucasus, Transcaucasus and Iran. Later, in 1880, he was employed by the Grand Duke of Russia, NIKOLAI MICHAILOWITSCH (ROMANOV) as a collector and curator of his collection in Saint Petersburg. This golden age in the life of CHRISTOPH made him one of the most legendary lepidopterists of his time; he described a large number of species and formed an expansive private collection. He died after a stroke in 1894, when he was only 63 years old. His wife sold part of his collection, later transferred to the Natural History Museum in London, to THOMAS DE GREY (6th Baron WALSINGHAM) and another part to OTTO STAUDINGER and ANDREAS BANG-HAAS (HORN et al. 1990), with the rest of the collection kept in the Zoological Institute of the Russian Academy of Sciences, Saint Petersburg. CHRISTOPH visited North Iran at least four times in 1879, 1871, 1873 and 1876, and his studies highlighted the rich and diverse fauna of Shakuh, an extremely important nature reserve, and of the Kopet-Dagh Mts. on the border between Iran and Turkmenistan (e.g., CHRISTOPH 1872, 1873, 1877, 1882, 1885, 1891) (Fig. 2).

OTTO STAUDINGER (*2.v.1830, Gross Wüstenfelde – †13.x.1900, Luzern) (Fig. 4g). One of the most famous

German lepidopterists, OTTO STAUDINGER found his passion for the world of insects through his tutor, WAGNER, at the young age of seven. Later he began studying medicine, but only after two semesters he shifted to zoology and wrote his dissertation on the taxonomy and systematics of the moth family Sesiidae (STAUDINGER 1854). He traveled around Europe and collected in most European countries, but also in the Middle East, Central Asia and North Africa. He and his Danish son-in-law, ANDREAS BANG-HAAS (1846–1925), built the largest private Lepidoptera collection of their time, in Dresden. Besides material from their own expeditions, they exchanged and bought many large Lepidoptera collections (e.g., VON HOPFFER, LEDERER, HERRICH-SCHÄFFER, MÖSCHLER, KADEN etc.). Altogether, OTTO STAUDINGER described, in 137 publications, 3,932 new Lepidoptera at various taxonomic levels, mostly from the Palearctic Region. Among his valuable publications and detailed descriptions, two catalogues are worth noting: first, his “Catalog der Lepidopteren Europa's und der angrenzenden Länder” (STAUDINGER & WOCKE 1861), published together with microlepidopterist friend MAX FERDINAND WOCKE and followed by a revised and expanded edition (STAUDINGER & WOCKE 1871); second, his “Catalog der Lepidopteren des Palaearctischen Faunengebietes” (STAUDINGER & REBEL 1901), which he worked on extensively together with HANS REBEL, curator of Lepidoptera at the Natural History Museum of Vienna. Unfortunately, STAUDINGER never saw this second milestone's completion, as it was published a year after his death. His Palearctic catalogue significantly increased the number of known Lepidoptera at the time. Of the 9,500 or so species listed in the catalogue, only about 330 had “Persia” in their distribution, and these were mostly records from a small area in northern Iran at the eastern edge of the Alborz Mts. known as “Astarabad” (currently Gorgan). A small number of these species were also reported from southern Iran, e.g., “Farsistan” (Fars) and Baluchistan. STAUDINGER's vast collection of Lepidoptera was later sold to Museum für Naturkunde, Berlin, whereas his duplicate Microlepidoptera collection was sold to Staatliches Tierkundemuseum Dresden. After STAUDINGER's death, his son-in-law ANDREAS BANG-HAAS inherited a managerial role in their joint insect trading company, STAUDINGER & BANG-HAAS, which was continued by ANDREAS's son, OTTO BANG-HAAS (1882–1948), until the end of his life (DRAESEKE 1992). ANDREAS BANG-HAAS was also a lepidopterist, famous for his ability to identify Lepidoptera species correctly. Both ANDREAS and OTTO published papers on the Lepidoptera fauna of Iran (A. BANG-HAAS 1912; O. BANG-HAAS 1927, 1937).

NIKOLAI GRIGORIEVICH ERSCHOFF (*23.iv.1837, Moscow – †12.iii.1896, Saint Petersburg) (Fig. 4h). Russian lepidopterist NIKOLAI ERSCHOFF came from a merchant family, taking on the family trade for some time early in his life. He was ultimately inspired by his teacher, JEAN

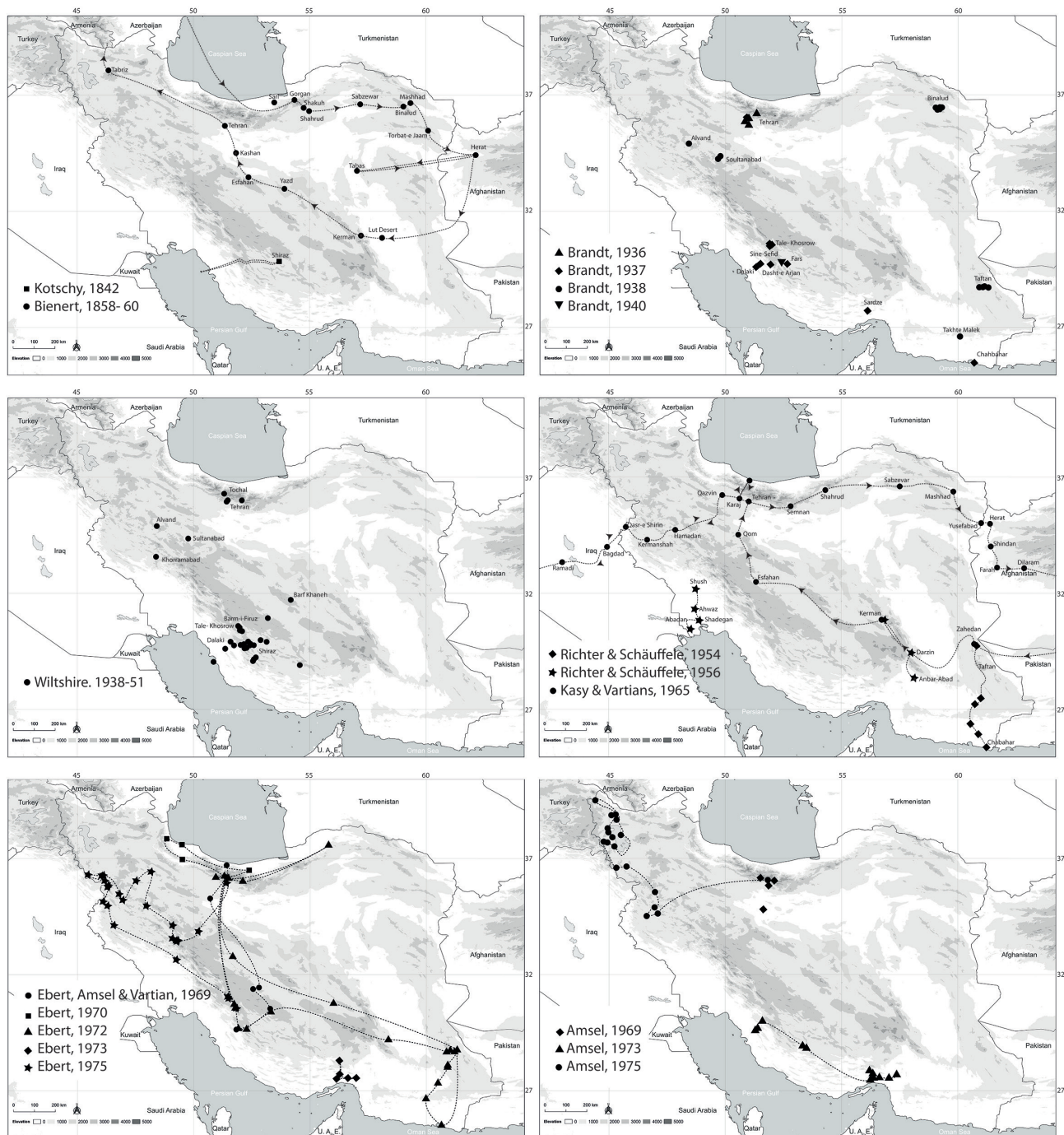


Fig. 3. The expedition routes of several lepidopterists in Iran.

  DOUARD M  N  TRIES, and became interested in Lepidoptera. Later, he joined the Russian Entomological Society and several other entomological societies, where he was influenced by well-known lepidopterists such as SERGEI NIKOLAEVICH ALPH  RAKY, OTTO VASILIEVICH BREMER and NIKOLAI MICHAILOWITSCH ROMANOV. His large collection,

with over 10,000 specimens of Palearctic Microlepidoptera and over 21,000 butterflies, was later donated to the Zoological Museum of the Imperial Academy of Sciences of Russia. Amongst his 30 or so publications is a paper on the rich fauna of Shahrud (ERSCHOFF 1876), based on the material collected by OGORODNIKOV.

Other early lepidopterists

Other lepidopterists who collected in Iran in the second half of the 19th century, before the outbreak of World War I, include the Germans GUSTAV FERDINAND and RICHARD RADDE (Astara, Talysh, Ardabil, Sabalan, 1879–1880), EMIL FUNKE (Shahkuh, 1897–1898) and HERMAN and RUDOLPH RANGNOW (Anzali, Tehran, Qom, Arak, Azna, Hamadan, Boroujerd, 1910), the Briton SIR EVELYN MOUNT-STUART GRANT DUFF (Lar Valley, 1892–1906), the German-Baltic GUSTAV IVANOVICH SIEVERS (Dasht-e Moghan, 1879–1880), the Briton ROBERT THEODORE GUNTHER (Lake Urmi 1898–1899) and Spanish entomologist and historian MANUEL MARTÍNEZ DE LA ESCALERA (Bakhtiyari, Khuzestan, Shushtar, Bazouft, Chikakhor, Esfahan, 1899). Most of the material collected by these explorers was studied and published by others.

II. Lepidoptera research from war to war (1914 to 1945)

World War I (also known as the “Great War”) began on July 28th, 1914 and spread to most of Europe, the Russian Empire, the Middle East, Africa, parts of Asia and the United States. By the end of the war on November 11th, 1918, around nine million people had perished. The war, which was one of the deadliest until that time, widely affected scientific activities globally, with research on the Lepidoptera of Iran being no exception, despite its flourishing in the years leading to the war. Between 1915 and 1919, no works on the Iranian Lepidoptera fauna were published. Soon after World War I, several new stars began to shine in the skies of Iranian lepidopterology. British Army officers such as P. A. BUXTON, H. D. PEILE and W. H. EVANS collected before 1920 in East, West and North Iran, later publishing several papers, including descriptions of several new species (BUXTON 1921; WATKINS & BUXTON 1921; PEILE 1924; EVANS 1932).

Just two decades later, World War II began on September 1st, 1939, when ADOLF HITLER’S Nazi Germany invaded Poland. Over the next six years, the war spread across Europe, North Africa, Russia, East Asia and the United States, and led to the death of roughly 80 million people. The war ended on September 11th, 1945 after the United States dropped the first atomic bombs on two Japanese cities (Hiroshima on August 6th and Nagasaki on August 9th). But even catastrophic global events such as this did not deter lepidopterists. Especially during World War II, several lepidopterists travelled to Iran on consular missions (e.g., E. P. WILTSHIRE) and found a great opportunity to collect, generating significant collections from Iran during that period and publishing extensively on the fauna of the country. In the following sections, we review

the lives and scientific activities of some of these lepidopterists.

FRED HERMANN BRANDT (*21.v. 1908, Saint Petersburg – †30.xi.1994, Paderborn) (Fig. 4i). FRED BRANDT was a Baltic-German entomologist and botanist who served as a military commander in World War II. Born in Russia, he was raised in Latvia before receiving German citizenship in 1941. As a military officer, he was sent on several missions to India, Afghanistan, Albania and Iran. During World War II, he joined the German Wehrmacht (the armed forces of Nazi Germany) and later rose to the rank of colonel, leading a Brandenburg Battalion in 1939–40. Later, he was arrested and sent to a Russian prison until 1955. FRED BRANDT had a deep knowledge of Russian, Iranian, Arabic and Islamic culture. From 1937 to 1939, as an army officer, he travelled to Iran, mostly to the southern and eastern parts of the country (Fig. 3), where he collected butterflies and moths. BRANDT ultimately collected around 50,000 specimens (mostly Macrolepidoptera) from Iran and Albania. He sent the collected material to Germany, to his brother **WILHELM WAIDERMAR BRANDT** (1904–1982)—also a lepidopterist whose main focus was on the fauna of Papua New Guinea—who set and identified the specimens and produced faunistic papers (W. BRANDT 1938, 1939a, 1939b, 1941a, 1941b). Other parts of the collection were later studied and published by various other lepidopterists (e.g., REISS 1938a; BOURSIN 1939, 1942, 1947; AMSEL 1949, 1950, 1951, 1954, 1961a; PETERSEN 1966; HANNEMANN 1967; POVOLNÝ 1969; RAJAEI 2012; RAJAEI et al. 2012). This extremely valuable collection, containing a large amount of type material, is now deposited in Naturhistoriska Riksmuseet (Swedish Museum of Natural History) in Stockholm. WILHELM BRANDT published most of his papers as a sole author, but he published at least one joint paper on the fauna of Iran together with another German entomologist, and professor at Tel Aviv University, **HANAN BYTINSKI-SALZ** (24.vi.1903–25.x.1986) (FREIDBERG 1987).

FRANZ DANIEL (*20.xii.1895, Munich – †9.x.1985, Munich) (Fig. 4j). DANIEL was a German lepidopterist and world-class specialist on Palearctic Bombycoidea. His father was a Lepidoptera collector and so he became fascinated by insects from his early childhood, just like his brothers KARL and JOSEF DANIEL, who were coleopterists (WITT 1987). Prior to World War II, DANIEL was an amateur lepidopterist and worked as a businessman. During the war, he was drafted by the army and sent to the front. After his return, he was hired as a curator at “Zoologische Staatssammlung München” (now the Bavarian State Collection of Zoology in Munich, ZSM), where he worked until his retirement. DANIEL was a preeminent authority on most families of Palearctic Bombycoidea (in the broad sense) and published some 145 papers (FORSTER

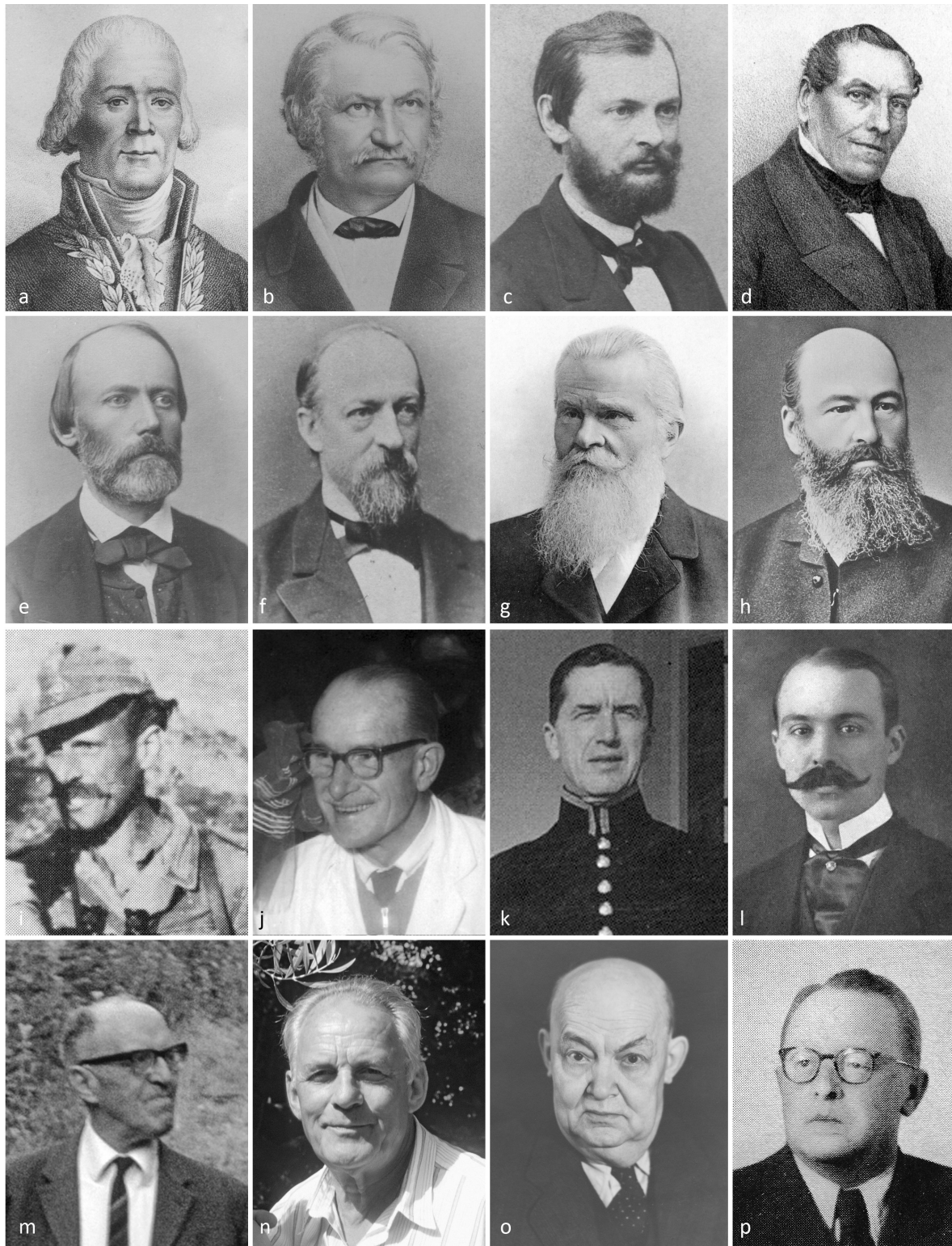


Fig. 4. Portraits of lepidopterists having worked on the fauna of Iran. **a.** GUILLAUME-ANTOINE OLIVIER. **b.** KARL GEORG THEODOR KOTSCHY. **c.** THEOPHIL BIENERT. **d.** JEAN ÉDOUARD MÉNÉTRIÉS. **e.** JULIUS LEDERER. **f.** HUGO CHRISTOPH. **g.** OTTO STAUDINGER. **h.** NIKOLAI ERSCHOFF. **i.** FRED BRANDT. **j.** FRANZ DANIEL. **k.** EDWARD WILTSHIRE. **l.** FERDINAND LOUIS LE CERF. **m.** HUGO REISS. **n.** GÜNTER REISS. **o.** OTTO KARL HOLIK. **p.** ERNST PFEIFFER. (Portraits of T. KOTSCHY, T. BIENERT, H. CHRISTOPH and O. HOLIK © Senckenberg Deutsches Entomologisches Institut historical archive)

1970). Among his publications, there are at least 10 papers referring to Iranian Lepidoptera (DANIEL 1937a, 1937b, 1938, 1954, 1956, 1960a, 1960b). After his death in 1985, DANIEL's private collection was given to the Witt Museum, which was recently transferred to the Bavarian State Collection of Zoology in Munich (Zoologische Staatssammlung München).

EDWARD PARR WILTSHIRE (*18.ii.1910 Gorleston-on-Sea, Norfolk – †8.vii.2004, London) (Fig. 4k). Known as TED to his friends, WILTSHIRE worked for the British consular service, mostly in the Middle East (e.g., Iraq, Iran, Lebanon and Bahrain) but also in Europe and South America. His love of insects began when he was a school student and stayed with him until the end of his life (he died at the age of 94), during which he established himself as one of the most prominent “amateur” lepidopterists (LARSEN & LEGRAIN 2005). Early in his life he joined the entomological meetings of the Natural History Society of Cambridge University, where he completed his bachelor's studies. As a consul, WILTSHIRE often travelled to Iraq (Baghdad, Mousel, Diana, Kerbela and Nejef) and other neighbouring countries including Iran (Fig. 3). During these trips, he spent his spare time collecting, studying and photographing the butterflies and moths of the area. In Baghdad he studied Farsi, and in 1937–1938 travelled to Iran (Ahvaz). He returned to Iran in 1939, first to Tehran then to Kermanshah and Shiraz, travels which “confirmed my love for Persia and its people” (ANONYMOUS 2004). In 1942, WILTSHIRE married GLADYS MABEL STEVENS in Tehran and went on a honeymoon to Kashmir (WILTSHIRE 1991, 1992). Back in Iraq, he published his preliminary draft of “Lepidoptera of Iraq” (WILTSHIRE 1944), with a more complete paper published over ten years later (WILTSHIRE 1957). After several years away from Iran, in Iraq, New York and Cairo, he returned to Shiraz in 1949. During his travels as a consul, he accumulated a large collection of Lepidoptera from the countries he visited. Among the over 50 papers he published on the fauna of the Middle East, 25 treat the taxonomy, biology and faunistics of Iranian Lepidoptera (mostly Macrolepidoptera). Several other authors also studied his collection (e.g., AMSEL 1949, 1961a; TOLL 1959), which contains many type specimens and is now deposited in the Natural History Museum, London.

FERDINAND-LOUIS LE CERF (*3.x.1881, Paris – †0.i.1945, Paris) (Fig. 4l). As a preparator and technical assistant in the entomology laboratory of the National Museum of Natural History (Muséum national d'Histoire naturelle) in Paris, FERDINAND LE CERF was a well-known lepidopterist. Of the large number of papers and books published by him at least four are dedicated to the Lepidoptera fauna of Iran, mostly on Papilionoidea and Sesidae (LE CERF 1910, 1913, 1937, 1938). His papers were primarily based on the material collected by JEAN-JACQUES DE MORGAN, who extensively travelled and worked in Iran

from the late 1800s until the outbreak of World War I.

HUGO REISS (*10.ix.1891, Stuttgart – †21.iii.1974, Stuttgart) and **GÜNTER HUGO EUGEN REISS** (*2.xi.1925, Stuttgart – †16.ii.1999, Stuttgart) (Fig. 4m–n). HUGO REISS (known as HUGO JR.) was a zygaenid moth specialist, son of Lepidoptera collector HUGO REISS (HUGO SR., 1859–1922) and father of GÜNTER HUGO EUGEN REISS, who was not only a Zygaenidae specialist and collector but also a dentist. The famous REISS collection, developed over three generations, contains roughly 150,000 specimens and a large amount of type material deposited in the Witt Museum at the Bavarian State Collection of Zoology (HOFMANN 1999; HOFMANN & TREMEWAN 2017). Because of HUGO REISS's expansive knowledge of the family Zygaenidae, he was invited as one of the co-authors of a supplement to the second volume of “The Macrolepidoptera of the Earth”, edited by A. SEITZ. HUGO and GÜNTER REISS published several important works on the Zygaenidae of Iran, including “Die Zygaenen der Umgebung von Chiraz” (G. REISS 1978; H. REISS 1933, 1937a, 1937b, 1938a, 1938b, 1938c). Together they described 16 *Zygaena* taxa from Iran, five of which are currently treated as valid species.

OTTO KARL HOLIK (*16.ii.1881, Bielitz – †4.xi.1963, Dresden) (Fig. 4o). As director of a large printing house in Prague, HOLIK amassed a significant collection of Zygaenidae. With the end of World War II, he lost not only his profitable livelihood but also his home and his collection, now housed in the National Museum of Prague. He went on to work for the STAUDINGER & BANG-HAAS company in Dresden. Previously, together with LEO SHELJUZHKO, he had thoroughly processed the huge Zygaenidae collection of the National Museum of Natural History (National Academy of Sciences of Ukraine) in Kyiv, which resulted in the publication of his seminal work “Über die Zygaenen-Fauna Osteuropas, Kleinasien, Irans, Zentralsien und Sibiriens” (HOLIK & SHELJUZHKO 1956). *Zygaena sengana* Holik & Sheljuzhko, 1956, from Kuh-e Taftan in Baluchistan, described in that paper, is still listed as a valid species. In addition, HOLIK described two more taxa in smaller articles on the *Zygaena* of Iran. Of particular note was his depth of knowledge of the zygaenid literature, which eclipsed that of all previous researchers in the field.

Austro-German expeditions in the Alborz Mts. (1936–1937)

In 1936, a team of lepidopterists, including the German ERNST PFEIFFER and Austrians LEO SCHWINGENSCHUSS and FRITZ WAGNER, travelled to northern Iran and, perhaps most notably, to the iconic Mt. Damavand. One year later, German lepidopterists ERNST PFEIFFER and WALTER FORSTER travelled again to Iran and this time visited the ancient site of Takht-e Suleiman in the Alborz Mts. Several

papers were published based on the material collected during these two expeditions (FORSTER 1936, 1938a, 1938b, 1939; WAGNER 1936, 1937a, 1937b; SCHWINGENSCHUSS 1937, 1939a, 1939b, 1955; OSTHELDER 1938; ZERNY 1939, 1940). The material from these expeditions is now deposited in "Naturkundliche Landessammlung Niederösterreich" in Sankt Pölten, Austria (coll. SCHWINGENSCHUSS) and in the Bavarian State Collection of Zoology in Munich (colls. PFEIFFER and FORSTER).

ERNST PFEIFFER (*20.xii.1893, Munich – †28.v.1955, Munich) (Fig. 4p). As a German bookseller, PFEIFFER managed a family bookstore with his brother until the end of his life, all the while remaining a passionate and talented lepidopterist. He was an active member of the Entomological Society of Munich ("Münchener Entomologischen Gesellschaft") and a council member of the Society from 1921 till his passing. PFEIFFER was largely interested in Palearctic Macrolepidoptera and undertook numerous excursions in Europe and Iran (FORSTER 1955). He travelled twice to the Alborz Mts. in northern Iran: first in 1936 together with H. BOBEK and F. WAGNER, then in 1937 with A. and W. FORSTER. Although he published only three papers on the Lycaenidae of Iran (PFEIFFER 1937, 1938a, 1938b), his material was extensively examined by other lepidopterists (e.g., M. DRAUDT, L. OSTHELDER, F. DANIEL and E. WEHRLI) and was key in solving taxonomic puzzles in many lepidopteran groups. Later in life, he focused solely on butterflies. He would go on to accumulate one of the largest Palearctic collections of his time, consisting of over 1,000 drawers and now deposited in the Bavarian State Collection of Zoology (DANIEL & FORSTER 1955).

LEO SCHWINGENSCHUSS (*25.ii.1878, St. Peter in der Au – †25.ii.1954, Munich) (Fig. 5a). Although professionally the director of Austrian state accounting, SCHWINGENSCHUSS gained his fame as a hobbyist lepidopterist due to his extensive and prolific lepidopterological work. SCHWINGENSCHUSS had a lifelong dream to build the largest Palearctic (Macro)Lepidoptera collection, a dream that took him to many European countries, the Middle East, Central Asia and Africa on collecting trips. Additionally, he exchanged a large number of specimens with his contemporaries, finally accumulating around 80% of the species known at the time (REISSER 1956). He was well known for his strong demeanour as well as his minimalist and healthy lifestyle, which no doubt promoted and prolonged his success. Among his other excursions, SCHWINGENSCHUSS travelled to the Alborz Mts. in Iran and later described many new species and subspecies in several papers (SCHWINGENSCHUSS 1937, 1939a, 1939b, 1955). His collection is now deposited at "Naturkundliche Landessammlung Niederösterreich" in Sankt Pölten, Austria.

FRIITZ WAGNER (*28.xi.1873, Steinamanger – †17.vi.1938, Vienna) (Fig. 5b). An Austrian-Hungarian

lepidopterist and bookseller, WAGNER became interested in butterflies from a young age. Later, he opened a section for selling entomological equipment in his bookstore in Vienna. He travelled to many countries in Europe and the Middle East between 1907 and 1937, including to Iran in 1936.

WALTER FORSTER (*12.vii.1910, Hörbach, near Augsburg – †25.xii.1986, Munich) (Fig. 5c). A German lepidopterist and former director of the Bavarian State Collection of Zoology in Munich, FORSTER started his university education in political science at Maximilians University of Munich but realized his passion for zoology after just two semesters. He followed his passions, completing his studies and later earning his Ph.D. with a thesis on the blue butterflies of the family Lycaenidae in 1936. Later, he found employment at the Zoological State Collection in Munich, first as a technical assistant then as a scientific assistant (from 1943) and curator (from 1949). In 1957, FORSTER became head of the entomology department and in 1965 was appointed director of the institute till 1975. During his many expeditions to southeastern Europe, South America, East Africa, Iran, Nepal and the Himalayas, he built an extensive collection of Lepidoptera for his home institute.

III. From the end of World War II to the Islamic Revolution (1946 to 1979)

By the end of World War II, large parts of Europe and Asia were left in ruins. Many natural history collections and museums were not spared from the carnage of the war. In the aftermath, the world began anew, borders were redrawn, prisoners returned home and cities began to rebuild. During this time of renewal, lepidopterists likewise returned to work in their collections and museums. During the war, entomologists played a prominent role in identifying biodiversity and preventing the outbreak of pests and arthropod-borne diseases (e.g., malaria, typhus, tsutsugamushi fever). The high demand for basic entomological knowledge resulted in an increased number of scientific positions in departments of agriculture and public health and in the specialized entomological departments of army medical services (GERBERG 2008).

Meanwhile, leaps in progress were made in taxonomy and systematics. An important concept that emerged during this period was that of populations as functional units of evolution, as suggested by Sir JULIAN SORELL HUXLEY (HUXLEY 1940), the English evolutionary biologist who played a central role in the "modern evolutionary synthesis". During World War II, German evolutionary biologist ERNST MAYR published his ground-breaking book titled "Systematics and the Origin of Species" (MAYR 1942), which was a distillation of species concepts and speciation processes in the context of the modern evolutionary syn-

thesis. A few years later, German entomologist and phylogeneticist WILLI HENNIG published his “Grundzüge einer Theorie der phylogenetischen Systematik” (HENNIG 1950), where he described a practical and consistent method for tracing phylogenetic relationships based on morphological characters. This contribution, especially after its translation by D. DAVIS and R. ZANGERL as “Phylogenetic Systematics” (HENNIG 1965a), was a significant step towards a “more natural classification” of taxa. Soon thereafter, WATSON & CRICK (1953) described the double helix structure of DNA, promoting a genetic revolution in biology. These contributions to science, alongside others in the post-war era, directly influenced the mindset of Lepidoptera taxonomists, broadening their perspectives on alternative species concepts.

Although Iran declared neutrality at the start of the war, the country was occupied in 1941 by Britain in the south and by the Soviet Union in the north. By 1942, an enormous influx of European refugees to Iran caused food shortages and extreme famine to spread across the country, leading to a high rate of mortality, political instability and social and economic suffering. However, the nature of Iran remained nearly untouched during the war, and its unsullied and little-known lepidopteran fauna became extremely attractive to budding lepidopterists in the 1960s and 1970s. This led to the undertaking of many expeditions in Iran from 1950 to 1979, when the Iranian Revolution overthrew the PAHLAVI dynasty. Among the lepidopterists who focused on the fauna of Iran during this period, several prominent figures are discussed in the following section.

JALAL AFSHAR (*1894, Orumiyeh – †5.iii.1975, Tehran) (Fig. 5d). The influx of new European entomologists traveling to Iran during the post-war era coincided with the emergence of a first generation of Iranian entomologists. Much of this pioneering generation was trained in Europe or Russia and returned home to train its countrymen and establish a new breed of native lepidopterists. A well-known professor in entomology at Tehran University, JALAL AFSHAR, who completed his Ph.D. in Zoology at Shaniavsky University in Moscow before returning to Iran in 1920, was one such pioneer. AFSHAR recognized the lack of an insect reference collection in Iran, and in 1943 established a small collection in Tehran. This collection was later expanded by his students (e.g., HAYK MIRZAYAN, GHODRATOLLAH FARAHBAKHSH), who also collected intensively in Iran and were prolific entomologists in their own right. Many Russian and European entomologists collaborated with the Iranians, further increasing the size and significance of the collection, which after the passing of MIRZAYAN was named the “Hayk Mirzayans Insect Collection” (abbreviated as HMIM). Alongside his publications on several other insect groups, AFSHAR pub-

lished a catalogue of the butterflies of Iran in two parts (AFSHAR 1946, 1947). Soon after, many publications on the Lepidoptera of Iran by other Iranian entomologists (e.g., DAVATCHI 1958; FARAHBAKHSH 1961) started to appear, mostly with a focus on the biological traits of pest species.

HANS GEORG AMSEL (*20.x.1905, Bensberg – †20.x.1999, Langensteinbach) (Fig. 5e). A well-known German microlepidopterist, AMSEL was curator of the Lepidoptera collection and head of the entomology department at the State Museum of Natural History in Karlsruhe (SMNK). He played a fundamental role in research on various families of Microlepidoptera (mostly Gelechiidae, Tineidae, Momphidae, Crambidae, Pyralidae, Carposiniidae and Oecophoridae) in Iran and neighbouring countries. After finishing his primary education, AMSEL first worked as a bookseller and then trained as a bank clerk before giving up both career avenues to pursue biology and research on Lepidoptera, which he had been fascinated with since his youth. In 1933, he defended his Ph.D. at the University of Berlin on the zoogeographical-ecological-faunistic aspects of the lepidopteran fauna of Palestine (e.g., AMSEL 1935). After finishing his studies, he worked for a few months as a volunteer in the Zoological Museum of Berlin before getting a position in 1934 as curator of the Overseas Museum in Bremen. Soon after the start of World War II, AMSEL was called to the “Wehrmacht”. He held the rank of corporal until 1945, when he became a prisoner of war in Norway. After the war he moved to Buchenberg, a small village in the Black Forest, and worked as a mushroom specialist (ROESLER 1975). In 1955, he became a curator and head of the entomology department at SMNK, where he worked until his retirement in 1973. AMSEL’s work led to the accumulation of a vast and scientifically significant Microlepidoptera collection at the Karlsruhe museum. Besides publishing 145 scientific papers on Lepidoptera, he is especially remembered for the magnificent book series “Microlepidoptera Palearctica”. This large project was initiated and edited by AMSEL together with FRANTIŠEK GREGOR and HANS REISSER (and continued by REINHARD GAEDIKE). It was published in thirteen volumes between 1965 and 2008 and is still the most important reference for the study of several Palearctic Microlepidoptera families. Besides his several expeditions to Palestine and Afghanistan in 1969, 1973 and 1975, AMSEL travelled to Iran (Fig. 3) and collected large numbers of Lepidoptera, focusing primarily on Microlepidoptera. Additionally, he extensively examined the Iranian Microlepidoptera of other contemporary collectors (e.g., F. BRANDT, E. P. WILTSHIRE & G. EBERT) and published the results in a series of papers (e.g., AMSEL 1949, 1950, 1951, 1954, 1958, 1959, 1961a, 1961b, 1974, 1975, 1977, 1978) providing a large overview of the Microlepidoptera fauna of Iran, with descriptions of several hundred species. However, many of the new genera and species described

by AMSEL were published outside of taxonomic revisions and have subsequently proved to be synonyms of previously described species (e.g., SATTLER 1969).

HANS ZERNY (*11.06.1887, Vienna – †17.09.1945, Vienna) (Fig. 5f). A highly influential Austrian lepidopterist and dipterist, ZERNY completed his university studies and Ph.D. in zoology at the University of Vienna. Later in life he became curator of the Lepidoptera collection of the Natural History Museum of Vienna, where he worked until the end of his life. Among his about 40 publications, at least two important papers were dedicated to the fauna of northern Iran (ZERNY 1939, 1940).

EUGEN WEHRLI (*17.iii.1871, Frauenfeld – †24.vi.1958, Münchenstein) (Fig. 5g). A Swiss medical doctor, EUGEN WEHRLI finished his studies in medicine in Zurich, Kiel, Genf and Basel, becoming a practicing ophthalmologist. Although he published his first paper on Lepidoptera in 1911 at the age of 40, he was fascinated with nature, especially butterflies and moths, since his childhood. In his twilight years he became a prominent lepidopterist, and from 1926 specialized on the family Geometridae (SACHTLEBEN 1959). He expanded his collection from a local private one to an immense Palearctic collection supplemented with the largest and most complete Lepidoptera library in Switzerland. WEHRLI became one of the main authors of the supplement to the fourth volume “Macrolepidoptera of the Earth” (“Gross-Schmetterlinge der Erde”), edited by ADALBERT SEITZ (WEHRLI 1939–1954). HENRY BEURET (1958) described him as a sensitive person who was often conflict-averse, avoiding arguments surrounding research. A part of WEHRLI’s collection was donated to the Natural History Museum of Basel. However, his extraordinary collections of Palearctic Geometridae and Psychidae, including many type specimens of species described by him but also types of species described by CHARLES OBERTHÜR, ACHILLE GUENÉE and JEAN BAPTISTE ALPHONSE DECHAUFFOUR DE BOISDUVAL, were deposited in the Zoological Research Museum “Alexander Koenig” in Bonn (ZFMK) four years before his death. WEHRLI published several important papers on the geometrid moths of Iran (WEHRLI 1938, 1939b, 1941) and described and recorded many more species from Iran in SEITZ’s series (WEHRLI 1939–1954).

WILLI RICHTER (*2.ii.1895, Berlin – †1.ii.1966, Ludwigsburg) (Fig. 5h). A Berlin entomologist who trained as a preparator and worked for several years in the Zoological Museum of Berlin. During his early years, he collected insects in several European countries, Russia and the Transcaucasus. During World War II, RICHTER was sent to the frontline and found himself in an Anglo-American prison (LINDNER 1966). After his release, he applied for a job at the Stuttgart State Museum of Natural History (SMNS), where he was hired as chief preparator of insects. The Stuttgart museum, like many others during the war,

was left in ruins. The old museum building in Ludwigsburg was bombed and destroyed, but its staff worked tirelessly, saving nearly all specimens and transferring them to safety. RICHTER had his work cut out, with most specimens needing to be sorted and remounted before transfer to the new museum buildings in Löwentor and Rosenstein Park in the 1950s. RICHTER was lucky enough to know FRIEDRICH SCHÄUFFELE, a German who was working in Iranian Baluchestan as a medical doctor. SCHÄUFFELE organized two expeditions for RICHTER, in 1954 (Sistan-o-Baluchestan province) and 1956 (Khuzestan and Kerman provinces). RICHTER and SCHÄUFFELE collected large numbers of specimens from nearly all insect orders during these two expeditions (Fig. 3), which were prepared by RICHTER and were later made available to taxonomists around Europe. These two expeditions provided not only invaluable insect sampling from small and previously unexplored regions, but also led to the publication of a series of over 40 remarkable papers based on these materials, mostly in the two journals published by the SMNS, namely “Jahreshefte des Vereins für Vaterländische Naturkunde in Württemberg” and “Stuttgarter Beiträge zur Naturkunde”. Many new taxa and new records for Iran were published in these papers, e.g., on Orthoptera (BEIER 1956, 1957; BEY-BIENKO 1958; CHOPARD 1959), Coleoptera (PETROVITZ 1958; MILOS 1961; SCHEERPELTZ 1961), Diptera (OLDROYD 1958; HENNIG 1965b), Trichoptera (SCHMID 1959), Hemiptera (WAGNER 1957; JIRI & FRIEDRICH 1962), Neuroptera (HÖNZER 1968) and Lepidoptera (AMSEL 1959, 1965; TOLL 1959; BOURSIN 1960; DANIEL 1960a) [for a complete list, see RICHTER & SCHÜZ (1959)]. Most specimens from these two expeditions are now kept in the SMNS collections, but some are deposited in SMNK and other museum collections. RICHTER also published a travel report about each of his expeditions (RICHTER 1956, 1961). He was not only an entomologist but also a lover of nature who picked up all elements of the natural world with his sharpened senses and wrote about them extensively in his travel logs. His pet for many years was a Persian spiny-tailed lizard [*Saara asmussi* (Strauch, 1863)], which he brought back from Iran and kept alive and healthy for much longer than any zoo might have hoped to (LINDNER 1966). He died from lung cancer just one day before his 71st birthday.

CHARLES BOURSIN (*6.xii.1901, Nantes – †27.xii.1971, Paris) (Fig. 5i), a leading French lepidopterist and world-class specialist on trifold Noctuidae, was born in Nantes and raised bilingual in French and German. In 1920 at the age of 19, he moved to Paris and soon joined the Entomological Society of France as a volunteer, later joining the entomology department of the “Muséum national d’Histoire naturelle” as an assistant under the supervision of LOUIS BOUVIER. Soon thereafter he began publishing scientific papers and taking part in international



Fig. 5. Portraits of lepidopterists having worked on the fauna of Iran. **a.** LEO SCHWINGENSCHUSS. **b.** FRITZ WAGNER. **c.** WALTER FORSTER. **d.** JALAL AFSHAR. **e.** HANS GEORG AMSEL. **f.** HANS ZERNY. **g.** EUGEN WEHRLI. **h.** WILLI RICHTER. **i.** CHARLES BOURSIN. **j.** FRIEDRICH KASY. **k.** EVA VARTIAN. **l.** HAYK MIRZAYANS. **m.** ALI ASGHAR AHMADI. **n.** CLAS MICHAEL NAUMANN. **o.** MANSOUR ABAI. **p.** ALI PAZUKI. (Portrait of H. G. AMSEL © Senckenberg Deutsches Entomologisches Institut historical archive; photos of E. VARTIAN and F. KASY from <https://www.zobodat.at/>; photos of H. MIRZAYANS, A. A. AHMADI, M. ABAI and A. PAZUKI courtesy of M. MOGHADAM)

congresses, and in 1938 he joined the editorial board of the journal “L'Amateur de Papillons” (now “Alexanor”). His close friendship with German entomologists, especially during World War II, resulted in his dismissal as chair of entomology at the museum, followed by his expulsion from the Entomological Society of France in 1944. He moved to Vienna to work as a translator for the French Army, where he could again pursue his entomological research. After returning to Paris at the beginning of 1950, the French entomological community continued to shun him, but he carried on with his studies. Although he lived alone in a small room in a hotel until the end of his life, he never stopped his intense research on trifold Noctuidae, maintaining his international scientific collaborations. He described hundreds of new taxa in around 200 scientific papers and built a collection of 29,245 specimens (including 171 holotypes, 1,990 paratypes and 3,800 genital preparations) and 12,000 photos. Facing financial problems, he sold his collection to SMNK in Karlsruhe. BOURSIN died on December 26th, 1971 after an intracerebral haemorrhage. GÜNTER EBERT (1974) described him as a quick and harsh person who often criticized others, which no doubt contributed to his lifelong exile from French entomological circles. Although he never travelled to Iran, he intensively studied the material collected there by others (e.g., BRANDT, EBERT, VARTIAN) and published several important papers on the country's Noctuidae (e.g., BOURSIN 1937, 1942, 1943, 1947, 1948, 1950, 1952, 1955, 1960, 1963a, 1963b, 1963c, 1968, 1969, 1970).

FRIEDRICH KASY (*25.ix.1920, Vienna – †4.ii.1990, Vienna) (Fig. 5j). An Austrian microlepidopterist, KASY was curator of the Lepidoptera collection at the Natural History Museum in Vienna. Although his passion lay in the natural sciences, his father pressured him into studying chemistry. World War II altered KASY's life course as it did for many others. Soon after finishing high school he was sent to the frontline, where in 1945 he was arrested by the Russians in Hungary. At the end of 1947, two years after his capture, he finally returned to his homeland where he began his studies in zoology and botany at the University of Vienna, completing his Ph.D. a few years later. KASY worked for the Austrian Forestry Service before becoming a curator in the Vienna Museum. Initially he was curator for Arachnoidea and Myriapoda, but by the 1960s he was given the curatorial position for the Lepidoptera collection. As an influential mentor, KASY trained several great lepidopterists, including EVA VARTIAN. He travelled to many countries in search of Lepidoptera, including several excursions (known as “Österreichische entomologische Iran-Expeditionen”) to Iran in 1963, 1965, 1970, 1972 and 1974, mostly with EVA and ASAD VARTIAN (Fig. 3), during which he collected numerous specimens of Lepidoptera. In the long list of KASY's publications, at least four papers exclusively reported on the Lepidoptera fauna

(mainly Gelechioidea) of Iran (KASY 1965, 1967, 1974, 1975). He left the description of new species belonging to families on which he was not a specialist to other taxonomists (e.g., POVOLNÝ 1972; SATTLER 1976).

EVA VARTIAN (*11.i.1925, Vienna – †14.v.2017, Vienna) (Fig. 5k). Austrian artist and lepidopterist EVA VARTIAN was born in a highly educated family in Vienna. Her father, WILHELM FOLTIN, was a university professor in architecture and provided his daughter with a diverse and learned upbringing, instilling in her a love of nature and insects (JOVANOVIC-KRUSPEL et al. 2017). EVA studied fine arts at the Academy of Applied Arts in Vienna and became an expert in fashion, textiles and painting. After World War II, at the age of 24, she met her future husband ASAD VARTIAN, an Armenian carpet businessman who travelled frequently on business trips. In 1950, the VARTIANS joined the “Association of Austrian Entomologists” (“Arbeitsgemeinschaft Österreichischer Entomologen”). Soon after, they met and came under the mentorship of the Lepidoptera curator at the Natural History Museum in Vienna, FRIEDRICH KASY, who trained the VARTIANS on numerous lepidopterological techniques such as light trapping and specimen mounting. This new-found love of Lepidoptera and KASY's guidance led to 22 expeditions by the couple to southern and eastern Europe over the next 26 years, and after the 1960s primarily to the Middle East and South Asia, where they were occasionally accompanied by KASY. During these years, the VARTIANS travelled extensively through Iran thirteen times, covering most of the country between 1962 and 1975. Over the course of their lives they accrued one of the largest collections of butterflies and moths (with a focus on Macrolepidoptera) from the Middle East, including 140,000 pinned and outstandingly prepared specimens in 940 insect boxes. After ASAD's death in 1982, EVA stopped her collecting activities and in 1995 deposited their vast collection in the Museum of Natural History in Vienna, in a separate room named after EVA VARTIAN herself. This exceptional collection was studied by many leading lepidopterists (e.g., C. BOURSIN, F. DANIEL, G. EBERT, W. FORSTER, F. KASY, C. M. NAUMANN, D. POVOLNÝ, U. ROESLER, E. P. WILTSHIRE, A. VOJNITS, Z. VARGA, L. and G. RONKAY), who designated 4,400 type specimens from it. The VARTIAN collection is one of the most important collections for the study of Iranian and Afghan Lepidoptera. A recently-published handbook series titled “Fibigeriana”, based on the VARTIAN collection, depicts species of various Lepidoptera families from West and Central Asia, with a special focus on the faunas of Iran and Afghanistan (e.g., LÖDL et al. 2012, 2013, 2015).

GÜNTER EBERT (*29.iii.1935, Nürnberg) (Fig. 11d). GÜNTER EBERT is undoubtedly the most important founder of modern lepidopterology in Iran. EBERT's love of insects started in his early childhood and was further fostered by several entomologists throughout his younger life, e.g.,

ENSLIN, KONRAD GAUCKLER, HERBET MENHOFER and ERICH GARTHE, who frequently brought EBERT along on excursions. He later became a co-founder of the North Bavarian Entomological Working Group (“Entomologische Arbeitsgemeinschaft Nordbayern”). To escape the tedium of his office job, EBERT volunteered at the Publishing Society of North Bayern (“Nordbayerische Verlagsgesellschaft”), immersing himself in articles and research on insects (TRUSCH 2003). In 1957 he travelled for seven months in Afghanistan, a mystical new frontier for many European explorers that was uncharted territory for entomologists. EBERT collected highly valuable Afghan butterflies and moths that remain rare in collections to the present day. He returned to Afghanistan in 1961 for several months, then went on another expedition to Nepal in 1962. These early trips were a turning point for EBERT, and his lifelong dream of becoming a professional entomologist ultimately led him to quit his job as an office clerk in 1963. Soon thereafter he began working as a preparator for well-known microlepidopterist HANS GEORG AMSEL. He returned once again to Afghanistan and Iran in 1969 and 1970 and was invited by HAYK MIRZAYANS to the Plant Pests and Diseases Research Institute (PPDRI) (now Iranian Research Institute of Plant Protection, IRIPP) in Tehran as a consultant on behalf of the Federal Office for Nutrition. He worked for roughly three years under the supervision of MIRZAYANS and established the Lepidoptera collection at IRIPP. During his tenure there, EBERT trained several entomologists (e.g., ALI PAZUKI and HUSHANG BOROOMAND). Alongside his preparator HEINZ FALKNER, he carried out many trips throughout Iran (Fig. 3) and generated one of the best Lepidoptera collections from the country, now available at SMNK in Karlsruhe. EBERT’s time in Iran led to numerous publications on the faunas of Iran and Afghanistan, which garnered him not only a reputation for his knowledge of Middle Eastern Lepidoptera but also a position as curator at SMNK in 1973, an unprecedented achievement for a self-taught scientist (TRUSCH 2003). Until his retirement in 2002, EBERT worked as a curator, building a massive Lepidoptera collection and adding a large number of specimens from around the world. After his retirement, EBERT continued to work on the Lepidoptera collection of SMNK as a volunteer, with a special focus on the Noctuidae of Iran (EBERT & HACKER 2002). EBERT was the editor and coordinator of an extensive series titled “Die Schmetterlinge Baden-Württembergs”, in which he reviewed, alongside many fellow German lepidopterists, the entire Lepidoptera fauna of the State of Baden-Württemberg (SW Germany) across nearly 6,000 pages in ten volumes. In 2003, EBERT’s series was awarded the Fabricius Medal of the DGaE (“Deutsche Gesellschaft für allgemeine und angewandte Entomologie”) at Martin Luther University in Halle, Germany, for his special achievements in basic entomological research. One year later, the book

series was awarded the 7th Ernst-Jünger-Prize for Entomology in Baden-Württemberg, for outstanding scientific work in the field of entomology. During his expeditions to the Middle East and Central Asia, besides discovering and describing many new species from different families, EBERT collected well over 100,000 specimens, the largest special collection of Near-Eastern Lepidoptera in Germany. EBERT was also a co-founder of *Societas Europaea Lepidopterologica* (SEL) and, as secretary general, was a member of the society’s board for ten years.

HAYK MIRZAYANS (*31.xii.1920, Qazvin – †2.iv.1999, Tehran) (Fig. 51). Known as ‘MIRZA’ to his friends, HAYK MIRZAYANS was perhaps the most famous Iranian entomologist. Following his early interest in insects he studied entomology at the faculty of Agriculture in University of Tehran, graduating in 1945. MIRZAYANS was regarded as one of the most prominent students of JALAL AFSHAR, known as the father of modern entomology in Iran. Like many early Iranian entomologists he was also heavily influenced by several famous Russian colleagues (e.g., ALEXANDROV, CHOVACHIN and KIRIOKHIN). Soon after completing his studies under AFSHAR, MIRZAYANS was hired as a research entomologist by the Ministry of Agriculture in Tehran, where he founded the Entomology and Plant Pathology Research Department (later renamed the Plant Pests and Diseases Research Institute). MIRZAYANS carried out several expeditions in Iran and visited every corner of the country, often travelling in dilapidated vehicles and even by pack animal. Although he mainly focused on Orthoptera, he never neglected other insect groups and collected a large number of insects from nearly all orders. MIRZAYANS, who was a talented polyglot, would often correspond with entomologists from other countries in their mother tongues (Armenian, Farsi, French, English, Russian), and built valuable scientific collaborations in the process. He invited several renowned entomologists of his time (e.g., EUGENIO MORALES AGACINO, GÜNTER EBERT, HANS GEORG AMSEL and JEAN BAROU) to Iran for joint field work and bilateral collaborations. These research stays were extremely helpful for the budding entomological sphere in Iran, and increased the size and scientific value of the insect collection at the Iranian Research Institute of Plant Protection in Tehran. For example, French entomologist JEAN BAROU published the first list of Iranian Lepidoptera based on this material (BAROU 1967), whereas GÜNTER EBERT reordered and updated the institute’s Lepidoptera collection during his time there. Together with other Iranian entomologists (e.g., MANSUR ABAI), MIRZAYANS played an essential role in founding the Entomological Society of Iran (ESI) in 1965 and was the editor of the “Journal of Entomological Society of Iran” (JESI) for many years. During his career, MIRZAYANS trained many young entomologists, including lepidopterists (e.g., VAZRICK NAZARI), discovering and publishing several new insect taxa for Iran. Among the many publi-

cations authored by MIRZAYANS, two constitute significant contributions to Iranian lepidopterology: MIRZAYANS & KALALI (1970), an update to the checklist published by BAROU (1967), and MIRZAYANS & ABAI (1974), a list of the oak-feeding Lepidoptera of the country. Although there were many misidentifications and typographical errors in these lists, both should be regarded as an important baseline for subsequent faunistic studies on Iranian Lepidoptera. One of the largest Iranian insect collections, located at the Iranian Research Institute of Plant Protection, is now named the “Hayk Mirzayans Insect Museum” (HMIM) in his honour.

ALI ASGHAR AHMADI (*18.xii.1937, Lar – †11.i.1999, Shiraz) (Fig. 5m). A university professor at Shiraz University, AHMADI was the first Iranian Lepidoptera specialist (Noctuidae). He obtained a degree in agricultural engineering from Shiraz University in 1961 and was then employed by the Department of Plant Protection, College of Agriculture, Shiraz University, where he worked as a teaching coordinator and entomologist. In 1965, he moved to Stuttgart, Germany for a 10-month research stay at the Hohenheim College of Agriculture on a German scholarship. Upon returning to Iran he served as an instructor in the Department of Plant Protection, College of Agriculture, Shiraz University between 1966 and 1974, when he earned his master's degree in entomology. In 1974 he received a Ph.D. scholarship from the Ministry of Science and Higher Education of Iran, to study at the prestigious Cornell University in New York, USA. He published his Ph.D. thesis, titled “A revision and review of the North American species of *Agrotis* and *Feltia* known to occur north of the Mexican border (Lepidoptera, Noctuidae)”, in 1977. Soon after, he returned to Iran and worked as an academic staff member at Shiraz University until his sudden death on January 11th, 1999. During his life, AHMADI trained many well-known entomologists in Iran (e.g., H. AL-MANSOUR, J. HAJIZADEH, H. A. LOTFALIZADEH, K. MINAEI, M. MOGHADDAM, A. M. SARAFRAZI).

CLAS MICHAEL NAUMANN (*26.vi.1939, Königsbrück – †15.ii.2004, Wachtberg-Pech, near Bonn) (Fig. 5n). CLAS NAUMANN was born just two months before World War II in Königsbrück, north of Dresden, East Germany. In 1945, the war forced the NAUMANN family to give up all their properties in Saxony and move to Weserbergerland, North Germany. They subsequently moved again in 1949, to Wilhelmshaven, before finally relocating to Braunschweig in 1951. Influenced by his father, a Ph.D. in agriculture and hobbyist beetle collector, CLAS developed an early enthusiasm for nature and entomology. He was further influenced by FRITZ HARTWIEG, the editor of the “Braunschweig Lepidoptera Fauna” (“Die Schmetterlingsfauna des Landes Braunschweig”), who drew his attention to Lepidoptera. In 1959, he moved to University of Tübingen and first studied chemistry for three semesters on the

advice of his father, who believed biology was an unprofitable field. However, in 1962, young CLAS followed his passions and began his studies in biology. Soon he met BURCHARD ALBERTI, KARL-HEINZ WIEGEL and HUGO REISS, at that time leading Zygaenidae specialists and collectors in Germany. NAUMANN's interests in the phylogenetic systematics of Lepidoptera led him to Bonn, where he carried out his Ph.D. at ZFMK and in 1970 defended his thesis at Bonn University on the phylogeny of Palearctic Sesiiidae. A partnership agreement in the early 1960s between the universities of Bonn, Cologne and Bochum and Kabul University in Afghanistan generated an opportunity for NAUMANN to take up a position as lecturer, between 1970 and 1973, in Kabul, where he also helped establish the university's zoological museum. Even before his tenure in Afghanistan, NAUMANN already had a fascination with classic 19th-century travel logs about Central Asia and Afghanistan. He quickly learned Farsi and fully immersed himself in Afghan culture during several expeditions that took him to the most remote areas of the country, in the Hindu Kush, in search of his favourite lepidopteran group, the burnet moths (Zygaenidae). From 1974 to 1977 he habilitated as a professor at Ludwig-Maximilian University in Munich and began teaching at the University of Bielefeld, where he was head of the “Morphology and Systematics of Animals” department. In 1989 he returned to Bonn, as a professor at Bonn University and director of ZFMK, where he worked until the end of his life. From 1976 on and throughout his career, NAUMANN managed to go on at least one excursion every year, mostly to the Near East (e.g., Iran, Turkey, Yemen, Saudi Arabia, Oman, Tibet and the Caucasus), Southern Russia and Central Asia (Uzbekistan and Kyrgyzstan), but also to South Africa, Ethiopia and, finally, in 2002, back to his beloved Afghanistan (WAGNER & HÄUSER 2004). During these expeditions, NAUMANN accumulated a fantastic collection of Zygaenidae, discovering a dozen new species in the process. His lifelong passion for the faunas of Afghanistan and Iran doubtless cemented his legacy amongst lepidopterists in Iran and worldwide. Sadly, only six weeks before his retirement in 2004, NAUMANN passed away after a long battle with cancer (WAGNER & HÄUSER 2004). Upon his passing, his wife STORAI donated his collection of burnet moths, consisting of over 130,000 specimens, to ZFMK. The second part of his collection, containing other moths and butterflies collected in Afghanistan, was donated to SMNK in Karlsruhe (HOFMANN 2007).

Czechoslovak-Iranian entomological expeditions to Iran (1970, 1973 and 1977)

Three important entomological expeditions, from 1970 to 1977, were jointly organized by entomologists from the National Museum in Prague and Iran. Along-

side the Czechoslovakian researchers, several Iranian entomologists from the Institute of Plant Pests and Disease Research of Tehran joined these expeditions (e.g., MOHAMMAD SAFAVI, MANSOUR ABAI, ABBAS HASHEMI, ALI PAZUKI, ABDULKARIM MORTAZAVIHA). The first expedition spanned two months, from June 19th to August 20th, 1970. During this trip, the team collected at 77 localities in the provinces Azerbaijan-e Gharbi, Azerbaijan-e Sharghi, Zanjan, Qazvin, Alborz, Tehran, Qom, Esfahan, Lorestan, Fars, Mazandaran, Gilan and Ardabil (HOBERLANDT 1974). In 1973, the team from Prague returned to Iran in early spring (March 4th). This second expedition was primarily focused on the eastern slopes of the Zagros mountain range down to southeastern Iran. By the end of the expedition on July 7th, the team had visited and collected at 152 different localities (HOBERLANDT 1981). A third and final expedition occurred in 1977, from March 27th through July 28th. This time, over 134 localities were visited along the western slopes of the Zagros Mts., as well as additional localities in the southern and eastern parts of the country (HOBERLANDT 1983). Aside from JOSSEF MOUCHA, who wrote a report about the 1970 expedition (MOUCHA 1974), no other Lepidopterists joined these expeditions and butterflies and moths were often collected haphazardly as bycatch (WEISS 1990). The material collected during these trips is deposited at the Department of Entomology of the National Museum, Prague and has been examined by several lepidopterists (e.g., ALBERTI 1974; WAGENER 1974; NAUMANN & TARMANN 1983; LAŠTŮVKA 1995).

IV. From the onset of the Islamic Revolution to the foundation of Association Lepidoptera Iranica (1980 to 2003)

Only two years after the third and last Czechoslovak-Iranian entomological expedition, the Islamic Republic of Iran was founded following the so-called “Islamic Revolution”. Broad bureaucratic and systemic changes in the government and associated institutions, such as the IPPDR and universities, led to a near halt of much international research cooperation for several years. On September 22nd, 1980, the Iraqi Army invaded Iran and the Iran-Iraq war began, lasting eight years until August 22nd, 1988. During this tumultuous period in Iranian history, basic research such as the study of Lepidoptera was of little concern. However, a wealth of specimens collected in Iran in previous years (e.g., by BRANDT, WILTSHIRE, EBERT, VARIAN, KASY, RICHTER, AMSEL) were extensively studied by many researchers during that time (e.g., RACHELI & NAUMANN 1979; NAUMANN & NAUMANN 1980; RACHELI 1980; PARENTI 1981; BEHOUNEK 1986; ROESLER 1987, 1988a, 1988b, 1989a, 1989b).

During the 1980s, a new generation of Iranian entomologists began to focus their research primarily on pest species (e.g., ABAI 1980, 1981; PARVIN 1981; OLOUMI-SADEGHI & ESMAILI 1983; ABAI & FASELI 1986; RADJABI 1986; RADJABI et al. 1986; NOORI 1988). Despite the ongoing war and the dangers related to collecting activities, entomologists such as HAYK MIRZAYANS, MANSOUR ABAI and others continued to collect Lepidoptera and publish data based on new records.

MANSOUR ABAI (*2.xii.1939, Arak – †7.i.2017, Tehran) (Fig. 5o). A well-known Iranian forest entomologist, ABAI studied plant pathology at Tehran University and later earned his Ph.D. in forest entomology at Ludwig-Maximilian University in Munich in 1979. Throughout his life, he was a constant promoter of entomology in Iran, being a co-founder of the Entomological Society of Iran (ESI) in 1965 and one of its council members for many years. ABAI published several entomology books (e.g., ABAI 2000) and many papers on the lepidopteran pests of Iran (e.g., ABAI 1975, 1976, 1980, 1981, 1997, 2000). In their checklist of the Lepidoptera associated with oak trees in Iran, MIRZAYANS & ABAI (1974) included a review of the oak-related insects of the Zagros Mts.

ALI PAZUKI (*13.xii.1941, Shahbodagh, Garmsar – †27.vi.2016, Tehran) (Fig. 5p). After earning his master's degree in agricultural entomology in 1961, ALI PAZUKI joined the Insect Taxonomy Research Department (ITRD) of the Iranian Research Institute of Plant Protection in Tehran. He ultimately served as curator of Lepidoptera at ITRD (later the Hayk Mirzayans Insect Museum, HMIM) from 1964 till his retirement in 2000. Between 1972 and 1973, while on sabbatical, PAZUKI joined the lab of GÜNTER EBERT in Karlsruhe where he learned and improved curatorial techniques for insects. He spent several other research stays in the natural history museums of Stockholm, Prague, Saint Petersburg and Hamburg. He was a council member of the Entomological Society of Iran as well as the editor of the “Journal of Entomological Society of Iran” (JESI) for several years. He travelled Iran extensively and joined countless expeditions to remote areas of the country during his career, accumulating highly valuable materials now deposited at HMIM.

WALTER GERALD TREMEWAN (*2.i.1931, Mt. Hawke – †1.x.2016, Truro) (Fig. 9f). “The Adventurous Life of a Cornish Entomologist” (HOFMANN et al. 2017) began and ended in Cornwall. In between, GERRY TREMEWAN lived in Surrey and Kent and worked at the British Museum (Natural History), now the Natural History Museum, London, ultimately as editor-in-chief of *The Entomologist*. GERRY was interested in nature and insects from childhood and started his first collection early in life. During his scientific education at the Natural History Museum of London he developed a deep interest in burnet moths and litera-

ture, two fields which would greatly influence his life. In 2003, aged 72, he received a doctorate for the investigation of Mendelian genetics in burnet moths, his lifelong love. Several collecting tours with colleagues led him to Morocco and Tunisia, the western Mediterranean, Turkey and the Caucasus. Extensive expeditions in Iran with D. COTTRILL (1971, 1972, 1973, 1975, 1976), C. M. NAUMANN (1995, 1996, 1997) and A. HOFMANN (2001, 2002, 2003, 2004, 2013) allowed him to discover new localities and clarify the biology of Iranian *Zygaena*. He published 220 scientific papers on this group, describing 68 taxa including two new genera (*Epizygaenella* and *Reissita*). During more than 60 years of fieldwork and tours in foreign countries, he acquired a very large and special collection now housed at SMNS (RAJAEI 2017). After more than 25 years of work, TREMEWAN was unable to see his lifelong dream, a comprehensive work on the rich endemic Iranian *Zygaena* fauna, realized before his death in 2016.

Austrian Zoological Expeditions to North Iran (11–26.v.2001 and 18.x–1.xi.2003)

In 1997, ten years after the war between Iraq and Iran, reformist president MOHAMMAD KHATAMI was elected, campaigning on promises of a democratic and tolerant society in Iran. During the next eight years, a new wave of European entomologists had the chance to travel to Iran and renew collaborations with Iranian colleagues. Two prime examples of this fruitful period of cooperation are the Austrian Zoological Expeditions to North Iran and “Association Lepidoptera Iranica” (see below).

During the Austrian expeditions, which were led by BERNHARD GUTLEB, thirteen Austrian zoologists and two Iranian specialists travelled to northern Iran. The first expedition in 2001 proved fruitful, with collecting activities conducted in the Miankaleh Wildlife Refuge on the southeastern shore of the Caspian Sea. The team then travelled to Lake Alagol near the Turkmenistan border, and finally to Golestan National Park at the eastern end of the Elburz mountain range. Over 600 Lepidoptera species were collected alongside other animals. Perhaps due to the success of the first trip, a second expedition was undertaken in 2003. Initially, collecting was done along the road between Tehran and Shahrud (e.g., Gaduk, Kordroy). The expedition continued to Jahan-Nama National Park and then crossed the Alborz Mts. from Jahan-Nama to Gorgan, once more ending in Golestan National Park (Tange Gol, Dasht, Mirzabayloo, Almeh). Around 200 Lepidoptera species were collected during this second trip, and the results were published in several volumes of the journal “Carinthia” (ARENBERGER 2002; LAŠTŮVKA & HUEMER 2002; WIESER et al. 2002; BENGTSSON & HUEMER 2003; STANGELMAIER et al. 2003; HUEMER & WIESER 2004; WIESER & STANGELMAIER 2005). In total, over 1,100 ani-

mal species from the mentioned Iranian localities were recorded as a result of these excursions (GUTLEB & WIESER 2002).

V. The rise and fall of Association Lepidoptera Iranica (2004 to 2006)

Background. In 2002, a collaboration on the Lepidoptera fauna of Iran was initiated between German Zygaenidae specialist AXEL HOFMANN and eminent Iranian botanist HOSSEIN AKHANI. HOFMANN was motivated by his contemporaries (e.g., W. G. TREMEWAN & C. M. NAUMANN) to begin studying the diverse burnet moth fauna of Iran. AKHANI, who earned his Ph.D. in plant systematics at Ludwig-Maximilian University of Munich in 1998, found a new interest in insects, especially Lepidoptera, as he was interested in fundamental data about insect-plant associations in his country. A meeting between HOFMANN and AKHANI during AKHANI’s research stay at Freiburg University convinced both scientists to launch a new initiative. Upon his return from Germany, AKHANI contacted his colleague and invertebrate specialist at Tehran University, ALIREZA SARI, and the researchers of the Hayk Mirzayans Insect Museum in Tehran, thus initiating a new cooperation between European lepidopterists (via SMNK) and Iranian entomologists (via HMIM). Later, three Iranian researchers, HELEN ALIPANAH (a Ph.D. student at that time), EBRAHIM EBRAHIMI and ALIREZA SARI, were invited to a small conference hosted in Karlsruhe by the SMNK, and officially named their initiative Association Lepidoptera Iranica (A.L.I., or “Anjoman-e Parwaneh Schenasi-e Iran” in Farsi) (Fig. 6a). This first meeting was later regarded as the 1st A.L.I. Symposium.

1st A.L.I. Symposium, Karlsruhe, 27–28 March 2004. At this first meeting, 18 lepidopterists (see Box 1) from various European countries and Iran met at SMNK in Karlsruhe. It was here that a contract and an initial constitution, named “A.L.I. Concepts”, were drafted between the two parent institutes (HMIM and SMNK) (Box 1). This official cooperation agreement generated immense scientific benefits for Iran. Soon after the first symposium, a large number of well-known lepidopterists from Iran and from all over the world joined A.L.I. (e.g., W. BACK; D. BARTSCH; H. BOSTANCHI; J. BUSZKO; M. FIBIGER; G. FLUTSCH; R. GAEDIKE; W. GARREVOET; C. GIELIS; A. HAUSMANN; B. MOLLET; A. NADERI; V. NAZARI; M. NUSS; B. PLÖSSL; N. PÖLL; U. RATZEL; K. ROSE; K. SCHURIAN; G. SEIGER; S. SINEV; T. SOBCHYK; A. STEINER; W. G. TREMEWAN; W. WEISSIG; R. ZAHIRI).

2nd A.L.I. Symposium, Tehran, 27–29 May 2005 (Fig. 6b). One year later, a second A.L.I. symposium was held in Tehran, where over 50 scientists from Iran, Germany, Austria, the UK and Denmark met and discussed

Box 1. The original text of the “Concepts of Association Lepidoptera Iranica”, resulting from the 1st A.L.I. Symposium in Karlsruhe, 27–28 March 2004.

A.L.I. (Association Lepidoptera Iranica) Concepts

- 1) Construct through mutual co-operation a basis for:
 - the determination of taxa,
 - help in the organisation of fieldwork,
 - help in the organisation of literature and in the exchange of material and information.
 - 2) Co-operate with members of PPDR to produce checklists of taxa for publication in the *Insect Taxonomy Research Department Publication* of PPDR and in the *Iranian Journal of Animal Biosystematics* (IJAB).
 - 3) Provide preliminary checklists to relevant specialists for completion.
 - 4) Support of organizing a gazetteer of localities in Iran.
 - 5) Collate data to be incorporated into a data bank system.
 - 6) From material collected in Iran within this project, relevant samples (especially from any type series) should be deposited in Hayk Mirzayans Insect Museum.
 - 7) Whenever possible efforts should be undertaken for joint fieldwork in Iran, and for Iranian students to be trained in European institutions (e.g. Staatliches Museum für Naturkunde Karlsruhe, Staatliches Museum für Naturkunde Stuttgart, Ferdinandeum/ Innsbruck).
 - 8) Regular meetings alternatively in Karlsruhe/Germany or Tehran/Iran should be organised.
- All members of A. L. I. declare that they have no commercial interests.
 - The remit of all members is to promote scientific knowledge.
 - All activities are to the advantage of all members.
 - If all those present agree with the formulated above, then A. L. I. is formally inaugurated.

These concepts were signed by following 18 participants at 28.iii.2004:

- | | |
|---------------------------|----------------------------|
| 1. Dr. Helen Alipanah | 10. Dr. Gerhard Tarmann |
| 2. Dr. Jörg-Uwe Meineke | 11. Dr. Christoph Häuser |
| 3. Günter Ebert | 12. Dr. Wolfgang ten Hagen |
| 4. Dr. Bernd Müller | 13. Axel Hofmann |
| 5. Dr. Wolfgang Eckweiler | 14. Dr. Robert Trusch |
| 6. Axel Steiner | 15. Peter Kautt |
| 7. Dr. Ebrahim Ebrahimi | 16. Jean-Claude Weiss |
| 8. Dr. Alireza Sari | 17. Thomas Keil |
| 9. Hermann Hacker | 18. Peder Skou |

potential joint research projects on the Lepidoptera fauna of Iran. The meeting began with a cultural tour of Tehran and continued with a series of new and thought-provoking talks on ongoing lepidopterology projects related to the country. The initiative quickly bore scientific fruit, as hundreds of specimens, including many type specimens collected and examined by other lepidopterists, were donated to HMIM, further expanding its already significant Lepidoptera collection. This initiative also encouraged new expeditions, with several European lepidopterists traveling to Iran on official collecting permits issued by the Department of Environment.

3rd A.L.I. Symposium, Karlsruhe, 9–10 September 2006 (Fig. 6c–d). The third and final A.L.I. symposium was held again at Karlsruhe and was attended by over 50 scientists. At that time, A.L.I. was in the midst of an internal debate stemming from conflicting perspectives between the Iranian and German scientists on the goals and purpose of the association. It was thought that these diffi-

culties were the primary reason for the absence of HELEN ALIPANAH, A.L.I.'s Iranian coordinator, from the symposium. Despite these tensions, at least three Iranian lepidopterists attended the symposium: REZA ZAHIRI, ALIREZA NADERI and HOSSEIN RAJAEI. While the future of A.L.I. seemed tenuous, the meeting concluded with the general agreement that, despite the many difficulties faced by A.L.I. at the time, it would be advantageous for all parties to continue the initiative. Besides renewing their endorsement of the “Concepts of A.L.I.”, all participants agreed to support the following, newly proposed goals (HOFMANN & TRUSCH 2006):

- The A.L.I. initiative can help Iranian colleagues acquire scientific loans from European museums;
- Whenever A.L.I. members travel to Iran [for scientific excursions], they will provide identified specimens from earlier collecting trips to the Iranian reference collection at HMIM;



Fig. 6. Association Lepidoptera Iranica (A.L.I.). **a.** Logo, designed by W. ECKWEILER. **b.** The happy faces of AXEL HOFMANN (right) and JÖRG MEINEKE (left) under the welcome banner of the 2nd A.L.I. Symposium in front of the main entrance of the Plant, Pests and Diseases Research Institute (PPDRI) in Tehran. **c.** Final discussion during the the 3rd A.L.I. Symposium at the State Museum of Natural History, Karlsruhe. **d.** Congress photo, 3rd A.L.I. Symposium; from left to right: HOSSEIN RAJAEI, MANFRED VERHAAG, WOLFGANG TEN HAGEN, GEORG PETSCHENKA, REZA ZAHIRI, MICHAEL FIBIGER, REINHARD GAEDIKE, WOLFGANG ECKWEILER, ROLF MÖRTTER, AXEL HOFMANN, CHRISTOPH HÄUSER, WERNER WEISSIG, BERND PLÖSSL, GERHARD TARMANN, GILLES FLUTSCH, BERNARD MOLLET, JÖRG-UWE MEINEKE, ROBERT TRUSCH, CEES GIELIS, THOMAS KEIL, BERND MÜLLER, AXEL KALLIES, GÜNTER EBERT, ALIREZA NADERI, DANIEL BARTSCH, ZAHRA NADERI and AXEL STEINER.

- Whenever new taxa are described from Iran, specimens from the type-series will be deposited in HMIM;
- As a general rule, all A.L.I. members visiting Iran should come to the HMIM to look at new or unidentified material from their groups of study and help their Iranian colleagues wherever possible. This proposal extended to the Iranian scientists, who were encouraged to presort material in advance;
- Iranian scientists would actively support the collecting activities of their European colleagues in Iran on an administrative and logistical level, assisting with acquiring collecting permits and transport in the country.

The fall of A.L.I.

The 2006 symposium in Karlsruhe reinvigorated hopes for the continuation of A.L.I. and of the working relationship between European and Iranian lepidopterists for years to come, but it was ultimately its last. As explained by the curator of Lepidoptera at HMIM (H. ALIPANAH), “the head of PPDR has no interest at the moment in continuing this cooperation and has asked to stop it” (A. HOFMANN, personal communication).

Association Lepidoptera Iranica, although short-lived, was of immense benefit to the entomological community of Iran. First, it led to the training of two Iranian lepidopterists in Europe (namely HOSSEIN RAJAEI and REZA ZAHIRI, respectively the initiator/first editor and author of many sections of the present catalogue), who procured positions and research funds via the connections made at the symposia, and, ultimately, to the publication of this catalogue. Second, it allowed for much identified material and many type specimens to be added to HMIM as a result of the excursions and scientific exchanges it facilitated, which also led to several scientific publications on Iranian Lepidoptera.

VI. Lepidopterists currently working on the fauna of Iran (2006 to now)

Over the last 20 years (especially since the launch of A.L.I.), many European lepidopterists have travelled to Iran, either alone or in small groups, and published important works on the Iranian fauna. Some of these lepidopterists were invited directly by HMIM under the project “Insect fauna of Iran” or as a part of A.L.I. initiatives.

Despite this influx of specialists, many Lepidoptera specimens at HMIM remain to be identified. As stated by ALIPANAH & ZAHIRI (2021: 45): “due to the weakness in study planning and the lack of an established structure in the field of identification and classification of Lepidoptera, as well as the large volume of samples sent from the research centres of other provinces for identification,

many specimens remain unidentified”. Overcoming this taxonomic impediment was one of the original goals of A.L.I., by inviting specialists to HMIM, advising on species identification and improving the collection. Despite the end of A.L.I., global interest and work on Iranian Lepidoptera continues.

In the following paragraphs, we briefly introduce the renowned living experts who are currently studying or actively collecting the Lepidoptera fauna of Iran. Specialists are ordered alphabetically by family name in the text, but according to the systematic order of their group(s) of interest in the plates and lepidopteran phylogenetic tree (Fig. 7), where additional specialists are also shown.

HELEN ALIPANAH finished her studies in zoology at Tehran University and wrote her master's thesis on the Formicidae (ant) fauna of Tehran and surrounding areas. In 2010, she defended her Ph.D. on the phylogenetic systematics of the tribe Oxyptilini (Pterophoridae) at the same university. She is now a Microlepidoptera specialist and the curator of Lepidoptera at HMIM since 2001. ALIPANAH is the author/co-author of over 40 scientific papers in peer-reviewed journals and books on various Microlepidoptera families (e.g., Cossidae, Crambidae, Gracillariidae, Tischeriidae, Pterophoridae, Pyralidae, Tortricidae).

JOAQUÍN BAIXERAS (Fig. 8j). A professor of zoology at the University of Valencia, Spain, BAIXERAS is a well-known specialist on the family Tortricidae. His research focuses primarily on the evolution of sexual organs in Lepidoptera. BAIXERAS visited Iran in 2008, invited by the Iranian Research Institute of Plant Protection, and collected in northern Iran. He has focused on the Olethreutini of Iran and is also a co-author of the “Online World Catalogue of the Tortricidae” (GILLIGAN et al. 2018).

GIORGIO BALDIZZONE (Fig. 8m). A well-known Italian microlepidopterist and specialist on the family Coleophoridae, BALDIZZONE finished his Ph.D. in biological sciences in 1970 at the University of Turin. He is the author of over 200 scientific papers and has described over 350 new species of Coleophoridae from many parts of the world. He also published the “World Catalogue of Coleophoridae” together with JEAN-FRANÇOIS LANDRY and HUGO VAN DER WOLF (BALDIZZONE et al. 2006).

JAROSLAW BUSZKO (Fig. 8d). An emeritus professor of entomology at the Nicolaus Copernicus University in Toruń, Poland, BUSZKO is one of the foremost experts on several lepidopteran families (e.g., Gracillariidae, Nepticulidae, Pterophoridae). He completed his Ph.D. in 1979 and became a professor in 2000 (BUNALSKI et al. 2001). His research mainly focuses on the taxonomy, zoogeography and ecology of Microlepidoptera. He is the primary author of many publications on Lepidoptera, including “The Lepidoptera of Poland: a distributional checklist” (BUSZKO & NOWACKI 2000). BUSZKO has amassed a large

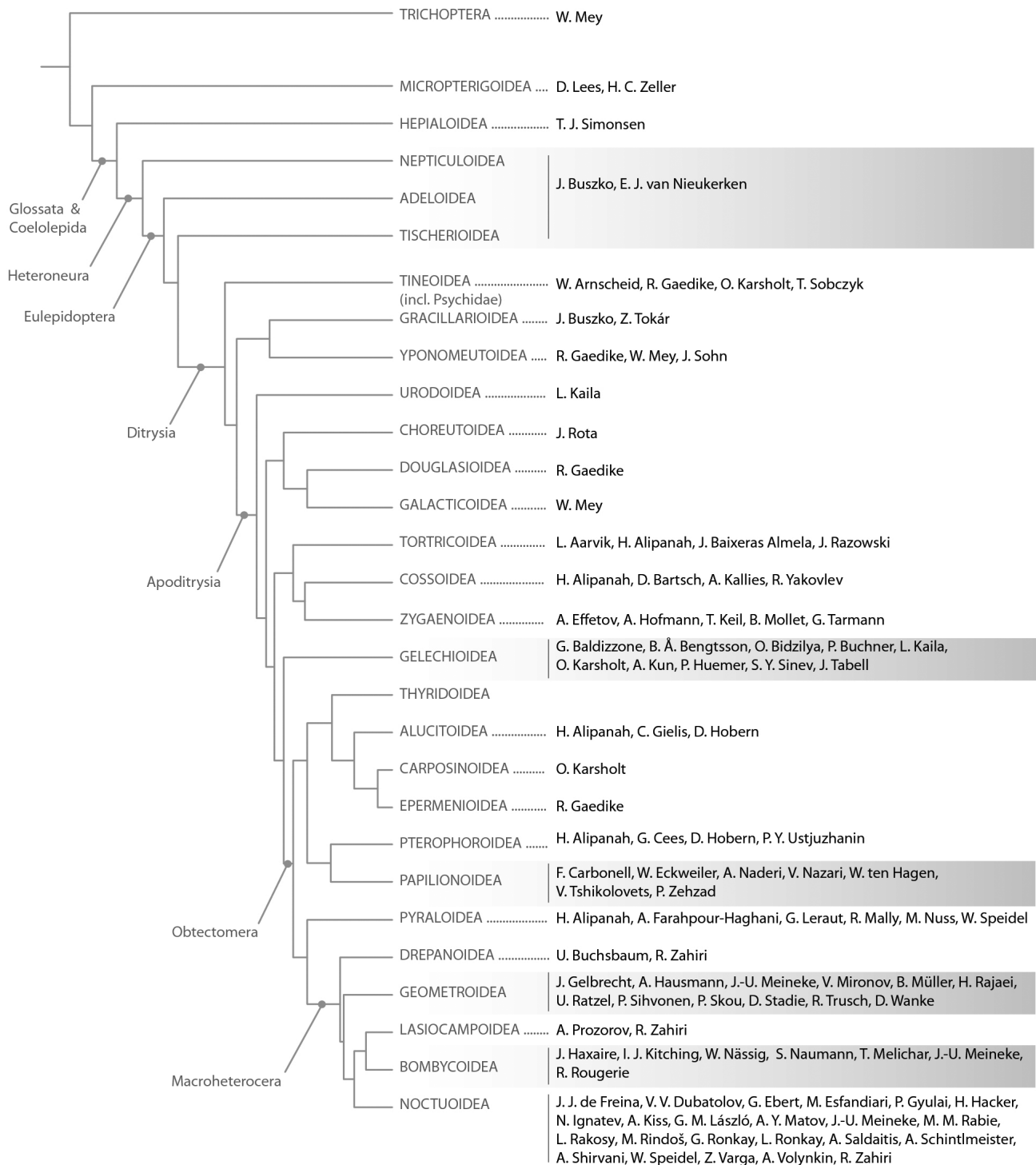


Fig. 7. Current specialists on Iranian Lepidoptera plotted onto the phylogenetic tree of the order.

collection including over 25,000 specimens belonging to several families.

FRÉDÉRIC CARBONELL (Fig. 10a) is a French computer scientist who very early-on developed a passion for entomology. Parallel to his career as an engineer at IBM

(expertise and consulting in improving software development processes), he has undertaken numerous entomological expeditions centred on the Middle East (Turkey, Iran, Pakistan, Lebanon) and on the islands of the Indian Ocean (Mascarenes). CARBONELL has made a name for himself

as a specialist (biology, ecology, taxonomy) of certain groups of Papilionoidea: Lycaenidae (Polyommatainae, *Polyommatus*, *Agrodiaetus*), Nymphalidae (Satyrinae) and Papilionidae (Parnassiinae). He has produced around 40 publications and contributed to many others, resulting in the description of several dozen species new to science. He is a long-time associate at the MNHN in Paris (study of the HUBERT DE LESSE collection).

JOSEF J. DE FREINA (Fig. 11e). A German industrial engineer who dedicated his life to entomology, DE FREINA is widely considered an outstanding lepidopterist. He has conducted research and collected on every continent and in countless countries, including Iran. He is the author of more than 250 scientific articles describing over 150 new taxa in 20 different Lepidoptera families, but is also the author of several important textbooks such as the four-volume “Bombyces and Sphinges of the West Palaearctic” (DE FREINA & WITT 1987, 1991, 2001; DE FREINA 1997). In 2017, he was awarded the Meigen Medal by the German Society for General and Applied Entomology (DGaEE), for his significant contributions to the taxonomy, biogeography and evolutionary biology of Lepidoptera. This award is given every two years to outstanding scientists who promote entomological research in the fields of systematics and faunistics.

VLADIMIR V. DUBATOLOV. A Russian Lepidopterist and curator of the Lepidoptera collections at the Siberian Zoological Museum in Novosibirsk, Russia, DUBATOLOV has an interest in the taxonomy, zoogeography and evolution of Palearctic tiger moths (Arctiinae). He has published over 400 papers on tiger moth taxonomy and has contributed to at least one major publication on the fauna of Iran (DUBATOLOV & ZAHIRI 2005).

WOLFGANG ECKWEILER (Fig. 9o). After completing his master's degree in biology, ECKWEILER continued his studies in neuroscience and received his doctorate in 1987 at Goethe University in Frankfurt, for his research on the tactile hairs of hunting spiders. ECKWEILER became the managing director of a wage tax assistance association, but also undertook numerous research expeditions in Asia, especially Turkey, Iran, Pakistan and China. He published several papers based on these trips (e.g., ECKWEILER 1979, 1981, 1987, 2000; ECKWEILER & HOFMANN 1980) and co-authored “The Butterflies of Iran and Iraq” (TSHIKOLOVETS et al. 2014). As a well-known specialist of Palearctic lycaenids and nymphalids, he has authored three volumes of the series “Guide to the Butterflies of the Palearctic Region”, edited by GIAN CRISTOFORO BOZANO. ECKWEILER is an editorial board member of “Nachrichten des Entomologischen Vereins Apollo (NEVA)”, as well as a council member of Societas Europaea Lepidopterologica (SEL).

MEHDI ESFANDIARI (Fig. 11j). A university professor at the Shahid Chamran University of Ahvaz in SW Iran, ESFANDIARI is a specialist of Noctuidae. He completed his

Ph.D. on the noctuid moth fauna of sugarcane fields in Khuzestan province at the same university in 2009, after a sabbatical in KAURI MIKKOLA's lab in Helsinki. His noctuid work mostly focuses on the fauna of southern Iran and on the identification of noctuid pest species (e.g., *Sesamia* spp.). He is currently the curator of the “Insect and Mite Collection of Ahvaz” (IMCA) at Shahid Chamran University, Ahvaz, where he has established a reference collection of Noctuidae. ESFANDIARI is the main author of over 50 publications on the Lepidoptera of Iran and has trained several M.Sc. and Ph.D. students.

REINHARD GAEDIKE (Fig. 8f). Fascinated by nature and animals from his childhood, and later influenced by his mentor GÜNTER TEMBROCK at the Zoological Institute of Berlin University, GAEDIKE studied entomology and completed his Ph.D. on the World Epermeniidae in 1970, under the supervision of HANS-JOACHIM HANNEMANN (PETERSEN et al. 2008). GAEDIKE worked 42 years as a researcher at Senckenberg's Deutsche Entomologische Institut (SDEI) in Müncheberg until his retirement (DATHE 2006). Aside from his contributions to the study of Lepidoptera, GAEDIKE is one of the most famous European entomologists, widely known for his monumental “Bibliography of Keys of European Insects” and his “Biographies of the Entomologists of the World”, which he built together with his colleagues (e.g., WALTER HORN, SIGMUND SCHENKLING, HANS SACHTLEBEN, WALTER DERKSEN) and which is publicly available as a regularly updated online database (<https://sdei.senckenberg.de/biographies/>). During 50 years of intensive research on Microlepidoptera and after publishing over 200 papers, many on the fauna of Iran, GAEDIKE has established himself as the preeminent specialist on several lepidopteran groups (e.g., Glyphipterigidae: Acrolepiinae, Douglasiidae, Epermeniidae and Tineoidea). Alongside other famous microlepidopterists like HANS GEORG AMSEL and HANS REISSER, GAEDIKE played a prominent role as editor of “Microlepidoptera Palaearctica”, published in thirteen volumes.

CEES GIELIS is a Dutch lepidopterist and scientific associate of the Naturalis Biodiversity Center in Leiden, The Netherlands. With over 400 published papers, he is a well-known expert on the families Pterophoridae and Alucitidae and the author of several important books, including “Pterophoridae and Alucitidae” and the fourth volume of the “World Catalogue of Insects” series, published by Apollo Books in 2003. He has contributed significantly to the Pterophoridae and Alucitidae faunas of Iran.

PÉTER GYULAI (Fig. 11i). A Hungarian entomologist and secondary school biology and chemistry teacher, GYULAI previously worked on insecticide research in a government laboratory. He specializes on Palearctic Noctuidae. Over the course of 25 expeditions to Asia (eight of which to Iran), many accompanied by his wife ADRIENNE (an orthopterist), he has developed an immense

and excellent collection of Palearctic Noctuidae, containing 437 published holotypes (e.g., GYULAI et al. 2002; GYULAI & RONKAY 2006; GYULAI 2019, 2021, 2022). The many faunistic, taxonomic and zoogeographic publications by GYULAI have greatly contributed to taxonomy and nature conservation in Hungary.

AXEL HAUSMANN (Fig. 9e). A senior curator and head of the entomology department at the Bavarian State Collection of Zoology in Munich, HAUSMANN earned his Ph.D. in Zoology at Munich University in 1990. He is one of the most famous Geometridae specialists and one of the leading researchers in the application of DNA barcoding to biological systematics. HAUSMANN is the editor-in-chief of the book series “The Geometrid Moths of Europe”, published in six volumes by Apollo Books and Brill, and the main author of a long list of books and papers on geometrid moths.

AXEL HOFMANN (Fig. 10e). A German lepidopterist and specialist on the family Zygaenidae, HOFMANN was only a teenager when he joined the Karlsruhe Natural Science Association in 1967 and met GÜNTER EBERT. Enthralled by the experiences of EBERT, who shared his stories of travelling throughout Asia and knowledge of the wondrous butterflies and moths found there, HOFMANN started down the path of becoming a lepidopterist. He studied geography, biology and geology at the universities of Heidelberg and Freiburg and graduated in 1983. Later, he founded an office for nature conservation (ABL) and organized, among other things, the species action plan for butterflies and moths in Baden-Württemberg (1992–2012). He was one of the authors of the book series “Die Schmetterlinge und Nachtfalter Baden-Württemberg” (“The Butterflies and Moths of Baden-Württemberg”, edited by G. EBERT), specializing on burnet moths (*Zygaena*) but also on several other groups. He became close friends with many outstanding Zygaenidae taxonomists such as KARL-HEINZ WIEGEL, CLAS NAUMANN, GERRY TREMEWAN and GÜNTER REISS. HOFMANN travelled extensively to many European, African, Central and Middle Eastern countries, focusing mainly on Turkey, Afghanistan and Iran. Since 1997 he has visited Iran almost every year, often together with JÖRG-UWE MEINEKE. In 2010, HOFMANN lived in Iran and spent his time discovering and describing the biology of many zygaenid species. He was also one of the founders of A.L.I., thus cementing his influence on Iranian lepidopterology (see above). Among the over 60 articles and books on Zygaenidae published by him, the series “Contribution to the knowledge of the genus *Zygaena* in Iran” (HOFMANN & TREMEWAN 2017) and the book “The Natural History of Burnet Moths” (HOFMANN & TREMEWAN 2020) are of note. His collection includes not only voucher specimens (approx. 100,000, of which approx. 8,000 are paratypes), but also cocoons (approx. 20,000) and a large archive of slides and documents from colleagues (C. M.

NAUMANN, G. REISS), including the unique Afghanistan archive of G. EBERT and C. M. NAUMANN with its over 12,000 transparencies.

PETER HUEMER. An Austrian lepidopterist and head of the natural history collections at the Tyrolean Federal States Museums, Innsbruck, PETER HUEMER is particularly interested in alpine Lepidoptera, with a special focus on the European Alps and Palearctic mountain systems. He is also an expert on the megadiverse family Gelechiidae and has worked on DNA barcoding initiatives on the Lepidoptera of Europe and Asia, including Iran. His body of work of ca. 500 papers and books covers a wide array of topics, from taxonomy and evolution to biogeography and conservation. He co-edited volumes 1–7 of the book series “Microlepidoptera of Europe” and co-authored the two volumes on Gelechiidae in that series. He travelled with the Austrian zoological team to Iran in 2001 as the team’s lepidopterist, and later published at least three papers resulting from this expedition (STANGELMAIER et al. 2003; WIESER et al. 2002; HUEMER 2009).

LAURI KAILA (Fig. 8n). A Finnish lepidopterist and curator of Lepidoptera at the Finnish Museum of Natural History, Helsinki, KAILA is a leading specialist on the phylogeny of the megadiverse superfamily Gelechioidea, as well as on Ustyurtiidae and the difficult Elachistidae. He is a co-author of the latter two taxa for Lepidoptera Iranica.

AXEL KALLIES (Fig. 9d) German-born biologist AXEL KALLIES is a professor of molecular immunology at the University of Melbourne, Australia. He is also a well-known lepidopterist interested in the taxonomy and systematics of Cossioidea, especially Sesiidae, Brachodidae and Castniidae, as well as of monotrystian moth families such as Helipalidae and Heliozelidae. KALLIES joined an expedition sponsored by A.L.I. in 2002, and together with KAREL ŠPATENKA published the first checklist of Iranian Sesiidae (KALLIES & ŠPATENKA 2003, 2004). Most of his collection of Palearctic and Asian Sesiidae and other Lepidoptera is deposited at the Natural History Museum of Berlin.

OLE KARSHOLT (Fig. 8p). Trained and employed as a schoolteacher in Denmark between 1966 and 1981, KARSHOLT is a self-educated entomologist who has been collecting Lepidoptera since 1961. He published the first “modern” checklist of Danish Lepidoptera in 1976 together with EBBE SCHMIDT NIELSEN (KARSHOLT & NIELSEN 1976). From 1981 to 2016 he was the collection manager for Lepidoptera and assistant to NIELS P. KRISTENSEN at the Zoological Museum of Copenhagen, Denmark. Due to his tireless efforts in the field and close cooperation with amateur lepidopterists and professional scientists around the world, KARSHOLT has greatly increased the scientific quality of the Lepidoptera collection in Copenhagen. OLE has published 240 scientific papers, including faunistic

works but also complex taxonomic revisions and phylogenetic studies using both morphology and molecules (NIEUKERKEN 2019). He is a co-editor of the “Microlepidoptera of Europe” and co-author of the two volumes on Gelechiidae in that series. KARSHOLT has also played a major role in several large catalogues, e.g., “The Lepidoptera of Europe” (edited by KARSHOLT & RAZOWSKI 1996), the “Nordic-Baltic checklist” (by AARVIK et al. 2017), “Fauna Europaea” (edited by KARSHOLT & NIEUKERKEN 2004–2022), and now “Lepidoptera Iranica”. KARSHOLT is an internationally recognized specialist of Palearctic Micropterigidae, Eriocraniidae, Ochsenheimeriinae and Gelechiidae. He has been an active member of SEL since 1984 and was recognized as an honorary member of the society in 2019.

THOMAS KEIL (Fig. 9g). A successful manager of a medical care company with over 150 employees in Dresden, KEIL is also a well-known self-educated specialist of the family Zygaenidae of Iran. Over the last 30 years, KEIL has travelled over 50 times to the country, extensively studying the taxonomy and biology of Iranian burnet and forester moths in nearly every habitat it has to offer. In 2014 he published a comprehensive contribution to the fauna of this family in Iran, titled “Die Widderchen des Iran” and published by Lausitzer (KEIL 2014), in which he summarized the knowledge of this moth family in Iran and depicted and mapped all known species in exceptional detail. This book was translated into Farsi by H. RAJAEI, with the title “Dokhtaran-e Shah-e Irani”. In 2015, KEIL was awarded the Fabricius Medal by the German Society for General and Applied Entomology for this book (SCHMITT 2015).

IAN J. KITCHING is a British lepidopterist and principal researcher on Lepidoptera at the Natural History Museum, London since 1982. His research program now centres on the systematics, evolution and biogeography of world Bombycoidea, with a particular focus on Sphingidae and Saturniidae. KITCHING’s research has extended beyond Lepidoptera to the phylogenetics of Culicidae (mosquitoes) and to methods by which taxonomy can be brought into the digital age. He has over 200 publications and maintains the Sphingidae Taxonomic Inventory scratchpad (<https://sphingidae.myspecies.info/>).

ALEXEI YURIEVICH MATOV (Fig. 11o). A Russian lepidopterist and curator of Lepidoptera (Noctuoidea and Bombycoidea) at the Zoological Institute of the Russian Academy of Sciences, Saint Petersburg, MATOV has an interest in the taxonomy, zoogeography and ecology of Noctuidae and Erebidae of the Palearctic Region as well as of the tropics. He has several major publications on the fauna of Iran (e.g., MATOV et al. 2008, 2016; ESFANDIARI et al. 2015).

JÖRG-UWE MEINEKE (Fig. 10d). A German lepidopterist, conservation biologist and former head of Administration of Conservation and Environment in two districts

of Baden-Württemberg (Germany), JÖRG-UWE MEINEKE earned his Ph.D. in 1982 at the University of Tübingen on the ecology and faunistics of Macro-Heterocera communities in the bogs and fens of southern Germany. MEINEKE joined many lepidopterological expeditions to European and Middle Eastern countries, especially Turkey and Iran. His highly valuable private collection, which he plans to deposit at SMNK, is used by many lepidopterists working on the fauna of Iran.

WOLFRAM MEY (Fig. 8c). A German lepidopterist and trichopterist and former curator of Lepidoptera and Trichoptera at the Natural History Museum of Berlin, MEY, who retired in 2018, has a strong interest in aquatic insects (mainly Trichoptera) but is also an authority on several Asian and African microlepidopteran groups (e.g., Micropterigidae, Tischeridae, Incurvarioidea, Lyonetiidae, Bucculatricidae, Bedelliidae, Galacticidae, Cossidae).

VLADIMIR MIRONOV (Fig. 10f) is a Russian lepidopterist and curator of Lepidoptera at Saint Petersburg’s Zoological Institute of the Russian Academy of Science. After studying zoology at Leningrad University he worked as an assistant and later for several years as a scientist in the Plant Protection Institute in Pushkin. He received his Ph.D. from the Zoological Institute of the Russian Academy of Science in Saint Petersburg, beginning his career as a professional scientist. MIRONOV has published multiple scientific papers and books on geometrid moths, including the fourth volume of the book series “The Geometrid Moths of Europe”, published by Apollo Books (MIRONOV 2003), and “The *Eupithecia* of China”, published by Brill (MIRONOV & GALSWORTHY 2014). MIRONOV is a world expert on *Eupithecia*, the largest genus of Geometridae.

BERNARD MOLLET (Fig. 9i) is a French engineer whose contribution to the exploration of the Zygaenidae fauna (particularly the subfamily Procrinae) and that of other groups in Iran has been essential. During fifteen expeditions to Iran since 1994 he explored many new localities in remote regions and was the first to rediscover *Zygaena cacuminum* Christoph, 1877, 120 years after HUGO CHRISTOPH, in Shakuh (Semnan prov.).

BERND MÜLLER (Fig. 10g). Although MÜLLER earned his Ph.D. in electrical engineering at the Technical University of Ilmenau, Germany in 1979, today he is recognized in entomological circles as one of the top specialists on the family Geometridae. MÜLLER is lead or co-author of several lepidopterological papers and books, including the sixth volume of “The Geometrid Moths of Europe”, published by Brill (MÜLLER et al. 2019a, 2019b). He has made several expeditions to Iran and his high-quality collection is available to taxonomists worldwide.

ALIREZA NADERI (Fig. 9p). Curator of Lepidoptera at the National Museum of Natural History of the Iranian Department of Environment in Tehran, NADERI has

been interested in insects, especially butterflies, since his childhood. After finishing his studies in agricultural engineering he received his current curatorial position in 2002. NADERI'S butterfly collection is unparalleled in terms of Iranian species. He is the author of the "Field Guide to the Butterflies of Iran", first published by Iranshenasi in 2012 and updated in 2019. Additionally, NADERI is one of three authors of the book "Butterflies of Iran and Iraq" (TSHIKOLOVETS et al. 2014).

VAZRICK NAZARI (Fig. 9n), an Iranian-Canadian lepidopterist, became fascinated with butterflies at the age of 10. He eventually met HAYK MIRZAYANS, who hired him as a technician in the insect collection of the Plant Pests and Diseases Research Institute (PPDRI), now known as the Hayk Mirzayans Insect Museum (HMIM). VAZRICK later travelled Iran extensively, collecting butterflies. He finished his bachelor studies in linguistics in Tehran and soon thereafter moved to Canada to pursue his passions: evolutionary biology and entomology. After graduating from the University of Alberta (2006) under the supervision of FELIX SPERLING, NAZARI received his Ph.D. from the University of Guelph (2011) under PAUL HEBERT on lepidopteran taxonomy, biogeography, molecular systematics and phylogenetics. From 2011 to 2019 he was assistant curator of entomology at the Canadian National Collection of Insects, Arachnids and Nematodes (CNC) in Ottawa. His interest in cultural entomology, i.e., the presence and role of butterflies and moths in the arts and cultures of peoples around the world, eventually took him to the University of Padua in Italy, where he has been a postdoctoral fellow since 2022. NAZARI is the author or co-author of over 50 scientific papers and several books in the field of insect taxonomy, including the first large monograph on the superfamily Papilionoidea, "Butterflies of Iran" (NAZARI 2003), published by the Iranian Department of Environment.

ERIK JOHANNES VAN NIEUKERKEN (Fig. 8b). A retired Dutch curator of Lepidoptera at the Naturalis Biodiversity Center in Leiden (The Netherlands) and president of Societas Europaea Lepidopterologica (SEL), NIEUKERKEN was perhaps destined to be an entomologist from birth, when his parents named him after the main character of the book "Erik in the Land of the Insects" (BOMANS 1941). As a child, he joined the Dutch Youth Association for Nature and later studied biology at the University of Leiden. He finished his Ph.D. at the University of Amsterdam on the taxonomy of the family Nepticulidae (pygmy leaf miners) in 1986 and obtained a position at the Naturalis Biodiversity Center the same year, as coordinator of the European Invertebrate Survey Foundation. Later, in 1999, he became curator of the Lepidoptera collection at the same institution. NIEUKERKEN is the world's foremost specialist on Nepticulidae and related families. He has authority on the Palearctic fauna, including that of Iran, and has published multiple papers on these groups.

MOHAMMAD MEHDI RABIE (Fig. 11p) is an associate professor at Birjand University (Iran) and a specialist of noctuid moths. RABIE finished his bachelor studies in plant protection at Ferdowsi University, Mashhad, and his master's in agricultural entomology at Shahid Chamran University, Ahvaz. He went on to defend his Ph.D., titled "Fauna of three subfamilies of Noctuidae (Lepidoptera) in Khorasan-e-Razavi province and an allometric study on *Helicoverpa armigera*", at Shahid Chamran University, Ahvaz in 2013.

HOSSEIN RAJAEI (Fig. 10h). Curator of Lepidoptera and head of the entomology department at SMNS, RAJAEI is a council member of Societas Europaea Lepidopterologica and president of the Entomological Society of Stuttgart, the oldest entomological society in Germany. He finished his bachelor's and master's degrees in Iran before moving to Bonn (Germany) on a scholarship from the German Academic Exchange Service (DAAD), where he earned his Ph.D. on the systematics, biogeography and phylogeography of the geometrid moths of Iran at Bonn University and ZFMK (RAJAEI 2012). He worked for one year as curator of the insect collection at the Zoological Museum of Hamburg before moving to his current position at the State Museum of Natural History of Stuttgart in 2014. He is one of the authors and editors of the sixth volume of "The Geometrid Moths of Europe", published by Brill (MÜLLER et al. 2019a, 2019b), and regularly publishes on the taxonomy and systematics of the superfamily Geometroidea. He is the main author of over 50 scientific papers on the Palearctic geometrid fauna, including Iran, and the initiator and first editor of the project "Lepidoptera Iranica".

JÓZEF RAZOWSKI. A Polish specialist on the family Tortricidae and scientific member of Jagiellonian University in Kraków since 1954, RAZOWSKI became professor of entomology in 1973. He was the director of the Institute of Systematics and Evolution of Animals in Kraków from 1988 to 1997. His long list of scientific publications includes at least seven papers related to the Iranian Tortricidae fauna (RAZOWSKI 1957, 1963, 1965, 1970, 1981, 1984a, 1984b). Additionally, he is an author of two volumes of the milestone book series "Microlepidoptera Palaearctica" (RAZOWSKI 1970, 1984b).

GÁBOR RONKAY. A Hungarian lepidopterist, founder and director of the "Heterocera" publisher, G. RONKAY is interested in the taxonomy and biogeography of most groups of Noctuoidea and Thyatiridae, having a rich private collection of Noctuidae, Erebidae and Euteliidae now in the Natural History Museum of Vienna. He established and edits the "Witt Catalogue" and "Fibigeriana" series.

LÁSZLÓ RONKAY (Fig. 11c). A Hungarian lepidopterist and former curator of Lepidoptera at the Hungarian Natural History Museum Budapest, LÁSZLÓ RONKAY retired in 2018. His major interests are in the taxonomy, biogeogra-

phy and phylogenetics of Noctuoidea and Thyatiridae. He is an expert on world Plusiinae and Cuculliinae as well as on Old World winter noctuids.

JADRANKA ROTA (Fig. 8k). Croatian lepidopterist and curator of entomology at the Biological Museum, University of Lund, Sweden. ROTA has focused her research on the phylogeny of several lepidopteran clades, using both morphology and DNA. She is a world specialist of the family Choreutidae and a co-author of this family for “Lepidoptera Iranica”.

AIDAS SALDAITIS. A Lithuanian lepidopterist in the Entomological Laboratory of the State Lithuanian Nature Research Centrum, SALDAITIS has a strong interest in Palearctic Heterocera moths (Noctuidae, Arctiidae and Cossidae) and has authored several publications on Iranian Cossidae and Noctuidae (e.g., MÜLLER et al. 2008; ALIPANAH et al. 2021).

ALEXANDER SCHINTLMEISTER (Fig. 11f). An Austrian lepidopterist, SCHINTLMEISTER earned his Ph.D. in 1987 at Humboldt University, Berlin on the biogeography and evolution of Palearctic Notodontidae. He is a known specialist on the family Notodontidae and author of “Palearctic Notodontidae”, published by Apollo Books (SCHINTLMEISTER 2008). His private collection comprises over 300,000 specimens.

KLAUS SCHURIAN (Fig. 10c). A German specialist on Lycaenidae, SCHURIAN developed an interest in butterflies from his early childhood. After teaching at a high school for years, he completed his university education in biology and geography in Frankfurt and wrote his Ph.D. dissertation on Lycaenidae. In addition to his teaching activities, throughout his career he has published over 170 scientific papers on butterflies and their early life stages. For decades he has made research trips to Turkey and Iran and studied the largely unknown biology of their butterflies and host plants. He led the “Entomologischer Verein Apollo” in Frankfurt for 36 years and described (or co-described) 21 new butterfly taxa from Iran.

ASGHAR SHIRVANI (Fig. 11k). A Noctuidae specialist and professor at Shahid Bahonar University, Kerman, SHIRVANI earned his Ph.D. with a thesis on the “Identification and geographical distribution of the subfamilies Noctuinae, Heliothinae and Hadeninae (Lep., Noctuidae) in some regions of south and southeastern of Iran” at Tarbiat Modares University in 2008, after a sabbatical in L. RONKAY’S lab at the Hungarian Natural History Museum. His private Noctuidae collection, consisting of roughly 750 species, is the largest in Iran.

SERGEY YU. SINEV (Fig. 8h). A well-known Russian microlepidopterist, SINEV is currently deputy director of the Zoological Institute of the Russian Academy of Sciences in Saint Petersburg, Russia. He is a specialist of many difficult groups of micromoths globally (e.g., Stathmopodidae, Momphidae, Blastobasidae, Cosmopter-

igidae, Scythrididae), with a special focus on the Palearctic fauna. SINEV is the senior editor of the series “Fauna of Russia and adjacent territories” and “Keys to the fauna of Russia”, published by the Zoological Institute RAS.

WOLFGANG SPEIDEL (Fig. 9m). A German Lepidopterist and former curator of the Museum Witt, now part of the Zoological State Collection in Munich, Germany, SPEIDEL retired in 2018. His research was strongly focused on aquatic Lepidoptera (Pyraloidea, Crambidae, Acenotropinae and Schoenobiinae), but he maintains a hobbyist’s zeal for Lepidoptera in general, especially Pyraloidea, Noctuoidea and Cossidae. During his scientific career he worked at the Landessammlungen für Naturkunde in Karlsruhe, at ZFMK in Bonn, and at the Natural History Museum of Berlin, contributing to various research projects on the phylogenetics and faunistics of Lepidoptera. SPEIDEL has two publications on the fauna of Iran (MÜLLER et al. 2008; MEHRNEJAD & SPEIDEL 2011).

DIRK STADIE (Fig. 10i). A German dentist from Lutherstadt Eisleben and prolific Macrolepidoptera collector, STADIE has travelled to many countries in the Middle East (including Iran) and Africa to collect and study Lepidoptera. He has published several papers on the results of his studies, maintaining a large private collection that he plans to deposit at ZSM.

GERHARD MICHAEL TARMANN (Fig. 9h) was head of the natural science department at the Tyrolean Federal State Museum in Innsbruck, where he is an honorary professor, from 1974 until his retirement in 2015 (HUEMER 2014). His interest in nature from an early age led him to study biology and geology at Innsbruck University. Under the mentorship of KARL BURMANN, he found his passion for insects and, most of all, Lepidoptera. TARMANN was president of Societas Europaea Lepidopterologica (SEL) from 2007 to 2015. As one of the founders of A.L.I., TARMANN travelled several times to Iran to collect and collaborate with local colleagues. With over 300 scientific papers on Lepidoptera with a focus on species of Procridinae (Zygaenidae), he has established himself as a renowned, world-class taxonomist.

ZDENKO (‘ZDENO’) TOKÁR (Fig. 8e). A Slovak engineer and lepidopterist who has co-authored very useful field guides on Central European Microlepidoptera, TOKÁR is a specialist on the family Buculatricidae and a co-author of this family for “Lepidoptera Iranica”.

WOLFGANG TEN HAGEN (Fig. 10b). A German dentist based in Mömlingen, TEN HAGEN enjoys studying Lepidoptera as one of his many hobbies. Active on the Iranian butterfly scene since the late 1990s, TEN HAGEN has travelled extensively in Iran, describing many new taxa and greatly contributing to our understanding of the Iranian butterfly fauna through his numerous publications. TEN HAGEN is also a globe-trotter and renowned musician in his spare time.

ROBERT TRUSCH (Fig. 10k). A Lepidoptera curator and specialist on geometrid moths, TRUSCH trained as a landscape gardener in his youth while simultaneously attending high school classes in the evenings. After completing his compulsory military service, he studied biosciences at the University of Leipzig from 1989 to 1994. In 1999, he received his Ph.D. from the University of Potsdam for his research on geometrid moths. He went on to train as a volunteer at SMNS in Stuttgart and later at ZSM in Munich. In 2002, he was permanently hired as curator of Lepidoptera at SMNK in Karlsruhe. Beyond his scientific contributions to Geometridae, TRUSCH has worked on implementing practical protection methods for biodiversity in Baden-Württemberg, Germany. Additionally, he has been a member of various professional associations (e.g., council member of SEL for several years, president of “Naturwissenschaftlicher Verein Karlsruhe” and co-founder of A.L.I. in 2004, see above). In 2019, TRUSCH was awarded the Meigen Medal by the German Society for General and Applied Entomology (DGaE) for his significant contributions to the “Database of Lepidoptera of Germany”, which has had extremely positive effects on citizen science.

VADIM TSHIKOLOVETS. Ukrainian butterfly collector and well-known publisher of numerous books and monographs on the butterflies of Asia through his publishing company “Tshikolovets Publications”, based in Pardubice, Czechia. Alongside descriptions of a few new subspecies, TSHIKOLOVETS’s main contribution to Iranian lepidopterology was his 2014 book “The Butterflies of Iran and Iraq” (TSHIKOLOVETS et al. 2014), co-authored by A. NADERI and W. ECKWEILER.

PETR Y. USTJUZHANIN. A known scientist and lepidopterist at Altai State University in Russia, USTJUZHANIN is a specialist on the family Pterophoridae and has published several papers on the Iranian pterophorid fauna in co-authorship with H. ALIPANAH (ALIPANAH & USTJUZHANIN 2005, 2007, 2013, 2014).

ZOLTÁN VARGA (Fig. 11h). A Hungarian emeritus professor in zoology at the University of Debrecen, VARGA is a well-known researcher on the taxonomy, biogeography and evolutionary biology of Lepidoptera. Retired since 2009, VARGA is an author and editor of the book series “The Witt Catalogue. A Taxonomic Atlas of the Eurasian and North African Noctuoidea”. He is also author or co-author of 239 scientific publications, an authority on Palearctic Noctuidae (mostly Noctuinae) and the biogeography of Lepidoptera (with a focus on high mountains), and an accomplished scientific illustrator. VARGA is among those who have intensively studied the materials of the VARTIAN collection at the Natural History Museum of Vienna.

DOMINIC WANKE (Fig. 10j). As an M.Sc. student at the University of Hohenheim, Germany, WANKE started his research on geometrid moths in 2018, revising the Middle

Eastern and Central Asian faunas of the genus *Triphosa* Stephens, 1829 in RAJAEI’s lab at the State Natural History Museum of Stuttgart. After receiving his master’s degree in 2019, he undertook a Ph.D. in the same lab on the taxonomy and phylogeny of Geometridae of the Middle East and Central Asia, with a special focus on Iran. Since his master’s thesis he has published a series of important scientific papers on the geometrid fauna of Iran (e.g., WANKE et al. 2019, 2020, 2021, 2022; WANKE & RAJAEI 2022).

ROMAN V. YAKOVLEV (Fig. 8l). A professor of entomology at Altai State University in Russia, YAKOVLEV is a global specialist on the family Cossidae. YAKOVLEV has discovered and described multiple Cossidae species from Iran. He is the main author of a recent monograph on the Cossidae of Iran (ALIPANAH et al. 2021).

REZA ZAHIRI (Fig. 11m). An Iranian-Canadian lepidopterist, REZA ZAHIRI is a specialist on Noctuoidea. After finishing his bachelor’s and M.Sc. studies in Iran, he was the curator of the Lepidoptera collection at HMIM from 2004 to 2008. In 2008, he moved to Turku (Finland) to pursue his Ph.D. studies under the supervision of NIKLAS WAHLBERG, successfully defending his Ph.D. thesis in June 2012. Focusing on multigene higher-level phylogenetics, he fundamentally changed the general understanding of relationships within Noctuoidea (ZAHIRI et al. 2011, 2013a, 2013b). After his Ph.D., ZAHIRI moved to Canada on a 3-year postdoctoral fellowship at the University of Guelph (Biodiversity Institute of Ontario) in PAUL HEBERT’s lab, where he assembled a DNA barcode library for 3,700 North American noctuid species. Soon after, in 2015, he began a fellowship with the Canadian Government in Ottawa for the development of molecular keys to detect invasive species entering the country. In 2016, ZAHIRI was offered a job as lepidopterist at the Entomology Diagnostic Laboratory of the Canadian Food Inspection Agency (CFIA) in Ottawa. Recently, in 2020, he spent a sabbatical as Lepidoptera curator at the Zoological Museum of Hamburg University. ZAHIRI is the author of over 50 peer-reviewed papers on Lepidoptera, mainly on the high-level phylogeny of global noctuid moths.

PAYAM ZEHZAD. Iranian Lepidopterist working on the taxonomy and biogeography of butterflies (Papilionoidea) of the Near and Middle East since 1996, especially on the genera *Colias*, *Argynnis*, *Melanargia*, *Archon*, *Allancastria*, *Hypermnestria*, as well as on the subgenus *Achillides*, of the Palearctic Realm. PAYAM ZEHZAD was a contributor to the book “Butterflies of Iran and Iraq” (TSHIKOLOVETS et al. 2014) and provided distributional data for some volumes of the “Guide to the Butterflies of the Palearctic Region”, edited by GIAN CRISTOFORO BOZANO.

HANS CHRISTOF ZELLER (Fig. 8a). Austrian microlepidopterist specializing in basal Lepidoptera families, especially Micropterigidae. ZELLER joined the second Austrian Zoological Expedition to the Alborz Mts. in 2003 and



Fig. 8. Portraits of lepidopterists having worked on the fauna of Iran. **a.** HANS CHRISTOF ZELLER. **b.** ERIK JOHANNES VAN NIEUKERKEN. **c.** WOLFRAM MEY. **d.** JAROSŁAW BUSZKO. **e.** ZDENKO TOKÁR. **f.** REINHARD GAEDIKE. **g.** GÜNTHER PETERSEN. **h.** SERGEY YU. SINEV. **i.** LEIF AARVIK. **j.** JOAQUÍN BAIXERAS. **k.** JADRANKA ROTA. **l.** ROMAN V. YAKOVLEV. **m.** GIORGIO BALDIZZONE. **n.** LAURI KAILA. **o.** ANDRAS KUN. **p.** OLE KARSHOLT.



Fig. 9. Portraits of lepidopterists who worked on the fauna of Iran. **a.** BENGT Å. BENGTSSON. **b.** OLEKSIY BIDZILYA. **c.** DANIEL BARTSCH. **d.** AXEL KALLIES. **e.** AXEL HOFMANN. **f.** WALTER GERALD TREMEWAN. **g.** THOMAS KEIL. **h.** GERHARD MICHAEL TARMANN. **i.** BERNARD MOLLET. **j.** JUKKA TABELL. **k.** DONALD HOBERN. **l.** ANTON VOLYNKIN. **m.** WOLFGANG SPEIDEL. **n.** VAZRICK NAZARI. **o.** WOLFGANG ECKWEILER. **p.** ALIREZA NADERI.



Fig. 10. Portraits of lepidopterists having worked on the fauna of Iran. **a.** FRÉDÉRIC CARBONELL. **b.** WOLFGANG TEN HAGEN. **c.** KLAUS SCHURIAN. **d.** JÖRG-UWE MEINEKE. **e.** AXEL HAUSMANN. **f.** VLADIMIR MIRONOV. **g.** BERND MÜLLER. **h.** HOSSEIN RAJAEI. **i.** DIRK STADIE. **j.** DOMINIC WANKE. **k.** ROBERT TRUSCH. **l.** PASI SIHVONEN. **m.** LUTZ LEHMANN. **n.** WOLFGANG A. NÄSSIG. **o.** RODOLPHE ROUGERIE. **p.** VADIM ZOLOTUHIN.



Fig. 11. Portraits of lepidopterists having worked on the fauna of Iran. **a.** MICHEL FIBIGER. **b.** THOMAS WITT. **c.** LÁSZLÓ RONKAY. **d.** GÜNTER EBERT. **e.** JOSEF J. DE FREINA. **f.** ALEXANDER SCHINTLMISTER. **g.** HERMANN HACKER. **h.** ZOLTÁN VARGA. **i.** PÉTER GYULAI. **j.** MEHDI ESFANDIARI. **k.** ASGHAR SHIRVANI. **l.** ULF BUCHSBAUM. **m.** REZA ZAHIRI. **n.** LÁSZLÓ RÁKOSY. **o.** ALEXEJ YURIEVICH MATOV. **p.** MOHAMMAD MEHDI RABIE.

collected the first two (and still only known) species of Micropterigidae in Iran (ZELLER & RAJAEI, unpublished).

In addition to the above-listed taxonomists, several other specialists working on the West Palearctic Lepidoptera fauna are also authoritative on the fauna of Iran. These are: LEIF AARVIK (Fig. 8i); A. KUN (Fig. 8o), B. Å. BENGTSSON (Fig. 9a); O. BIDZILYA (Fig. 9b); J. TABELL (Fig. 9j); D. HOBERN (Fig. 9k); A. VOLYNKIN (Fig. 9l); P. SIHVONEN (Fig. 10l); W. NÄSSIG (Fig. 10n); R. ROUGERIE (Fig. 10o); H. HACKER (Fig. 11g); U. BUCHSBAUM (Fig. 11l); and L. RÁKOSY (Fig. 11n).

Iranian amateur butterfly collectors

Several private (and often highly valuable) collections of Iranian butterflies are maintained by amateur collectors in different cities across Iran. Among the most important are the private collections of JALALEDDIN BAHRAMI (Qazvin), HAMID BOSTANCHI (Karaj), MORTEZA DELSHAD TEHRANI (Tehran), ABBAS GHAFFARI (Tabriz), AMIR-HOSSEIN HARANDI (Esfahan), AHMAD KARBALAYE (Tehran), ALIREZA NADERI (Tehran) and PAYAM ZEHZAD (Tehran). The private collection of MOHAMMAD ALI MOAYERI, which includes an extensive representation of exotic butterflies, was donated to the National Museum of Natural History of Tehran in the 1990s and forms a significant part of the museum's entomological collection at the Iranian Department of Environment in Tehran.

Recently deceased specialists

Several famous lepidopterists with a special focus on the fauna of Iran passed away in recent years, some since the launch of the present project, and are listed hereafter.

MICHAEL FIBIGER (*29.vi.1945 – †16.ii.2011) (Fig. 11a). A professional Danish psychologist, FIBIGER dedicated his spare time to the taxonomy of Noctuidae. "Noctuidae Europaeae" is one of the few multi-volume series on Lepidoptera to have ever achieved completion. The friendly and cooperative spirit of MICHAEL is self-evident from the long list of works he co-authored with numerous colleagues from around the world. His life's work includes many new noctuid species described from Iran in collaboration with REZA ZAHIRI. MICHAEL visited Iran in 2005 for the first time, to attend the 2nd A.L.I. symposium, and visited the Alborz and Zagros Mts. with REZA before and after the meeting. REZA ZAHIRI remembers the moment when MICHAEL was overcome with emotion by the majesty of the southern slopes of the Alborz Mts. after he was picked up from the airport; his comment was "Wow! Alborz, finally I saw you!".

LUTZ LEHMANN (*14.i.1963, Eisenhüttenstadt – †14.x.2011, Qarn al-Alam, Oman) (Fig. 10m). Called 'LUTZE' or 'LUTZEL' by his friends, LEHMANN moved to Jena after his school years to study pedagogy in both German and English, later working as a teacher and well-known for his friendly demeanour. He was fascinated by nature from his childhood, with an early interest in insects and Lepidoptera. He started his first Lepidoptera collection while still a student, as an outlet for his growing passion. The scope of his interest gradually expanded from the local fauna to the whole of Europe and, finally, to the West Palearctic, including Iran and the Arabic countries (BITTNER et al. 2011). This forced LEHMANN to focus his interest on a few families, and he chose Geometridae and Noctuidae. He travelled to many European countries but also to North America, North Africa, Central Asia and the Middle East. He visited Iran at least twice, accompanied by DIRK STADIE and REZA ZAHIRI. LEHMANN was an active member of various lepidopterological societies (e.g., SEL) and a co-founder of the association "Ostdeutscher Verein zur Erforschung der Biodiversität der Lepidopteren e.V.". In 2010, while visiting the Lepidoptera collection at ZFMK, he was informed by H. RAJAEI about the project "Lepidoptera Iranica" and was invited to join. He maintained a great interest in Iran, its people and its culture, and wished to return there to continue studying its Macrolepidoptera fauna. That wish was unfortunately never realized, as the life of this beloved and enthusiastic lepidopterist was cut short by tragedy. On the last day of an excursion in Oman, LEHMANN and another well-known Noctuidae specialist, **HENRI HOPPE** (*02.vi.1964 – †14.x.2011), died in a car accident near Qarn al-Alam, about 200 km south of Nizwa. RAJAEI and STÜNING named an Iranian genus, *Lehmannodes* Rajaei & Stüning, 2013, in his honour. His invaluable scientific collection of over 60,000 specimens is deposited at the Natural History Museum of Potsdam, Germany.

GÜNTHER PETERSEN (*25.viii.1924, Marienberg/Erzgebirge – †24.iii.2012, Görsdorf, near Berlin) (Fig. 8g) was one of the most prominent specialists on the family Tineidae (clothes moths) (GAEDIKE 1989). PETERSEN finished elementary school in his hometown of Marienberg and attended secondary schools in Marienberg, Rochlitz and Meissen. However, his education was interrupted until 1948 by World War II. In 1949 he began studying biology and chemistry at Humboldt University, Berlin, to become a teacher. In 1951, he continued his studies in biology. He wrote his diploma thesis under W. TOMASZEWSKI about the taxonomy and distribution of clothes moths. Soon after, he joined Senckenberg's "Deutsches Entomologisches Institut", first in the department of ecology and then in the department of systematics. PETERSEN defended his Ph.D. in 1957, titled "Die Genitalien der paläarktischen Tineiden", under E. M. HERING. This work, which was then published

(PETERSEN 1957, 1958), became a standard reference for the study of Palearctic tineid moths, and increased PETERSEN's reputation as an expert. His important publications on Palearctic Tineidae include over ten papers on the tineid moths of Iran and neighbouring countries (e.g., PETERSEN 1960, 1961, 1964, 1965, 1966, 1971).

THOMAS WITT (*2.iv.1947, Bad Reichenhall – †28.i.2019, Munich) (Fig. 11b). A German entrepreneur and founder of the Museum Witt in Munich, Germany, WITT attended the Oskar von Miller Gymnasium (Munich) and later studied economics at Ludwig Maximilian University (LMU) in the same city. In 2013 he was granted an honorary doctorate title by the dean of LMU. WITT collected moths (mainly “Bombyces” and “Sphinges” sensu SEITZ) all over the world and was broadly interested in taxonomic and systematic research as well as in their distribution. He was co-editor of the journal “Entomofauna” and editor of “Proceedings of The Museum Witt”.

VADIM V. ZOLOTUHN (*15.vi.1967, Ulyanovsk – †3.vi.2021, Ulyanovsk) (Fig. 10p). ZOLOTUHN was a well-known lepidopterist and renowned specialist on several Macrolepidoptera families, with a focus on Lasiocampidae, Erebididae and Lemoniidae. As a scientist at the State Pedagogical University of Ulyanovsk, Russia, ZOLOTUHN published a long list of papers on the Iranian Lepidoptera fauna (ZOLOTUHN 1999, 2007, 2010, 2015), the most important of which is perhaps ZOLOTUHN & ZAHIRI (2008), in which the Lasiocampidae fauna of the country was reviewed. ZOLOTUHN was involved in the present catalogue as a co-author, but unfortunately passed away too soon, from a heart attack, at only 54.

Historical review of previous checklists of the Lepidoptera of Iran

Every taxonomist knows that a checklist is out of date the day of its publication, and that is why checklists and catalogues need to be constantly corrected, edited and updated.

Several remarkable lists of Iranian Lepidoptera were published in the past, but very few of them were later updated and corrected, one exception being the Papilionoidea list by NADERI (2012, 2019). However, most of these lists have limited geographic coverage (e.g., ROTH-SCHILD 1921; KALALI 1976), taxonomic coverage (ECKWEILER & HOFMANN 1980; NAZARI 2003), or involved limited examination of material from collections (BAROU 1967; MIRZAYANS & KALALI 1970). The only list with broad taxonomic coverage at the order level was published by KOÇAK & KEMAL (2014), an otherwise problematic work full of misleading data and other issues (see below).

Below is a chronological overview of the major published lists of Iranian Lepidoptera covering at least one superfamily:

1. An old list titled “Moths of Mesopotamia and N. W. Persia, Part I. Noctuidae, Lemoniidae and Pyralidae”, published by ROTH-SCHILD (1921), covering only the fauna of the Urmia basin;
2. Another old list with narrow geographic coverage, by SUTTON (1963), titled “South Caspian Insect Fauna”, on the fauna of the northern Alborz Mts. and the Caspian Sea basin;
3. The first attempt at a comprehensive list of Iranian Lepidoptera, titled “Contribution à la connaissance de la Faune des lépidoptères de l’Iran”, by BAROU (1967), listed the identified Lepidoptera species deposited in the Iranian Research Institute of Plant Protection. BAROU's list included around 350 species in 255 genera and 32 families;
4. A list of butterflies of Tabriz (Azerbaijan-e Sharghi), published in a book titled “Butterflies of Iran”, in Farsi, by HASHEMI-TAFRESHI (1970);
5. A complement to the list of BAROU (1967), published with the same title by MIRZAYANS & KALALI (1970), including 165 species in 139 genera and 27 families. Both this and BAROU's list contain a large number of misspellings and gender agreement issues. The locality data of the species were given only to the level of province and many species were listed without any geographic information;
6. The first list of butterflies of Iran, titled “Verzeichnis iranischer Tagfalter”, by ECKWEILER & HOFMANN (1980). The authors reviewed all previously published data on the butterflies of Iran and added new records, altogether including 240 species;
7. A list of the Lepidoptera of Khorasan province by KALALI (1976), including 140 species in 110 genera and 15 families. This list should be regarded as a regional list based only on one examined collection, that of the Research Institute of Plant Protection, Mashhad;
8. A book in Farsi titled “List of pests and their natural enemies”, published and updated by MODARRES AWAL (1994, 1997, 2012), which listed only the lepidopteran pest species occurring in Iran;
9. The most comprehensive list of the Papilionoidea of Iran, published in the book “Butterflies of Iran” by NAZARI (2003), which listed 379 species of this superfamily for the country;
10. An updated list of the Papilionoidea of Iran, published as part of the “Field Guide of Butterflies of Iran” by NADERI (2012), listed 406 species. A further update, with 442 species, was published in a more recent edition of the field guide (NADERI 2019);
11. Another list of the Papilionoidea of Iran, published by TSHIKOLOVETS et al. (2014) in a book titled “The Butterflies of Iran and Iraq”, in which the authors added multiple corrections to previous lists (e.g., NADERI 2012);

12. The only list of Iranian Lepidoptera with broad taxonomic coverage, by Turkish lepidopterists KOÇAK & KEMAL (2014) and including 3,925 species in 1,449 genera and 57 families, was the most complete list to date. However, this work suffers from a large number of nomenclatural errors, the use of out-of-date classifications, misspellings and an incomplete review of the literature. Despite its breadth, a large number (roughly 1,000) of names are missing from this list, which was not peer-reviewed. It is also problematic that the taxa are sorted alphabetically, and it is confusing that the authors and years, and not the scientific names, are written in italics.

Besides these lists, other works have reviewed one or a few families of Lepidoptera, e.g., Sesiidae (KALLIES & ŠPATENKA 2003), Zygaenidae (KEIL 2014), Lasiocampidae (ZOLOTUHIN & ZAHIRI 2008) and Cossidae (ALIPANAH et al. 2021). Other lists at the subfamily, tribe or generic levels can be found in the literature (see references in RAJAEI et al. 2023).

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