

A Historical Review and Recent Advances in Moth-studies in Japan : Mature Stage*

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The first species of moth described from Japan was *Noctua serici* THUNBERG, 1781. But unfortunately it was a South African Arctiid now considered to be a junior synonym of *Rhodogastris amesis* (CRAMER) (HAMPSON, 1901 ; KARSHOLT & NIELSEN, 1985, Ent. Scand. 16 : 455). The next ones were *Bombyx albina* and *Phalaena stratonice* by STOLL, 1782. The former was cited by KIRBY, 1892, as a member of *Euproctis* (Lymantriidae), but its status is still unknown to us. The latter is a Geometrid, *Cystidia stratonice*, a very common insect throughout Japan. THUNBERG, 1788, described *Tinea niponella* and *T. plumella* from Japan (cf. KARSHOLT & NIELSEN, 1985, op. cit. : 451 and 453). After a long interval a few species were described from Japan by GUENÉE, 1857, MOTSCHULSKY, [1861] , 1866, ORZA, 1869, FELDER & (ROGENHOFER) , 1874-1875, etc. BUTLER, 1877-81, described more than 400 species of moths, mainly macros, from Japan founded on collections of CHRISTY, FENTON, JONAS, MANLEY, WHITELEY and PRYER. LEECH, 1887-1901, compiled a list of Lepidoptera from China, Japan and Korea mainly based on his own and his collectors' catches with additional material received from PRYER in Yokohama. LEECH described more than 150 species of macro-moths from Japan. WARREN, 1892-1914, described new Pyralidae and macros, MEYRICK, 1912-1937, new micros and WALSINGHAM, 1900, new Tortricid moths.

When MATSUMURA, 1905, compiled a catalogue of Lepidoptera from Japan, including some from Taiwan and Korea, he enumerated about 1800 species of moths. MATSUMURA was one of the pioneers of entomology in Japan and he, 1900-1933, described many new species and subspecies of moths from Japan, Korea, Taiwan and Sakhalin. Unfortunately, however, many of his taxa became junior synonyms, because he named so many individual and seasonal forms as species.

WILEMAN, 1911, NAGANO, 1916-1917, MARUMO, 1920-1942, SHIBUYA, 1927-1932 (Pralidae), ISSIKI, 1922-1957 (micros), INABA, 1927-1933 (Noctuidae) and KAWADA, 1930 (Limacodidae) are main students of moths from Japan before the 2nd World War.

During recent 30 years studies of moths in Japan have extensively advanced and so many new and unrecorded species have been added (Table 2). When I compiled Check List, 1954-

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1961, I could cite a little more than 3000 species of moths from Japan, excepting the Ryukyu Islands, but as you see from Table 1, now we have nearly 5000 species.

In *Moths of Japan, 1982*, informations about taxonomy of Japanese moths accumulated for a century are included, and 4451 species, 8083 individuals are illustrated in colour. Seven years after that publication about 100 species were added and some important revisional works were published. However, systematic studies of micros of Japan are still incomplete and ultimately number of moths will become 7000 species.

Important articles published in Japan after 1982 :

- KUMATA, T., 1982. A taxonomic revision of the *Gracillaria* group occurring in Japan. Ins. Matsum., N, S. 26.
- SATO, R., 1984. Taxonomic study of the genus *Hypomecis* HÜBNER and its allied genera from Japan. Spec. Bull. Essa Entomol. Soc. I.
- UEDA, K., 1984, 1987. A revision of the genus *Deltote* R. L. and its allied genera from Japan and Taiwan. Bull. Kitakyushu Mus. Nat. Hist., 5, 6.
- KEMPERMAN, T. C. M. and C. WILKINSON., 1985. Japanese species of the genus *Stigmella*. Ins. Matsum. N. S. 32.
- YOSHIYASU, Y., 1985. A systematic study of the Nymphulinae and the Musotiminae of Japan. Scient. Rep. Kyoto Prefect. Univ. Agric., 37.
- ARITA, Y. 1987. Taxonomic study of the Glyphipterigidae and Choreutidae of Japan. Trans. Shikoku Entomol. Soc., 18 (1-2).
- OWADA, M., 1987. A taxonomic study on the subfamily Herminiinae of Japan. Nat. Sci. Mus. Tokyo, Pbl.
- KŌDA, N., 1987, 1988. A generic classification of the subfamily Arctiinae of the palaeartic and oriental regions based on the male and female genitalia. Tyō Ga, 38 (3), 39 (1).
- BALDIZZONE, G. and T. OKU., 1988. Descriptions of Japanese Coleophoridae. Tyō Ga, 39 (2-3).
- KOBAYASHI, Y. and H. ANDO., 1988. Phylogenetic relationships among the lepidopteran and trichopteran suborders from the embryological standpoint. Z. Zool. Syst. Evolut. -forsch., 26.

Table 1. Number of nominal species of moths known in Japan.

ZEUGLOPTERA			
MICROPTERIGOIDEA			
1. Micropterigidae	9	34. Xyroroyctidae	1
DACNONYPHA		35. Elachistidae	14
ERIOCRANIOIDEA		36. Coleophoridae	23
2. Eriocraniidae	4	37. Blastobasidae	6
EXOPORIA		38. Scythrididae	2
HEPIALOIDEA		39. Cosmopterigidae	23
3. Hepialidae	8	40. Lecithoceridae	13
MONOTRYSLA		41. Gelechiidae	113
NEPTICULOIDEA		42. Symmocidae	1
4. Nepticulidae	42	COPRORORPHOIDEA	
5. Opostegidae	1	43. Alucitidae	5
INCURVARIOIDEA		44. Carposinidae	10
6. Incurvariidae	36	ZYGAENOIDEA	
7. Heliozelidae	13	45. Zygaenidae	28
8. Tischeriidae	4	46. Epipyropidae	2
DITRYSLA		47. Limacodidae	26
COSSOIDEA		PYRALOIDEA	
9. Cossidae	7	48. Hyblaeidae	3
TORTRICOIDEA		49. Thyrididae	24
10. Tortricidae	568	50. Pyralidae	646
11. Cochylidae	40	PTEROPHOROIDEA	
TINEOIDEA		51. Pterophoridae	56
12. Psychidae	20	GEOMETROIDEA	
13. Tineidae	33	52. Drepanidae	30
14. Bucculatricidae	2	53. Cyclidiidae	2
15. Lyonetiidae	19	54. Thyatiridae	38
16. Gracillariidae	185	55. Geometridae	806
17. Phyllocnistidae	5	56. Uraniidae	4
YPONOMEUTOIDEA		57. Epicopeiidae	1
18. Acrolepiidae	12	58. Epiplemidae	21
19. Roeslerstammliidae	2	CALLIDULOIDEA	
20. Yponomeutidae	82	59. Callidulidae	2
21. Argyrestiidae	26	BOMBYCOIDEA	
22. Amphitheridae	2	60. Lasiocampidae	20
23. Glyphipterigidae	23	61. Eupterotidae	1
24. Epermeniidae	2	62. Bombycidae	5
25. Heliodinidae	2	63. Brannaeidae	1
26. Schreckensteiniidae	1	64. Saturniidae	11
SESSIOIDEA		SPHINGOIDEA	
27. Brachodidae	2	65. Sphingidae	72
28. Sesiidae	28	NOTODONTOIDEA	
29. Choreutidae	36	66. Notodontidae	121
IMMOIDEA		NOCTUOIDEA	
30. Immidae	1	67. Lymantriidae	53
GELECHIOIDEA		68. Arctiidae	109
31. Oecophoridae	71	69. Hypsiidae	5
32. Ethmiidae	9	70. Nolidae	42
33. Stathmopodidae	10	71. Ctenuchidae	3
		72. Noctuidae	1210
		73. Agaristidae	7
		Micros	2301
		Macros	2564
		Total	4865

Table 2. Authors of valid species-names of Japanese moths.

AGASSIZ 1	GAEDE 1
ALBERTI 1	GOEZE 4
ALPHERAKY 10	GEOFFROY 1
AMSEL 1	GEYER 2
ARITA 14	GOZMANY 1
ARITA & SPATENKA 1	GRAESEN 34
ARITA s YATA 2	GRASLIN 1
AURIVILLIUS 1	GRAY 1
AUSTAUT 1	GREGON 1
BALDIZZONE & OKU 8	GROTE 1
BANG-HAAS 1	GUENÉE 84
BARRET 1	GUÉRIN-MÉNÉVILLE 3
BARTEL 1	HAMPSON 96
BASTELBERGER 1	HARUTA 1
BLESZYNSKI 14	HASHIMOTO 2
BOISDUVAL 8	HAWORTH 20
BOJER 1	HEDEMANN 3
BORKHAUSEN 8	HEINEMANN 2
BOSC 1	HEINRICH 2
BOURSIN 6	HEINICKE 1
BRAHM 1	HERING 2
BRANTS 1	HERRICH-SCHÄFFER 22
BREMER 63	HERZ 4
BREMER & GREY 17	HEYDEN 1
BRUAND 1	HEYDEMANN 2
BRYK 10	HEYLAERTS 2
BURROWS 1	HOCHENWARTH 1
BUSCHK 1	HOLLAND 2
BUTLER 527	HOLST 1
CARADJA 25	HÖNE 2
CAROLA 1	HOPE 1
CHAPMAN 1	HORI 4
CHRISTOPH 83	HOULBERT 1
CLARKE 5	HÜBNER 109
CLEMENS 1	HUFNAGEL 31
CLERCK 18	HUMMEL 1
CRAMER 16	HUMPHREYS & WESTWOOD 1
CURTIS 6	INABA 1
DALMAN 1	INOUE 253
DANIEL 1	INOUE & KOBAYASHI 1
DANILEVSKY 4	INOUE, MUNROE & MUTUURA 1
DENIS & SCHIFFERMÜLLER 86	INOUE & SATO 1
DE GEER 1	INOUE & SUGI 3
DEVENTER 1	INOUE & YAMANAKA 1
DIAKONOFF 15	ISSIKI 31
DIAKONOFF & ARITA 17	ISSIKI & STRINGER 1
DIAKONOFF & SÄTTLER 1	JOANNIS 2
DIETZE 4	JOICEY & TALBOT 1
DJAKONOFF 5	JORDAN 1
DONOVAN 3	KANAZAWA 3
DONZEL 1	KARDAKOFF 2
DORFMEISTER 1	KASY 2
DOUBLEDAY 3	KATO 1
DOUGLAS 2	KAWADE 66
DRAUDT 6	KAWADA 1
DRURY 7	KAWAZOE & OGATA 1
DUFAY 7	KEARFOTT 1
DUPONCHIEL 8	KEMPERMAN & WILLINSON 36
DYAR 3	KENNEL 23
ELWES 2	KENRICK 1
ERMOLAEV 4	KIRIAKOFF 1
ERSCHOFF 12	KISHIDA & YOSHIMOTO 1
ESPER 16	KNOCH 1
EVERSMANN 14	KODAMA 2
FABRICIUS 85	KOLLAR 7
FALKOVITSH 25	KOMAI 7
FELDER & FELDER 3	KONDO 1
FELDER & ROGENHOFER 17	KONO & SAWAMOTO 1
FENN 1	KONONENKO 1
FILIPJEV 17	KRETSCHMAR 2
FISCHER VON RÖSLERSTAMM 5	KRULIKOWSKY 2
FITCH 2	KUMATA 111
FÖRSTER 1	KUMATA & ERMOLAEV 2
FREY 1	KUMATA & KUROKO 16
FREYER 6	KUROKO 42
FRIESE & MORIUTI 2	KUZNETZOV 44
FÖRÖLICH 2	KUZNETZOV & SINEV 1
FÜESSLY 1	LASPEYRES 1
FUJISAWA 4	

LATTIN 2	SATTLER 1
LEDERER 18	SAUBER 1
LEECH 193	SAUNDERS 2
LEWVANICH 1	SAXESEN 2
LINNAEUS 138	SEINO 1
LOWER 2	SCHALLER 1
LUTZAU 1	SCHAWERDA 3
LVOVSKY 2	SHELJUZHKO 2
MANN 1	SCHLÄGER 1
MARUMO 13	SCHULTZE 1
MATSUMURA 133	SCRIBA 1
MATSUMURA & SHIBUYA 1	SCOPOLI 18
MELL 2	SHIBUYA 6
MÉNÉTRIÈS 13	SHINTLEMEISTER & KINOSHITA 1
METCALFE 1	SHIRAKI 2
MEYRICK 222	SIRCOM 2
MILLIERE 2	SNELLEN 19
MIYAKE 1	SOUTH 11
MOLTRECHT 1	STAINTON 15
MOORE 79	STAUDINGER 90
MORIUTI 88	STEPHENS 7
MORIUTI & SAITO 4	STICHEL 1
MÖSCHLER 2	STOLL 8
MOTSCHULSKY 25	STRAND 11
MÜLLEN 1	SRINGER 15
MUNROE & MUTUURA 6	STRÖM 1
MUTUURA 3	SUZUKI 1
MUTUURA & MUNROE 2	SUGI 152
NAGANO 6	SUGI & KONONENKO 1
NAKAMURA 3	SUGI & OHTSUKA 1
NAKATOMI 1	SVENSON 1
NASU 3	SWINHOE 20
NICKERL 1	TAKAHASHI 1
NIELSEN 6	TANAKA 2
NIETNER 1	TAUSCHER 2
NITOBE 1	TENGSTRÖM 2
NOHIRA 1	THIERRY-MIEG 1
NOMURA 1	THUNBERG 11
OBERTHÜR 58	TREITSCHKE 23
OBRAZTSOV 4	TSIUS'IAKOV 1
OGATA 2	UEDA 1
OKADA 3	URBAHN 1
OKAMOTO 1	VIEWEG 1
OKANO 16	VILLERS 1
OKU 36	VOJNITS & LAEVER 1
OLIVIER 1	VOLLENHOVEN 1
ORZA 1	WALKER 261
OSBECK 1	WALDERDORFF 1
OWADA 20	WALLENGREN 2
PAGENSTECHE 1	WALSHINGHAM 72
PARENTI 10	WARNECKE 1
PARK 4	WARREN 75
PAYKULL 2	WATSON 1
PETERSEN 3	WEHRLI 9
POOLE 2	WERNEBURG 2
POUJADE 2	WEST 4
POVOLNY 4	WESTWOOD 4
PROUT 47	WHALLEY 3
PRYER 4	WILEMAN 88
PÜNGELER 9	WILEMAN & SOUTH 13
RAGONOT 35	WILEMAN & WEST 12
RAMBUR 2	WOCKE 4
RATZBURG 1	YAMANAKA 22
RAZOWSKI 15	YANO 21
RAZOWSKI & YASUDA 5	YASUDA 18
REBEL 5	YASUDA & KAWABE 5
REITTI 1	YASUDA & SUZUKI 1
RETZIUS 1	YAZAKI 4
ROESLER 8	YAZAKI, K. 2
ROESLER & INOUE 1	YOSHIMOTO 2
ROTHSCHILD 2	YOSHIMATSU 1
ROTHSCHILD & JORDAN 9	YOSHIYASU 12
ROTTEMBERG 1	YOSHIYASU & ÔHARA 1
RUNGS 1	YUAN 2
SAALMÜLLER 1	ZAGULAJEV 1
SAIGUSA 8	ZELLER 60
SAITO 5	ZETTERSTEDT 5
SASAKI 1	ZIMMERMAN & BRADLEY 1
SATO 6	ZINCKEN 2