

March 1989

ISSN 0007-4853
Vol. 79(1), 1-171

Bulletin of Entomological Research



C·A·B International Institute of Entomology

C·A·B INTERNATIONAL INSTITUTE OF ENTOMOLOGY

Director

K. M. HARRIS, BSc, DSc, DipAgrSc, DTA, FIBiol

Editor

J. M. B. HARLEY, BSc

Headquarters and Publication Office—56 Queen's Gate, London SW7 5JR, UK. Telephone: 01-584-0067. Telegrams: ENTINFO LONDON SW7. BT GOLD/DIALCOM: 84: CAU006. Telex: 265871 MONREF G (Box CAU006). Fax: 01-581-1676.

Identification Service—c/o British Museum (Natural History), Cromwell Road, London SW7 5BD, UK.

The C·A·B International Institute of Entomology is one of 4 Institutes and 11 Bureaux that together form C·A·B International (CABI) a not-for-profit, inter-governmental organisation which exists to provide information, scientific and development services for agriculture and allied disciplines throughout the world.

The *Bulletin of Entomological Research* is a quarterly journal prepared by the Institute and published by C·A·B International.

Annual Subscription Rate 1989

To subscribers in countries that are members of CABI	£77·00
To subscribers in countries that are not members of CABI	£103·00

Back Numbers

Back volumes of the *Bulletin of Entomological Research* are available at a discount.

Orders and enquiries concerning subscriptions and back numbers should be sent to

Marketing and Sales Division,
C·A·B INTERNATIONAL,
WALLINGFORD, OXON, OX10 8DE, UK.
TELEPHONE: WALLINGFORD (0491) 32111
TELEX: 847964 (COMAGG G)
FAX: (0491) 33508
TELECOM GOLD/INTERNATIONAL DIALCOM: 84: CAU001

[Note: Prices are subject to change without notice.]

© C·A·B International, 1989. All rights reserved. No part of this publication may be reproduced in any form or by any means, electronically, mechanically, by photocopying, recording or otherwise, without the prior permission of the copyright owner.

Disclaimer

The information contained herein, including any expression of opinion and any projection or forecast, has been obtained from or is based upon sources believed by us to be reliable but is not guaranteed as to accuracy or completeness. The information is supplied without obligation and on the understanding that any person who acts upon it or otherwise changes his/her position in reliance thereon does so entirely at his/her own risk.

C·A·B International does not accept responsibility for any trade advertisement included in this publication.

BULLETIN
OF
ENTOMOLOGICAL
RESEARCH

VOL. 79

ISSUED BY THE C·A·B INTERNATIONAL
INSTITUTE OF ENTOMOLOGY

EDITOR: J. M. B. HARLEY

LONDON

C·A·B INTERNATIONAL INSTITUTE OF ENTOMOLOGY
56, QUEEN'S GATE, SW7 5JR

1989

C·A·B INTERNATIONAL INSTITUTE OF ENTOMOLOGY

Director

K. M. HARRIS, BSc, DSc, DipAgrSc, DTA, FIBiol

Editor

J. M. B. HARLEY, BSc

Headquarters and Publication Office and Library—56 Queen's Gate, London SW7 5JR, UK.
Telephone: 01-584-0067. Telegrams: ENTINFO LONDON SW7. BT GOLD/DIALCOM:
84: CAU006. Telex: 265871 MONREF G (Box CAU006). Fax: 01-581-1676.

Identification Service—c/o British Museum (Natural History), Cromwell Road, London SW7 5BD, UK.

The C·A·B International Institute of Entomology is one of 4 Institutes and 11 Bureaux that together form C·A·B International (CABI) a not-for-profit, inter-governmental organisation which exists to provide information, scientific and development services for agriculture and allied disciplines throughout the world.

The *Bulletin of Entomological Research* is a quarterly journal prepared by the Institute and published by C·A·B International.

Annual Subscription Rate 1989

To subscribers in countries that are members of CABI	£77·00
To subscribers in countries that are not members of CABI	£103·00

Back Numbers

Back volumes of the *Bulletin of Entomological Research* are available at a discount.

Orders and enquiries concerning subscriptions and back numbers should be sent to

Marketing and Sales Division,
C·A·B INTERNATIONAL,
WALLINGFORD, OXON, OX10 8DE, UK.
TELEPHONE: WALLINGFORD (0491) 32111
TELEX: 847964 (COMAGG G)
FAX: (0491) 33508
TELECOM GOLD/INTERNATIONAL DIALCOM: 84: CAU001

[Note: Prices are subject to change without notice.]

© C·A·B International, 1989. All rights reserved. No part of this publication may be reproduced in any form or by any means, electronically, mechanically, by photocopying, recording or otherwise, without the prior permission of the copyright owner.

Disclaimer

The information contained herein, including any expression of opinion and any projection or forecast, has been obtained from or is based upon sources believed by us to be reliable but is not guaranteed as to accuracy or completeness. The information is supplied without obligation and on the understanding that any person who acts upon it or otherwise changes his/her position in reliance thereon does so entirely at his/her own risk.

C·A·B International does not accept responsibility for any trade advertisement included in this publication.

CONTENTS

PART 1 MARCH 1989

Original articles	PAGE
QUICKE, D. L. J. & WHARTON, R. A. <i>Myosoma nyanzaensis</i> sp. n. (Hymenoptera: Braconidae) parasitic on the stem-borer pest <i>Chilo partellus</i> (Swinhoe) (Lepidoptera: Pyralidae) in Kenya	1
ROBERTSON, H. G. & HOFFMANN, J. H. Mortality and life-tables of <i>Cactoblastis cactorum</i> (Berg) (Lepidoptera: Pyralidae) compared on two host-plant species	7
TYNDALE-BISCOE, M. The influence of adult size and protein diet on the human-oriented behaviour of the bush fly, <i>Musca vetustissima</i> Walker (Diptera: Muscidae)	19
BARNES, B. N. & PRINGLE, K. L. Oviposition by the banded fruit weevil, <i>Phlyctinus callosus</i> (Schoenherr) (Coleoptera: Curculionidae), in deciduous fruit orchards in South Africa	31
KAPATSA, G., SPATES, G. E., SHEFFIELD, C. L. & DELOACH, J. R. Comparison of lipid-free haemoglobin and stroma-contaminated haemoglobin diets for adults of <i>Stomoxys calcitrans</i> (L.) (Diptera: Muscidae)	41
LOPEZ, E. R. & VAN DRIESCHE, R. G. Direct measurement of host and parasitoid recruitment for assessment of total losses due to parasitism in a continuously breeding species, the cabbage aphid, <i>Brevicoryne brassicae</i> (L.) (Hemiptera: Aphididae)	47
ATKINSON, P. R. & CARNEGIE, A. J. M. Population dynamics of the sugarcane borer, <i>Eldana saccharina</i> Walker (Lepidoptera: Pyralidae), in Natal, South Africa	61
GREEN, C. H. The use of two-coloured screens for catching <i>Glossina palpalis palpalis</i> (Robineau-Desvoidy) (Diptera: Glossinidae)	81
KABISSA, J. C. B. Evaluation of damage thresholds for insecticidal control of <i>Helicoverpa armigera</i> (Hübner) (Lepidoptera: Noctuidae) on cotton in eastern Tanzania	95
TORR, S. J., PARKER, A. G. & LEIGH-BROWNE, G. The responses of <i>Glossina pallidipes</i> Austen (Diptera: Glossinidae) to odour-baited traps and targets in Somalia	99
PÄTS, P. & WIKTELIUS, S. Tethered flight of <i>Chilo partellus</i> (Swinhoe) (Lepidoptera: Pyralidae)	109
GOLD, C. S., ALTIERI, M. A. & BELLOTTI, A. C. The effects of intercropping and mixed varieties of predators and parasitoids of cassava whiteflies (Hemiptera: Aleyrodidae) in Colombia	115
HEMINGWAY, J., BODDINGTON, R. G., HARRIS, J. & DUNBAR, S. J. Mechanisms of insecticide resistance in <i>Aedes aegypti</i> (L.) (Diptera: Culicidae) from Puerto Rico	123
AUSTIN, A. D. & DANGERFIELD, P. C. The taxonomy of New World microgastrine braconids (Hymenoptera) parasitic on <i>Diatraea</i> spp. (Lepidoptera: Pyralidae)	131
FITT, G. P., ZALUCKI, M. P. & TWINE, P. Temporal and spatial patterns in pheromone-trap catches of <i>Helicoverpa</i> spp. (Lepidoptera: Noctuidae) in cotton-growing areas of Australia	145
LIEBREGTS, W. J. M. M., SANDS, D. P. A. & BOURNE, A. S. Population studies and biological control of <i>Pseudaulacaspis pentagona</i> (Targioni-Tozzetti) (Hemiptera: Diaspididae) on passion fruit in Western Samoa	163

Review article	PAGE
COWIE, R. H., LOGAN, J. W. M. & WOOD, T. G. Termite (Isoptera) damage and control in tropical forestry with special reference to Africa and Indo-Malaysia: a review	173
Original articles	
MCGEACHIE, W. J. The effects of moonlight illuminance, temperature and wind speed on light-trap catches of moths	185
MALCOLM, C. A. & BODDINGTON, R. G. Malathion resistance conferred by a carboxylesterase in <i>Anopheles culicifacies</i> Giles (species B) (Diptera: Culicidae)	193
TAHHAN, O. & VAN EMDEN, H. F. Biology of <i>Bruchus dentipes</i> Baudi (Coleoptera: Bruchidae) on <i>Vicia faba</i> and a method to obtain gravid females during the imaginal quiescence period	201
TAHHAN, O. & VAN EMDEN, H. F. Resistance of faba bean, <i>Vicia faba</i> , to <i>Bruchus dentipes</i> Baudi (Coleoptera: Bruchidae)	211
WAY, M. J., CAMELL, M. E., BOLTON, B. & KANAGARATNAM, P. Ants (Hymenoptera: Formicidae) as egg predators of coconut pests, especially in relation to biological control of the coconut caterpillar, <i>Opisina arenosella</i> Walker (Lepidoptera: Xyloryctidae), in Sri Lanka	219
BRAUN, A. R., GUERRERO, J. M., BELLOTTI, A. C. & WILSON, L. T. Within-plant distribution of <i>Mononychellus tanajoa</i> (Bondar) (Acari: Tetranychidae) on cassava: effect of clone and predation on aggregation	235
ALLSOPP, P. G. & BULL, R. M. Spatial patterns and sequential sampling plans for melolonthine larvae (Coleoptera: Scarabaeidae) in southern Queensland sugarcane	251
PEGRAM, R. G., ZIVKOVIC, D. & JONGEJAN, F. Ticks (Acari: Ixodoidea) of the Yemen Arab Republic. II. The <i>Rhipicephalus sanguineus</i> (Latreille) group	259
WILSON, A. G. L. & MORTON, R. Some factors affecting the reliability of pheromone traps for measurement of the relative abundance of <i>Helicoverpa punctigera</i> (Wallengren) and <i>H. armigera</i> (Hübner) (Lepidoptera: Noctuidae)	265
JACKAI, L. E. N. A laboratory procedure for rearing the cowpea coreid, <i>Clavigralla tomentosicollis</i> Stål (Hemiptera), using dry cowpea seeds	275
WALKER, A. K. Synonymy of two <i>Apanteles</i> species (Hymenoptera: Braconidae) parasitizing the coconut flat moth, <i>Agonoxena argaula</i> Meyrick (Lepidoptera: Agonoxenidae)	283
ASCHE, M. & WILSON, M. R. The three taro planthoppers: species recognition in <i>Tarophagus</i> (Hemiptera: Delphacidae)	285
HOSSAIN, M. I., CURTIS, C. F. & HEELIN, J. P. Assays of permethrin-impregnated fabrics and bioassays with mosquitoes (Diptera: Culicidae)	299
PADGHAM, D. E., WOODHEAD, S. & RAPUSAS, H. R. Feeding responses of the brown planthopper, <i>Nilaparvata lugens</i> (Stål) (Hemiptera: Delphacidae), to resistant and susceptible host-plants	309
HALL, M. J. R. & LANGLEY, P. A. The responses of individual males in an isolated population of <i>Glossina morsitans morsitans</i> Westwood (Diptera: Glossinidae) to pheromone-baited decoy 'females'	319
WALL, R. Sexual responses of males of <i>Glossina morsitans morsitans</i> Westwood and <i>G. pallidipes</i> Austin (Diptera: Glossinidae) to traps and targets in the field ..	335

	PAGE
Review article	
LEATHER, S. R., WALTERS, K. F. A. & DIXON, A. F. G. Factors determining the pest status of the bird cherry-oat aphid, <i>Rhopalosiphum padi</i> (L.) (Hemiptera: Aphididae), in Europe: a study and review	345
Original articles	
AMIN, A. M. & HEMINGWAY, J. Preliminary investigation of the mechanisms of DDT and pyrethroid resistance in <i>Culex quinquefasciatus</i> Say (Diptera: Culicidae) from Saudi Arabia	361
NOYES, J. S. <i>Copidosoma graminis</i> sp.n. (Hymenoptera: Encyrtidae), a polyembryonic parasitoid of armyworms (Lepidoptera: Noctuidae) in Australia .	367
ZHOU, X., CARTER, N. & MUMFORD, J. A simulation model describing the population dynamics and damage potential of the rose grain aphid, <i>Metopolophium dirhodum</i> (Walker) (Hemiptera: Aphididae), in the UK	373
BAILEY, P. T. The millipede parasitoid <i>Pelidnoptera nigripennis</i> (F.) (Diptera: Sciomyzidae) for the biological control of the millipede <i>Ommatoiulus moreleti</i> (Lucas) (Diplopoda: Julida: Julidae) in Australia	381
ANSART, A. K., VAN EMDEN, H. F. & SINGH, S. R. Graft-transmissibility of resistance to cowpea aphid, <i>Aphis craccivora</i> Koch (Hemiptera: Aphididae), in six highly antibiotic cowpea varieties	393
WHARTON, R. A., SMITH, J. W., JR, QUICKE, D. L. J. & BROWNING, H. W. Two new species of <i>Digonogastra</i> Viereck (Hymenoptera: Braconidae) parasitic on Neotropical pyralid borers (Lepidoptera) in maize, sorghum and sugarcane.	401
SATTLER, K. & STRIDE, A. B. A new species of <i>Hypatima</i> Hübner (Lepidoptera: Gelechiidae) injurious to mango trees in East Africa	411
BALLARD, J. W. O. Factors influencing silhouette-trap captures of the blackfly <i>Austrosimulium bancrofti</i> (Taylor) (Diptera: Simuliidae) in the Australian Capital Territory	421
LANGLEY, P. A. Laboratory colonization of the tsetse fly <i>Glossina pallidipes</i> Austen (Diptera: Glossinidae) using an <i>in vitro</i> feeding method	429
COOK, A. G. & PERFECT, T. J. Population dynamics of three leafhopper vectors of rice tungro viruses, <i>Nephotettix virescens</i> (Distant), <i>N. nigropictus</i> (Stål) and <i>Recilia dorsalis</i> (Motschulsky) (Hemiptera: Cicadellidae), in farmers' fields in the Philippines	437
WHITE, I. M. & MARQUARDT, K. A revision of the genus <i>Chaetorellia</i> Hendel (Diptera: Tephritidae) including a new species associated with spotted knapweed, <i>Centaurea maculosa</i> Lam. (Asteraceae)	453
ATKINSON, P. R. & NUSS, K. L. Associations between host-plant nitrogen and infestations of the sugarcane borer, <i>Eldana saccharina</i> Walker (Lepidoptera: Pyralidae)	489
NEWTON, P. J. Combinations of applications of a chitin synthesis inhibitor and inundative releases of egg parasitoids against the false codling moth, <i>Cryptophlebia leucotreta</i> (Meyrick) (Lepidoptera: Tortricidae), on citrus	507
DOKU, C. & BRADY, J. Landing site preferences of <i>Glossina morsitans morsitans</i> Westwood (Diptera: Glossinidae) in the laboratory: avoidance of horizontal features?	521

Original articles

	PAGE
WRIGHT, A. D., BOLAND, N. P. & KERR, J. D. Changes in leaf hardness and moisture content of water hyacinth, <i>Eichhornia crassipes</i> , following feeding by <i>Neochetina eichhorniae</i> Warner (Coleoptera: Curculionidae)	529
VAN DER LINDE, T. C. DE K., HEWITT, P. H., VAN DER WESTHUIZEN, M. C. & MITCHELL, J. The use of ¹³¹ I, ¹²⁵ I and aggressive behaviour to determine the foraging area of <i>Hodotermes mossambicus</i> (Hagen) (Isoptera: Hodotermitidae)	537
DIKE, M. C. A key for the identification of Afrotropical species of the shoot-fly subgenus <i>Atherigona</i> of <i>Atherigona</i> (Diptera: Muscidae), with a description of some new species from Africa	545
WHEATLEY, A. R. D., WIGHTMAN, J. A., WILLIAMS, J. H. & WHEATLEY, S. J. The influence of drought stress on the distribution of insects on four groundnut genotypes grown near Hyderabad, India	567
NEUENSCHWANDER, P., HAMMOND, W. N. O., GUTIERREZ, A. P., CUDJOE, A. R., ADJAKLOE, R., BAUMGÄRTNER, J. U. & REGEV, U. Impact assessment of the biological control of the cassava mealybug, <i>Phenacoccus manihoti</i> Matile-Ferrero (Hemiptera: Pseudococcidae), by the introduced parasitoid <i>Epidinocarsis lopezi</i> (De Santis) (Hymenoptera: Encyrtidae)	579
JACKAI, L. E. N. & OGHIAKHE, S. Pod wall trichomes and resistance of two wild cowpea, <i>Vigna vexillata</i> , accessions to <i>Maruca testulalis</i> (Geyer) (Lepidoptera: Pyralidae) and <i>Clavigralla tomentosicollis</i> Stål (Hemiptera: Coreidae)	595
MARTIN, J. H. Identification, occurrence and pest status of <i>Toxoptera odinae</i> (van der Goot) (Hemiptera: Aphididae) in Africa	607
JOHNSTONE, D. R., COOPER, J. F., DOBSON, H. M. & TURNER, C. R. The collection of aerosol droplets by resting tsetse flies, <i>Glossina morsitans</i> Westwood (Diptera: Glossinidae)	613
SULAIMAN, S., SOHADI, A. R. & JEFFERY, J. Human helminth parasite burdens on cyclorrhaphan flies (Diptera) trapped at an aboriginal settlement in Malaysia	625
DUNCAN, F. D. & HEWITT, P. H. Observations on the foraging behaviour of the harvester termite, <i>Hodotermes mossambicus</i> (Hagen) (Isoptera: Hodotermitidae)	631
WILLIAMS, D. J. A new genus and two new species of mealybugs (Hemiptera: Pseudococcidae) from South Africa on bulbs and corms imported into Great Britain	643
ADAIR, R. F. & SCOTT, J. K. The life-history and host specificity of <i>Comostolopsis germana</i> Prout (Lepidoptera: Geometridae), a biological control agent of <i>Chrysanthemoides monilifera</i> (Compositae)	649
HEMINGWAY, J., CALLAGHAN, A. & KURTA, D. C. Temephos resistance in <i>Simulium damnosum</i> Theobald (Diptera: Simuliidae): a comparative study between larvae and adults of the forest and savanna strains of this species complex ..	659
AGRICOLA, U., AGOUNKÉ, D., FISCHER, H. U. & MOORE, D. The control of <i>Rastrococcus invadens</i> Williams (Hemiptera: Pseudococcidae) in Togo by the introduction of <i>Gyranusoidea tebygi</i> Noyes (Hymenoptera: Encyrtidae) .	671
EL-SAYED, S., HEMINGWAY, J. & LANE, R. P. Susceptibility baselines for DDT metabolism and related enzyme systems in the sandfly <i>Phlebotomus papatasi</i> (Scopoli) (Diptera: Psychodidae)	679
THOMSON, M. C., DAVIES, J. B. & WILSON, M. D. A portable allozyme electrophoresis kit used to identify members of the <i>Simulium damnosum</i> Theobald complex (Diptera: Simuliidae) in the field	685
HOBBS, S. E. & WOLF, W. W. An airborne radar technique for studying insect migration	693

DATES OF PUBLICATION IN PARTS

PART 1, pp. 1–171 16 March 1989
 PART 2, pp. 173–343 23 May 1989
 PART 3, pp. 345–528 13 September 1989
 PART 4, pp. 529–720 30 November 1989

ERRATA (VOL. 79)

- p. 115, title line 1, for 'of predators' read 'on predators'.
 p. 116, line 24 and p. 120, Table IV & line 22, for '*Amitus aleurodinus*' read '*Amitus aleurodinis*'.
 p. 120, Table IV, title line 2, for 'aleurodiphaga' read 'aleyrodiphaga'.
 pp. 235–249 except p. 235 line 20, for '*tanajoa*' read '*progresivus*'.

ADDENDA (VOL. 79)

- pp. 285–298, article by M. Asche & M. R. Wilson.
 By an oversight only one species of *Tarophagus*, *T. colocasiae* (Matsumara) was recorded from Hawaii. Further specimens have now been examined in the B.P. Bishop Museum, Honolulu and in the Dept. of Entomology, University of Hawaii at Manoa. We now find that *T. proserpina* (Kirkaldy) is also found in Hawaii and, indeed, is more common than *T. colocasiae*. Specimens are recorded from several localities on Oahu Island. The following additions/corrections should be made to the paper as follows:
 p. 290, '*T. proserpina*, Material examined' add 'Hawaii Islands (Oahu)'.
 p. 295, Table I, add 'x' for *T. proserpina* at Hawaii.
 p. 296, Fig. 35 is revised and an error in the legend corrected as below

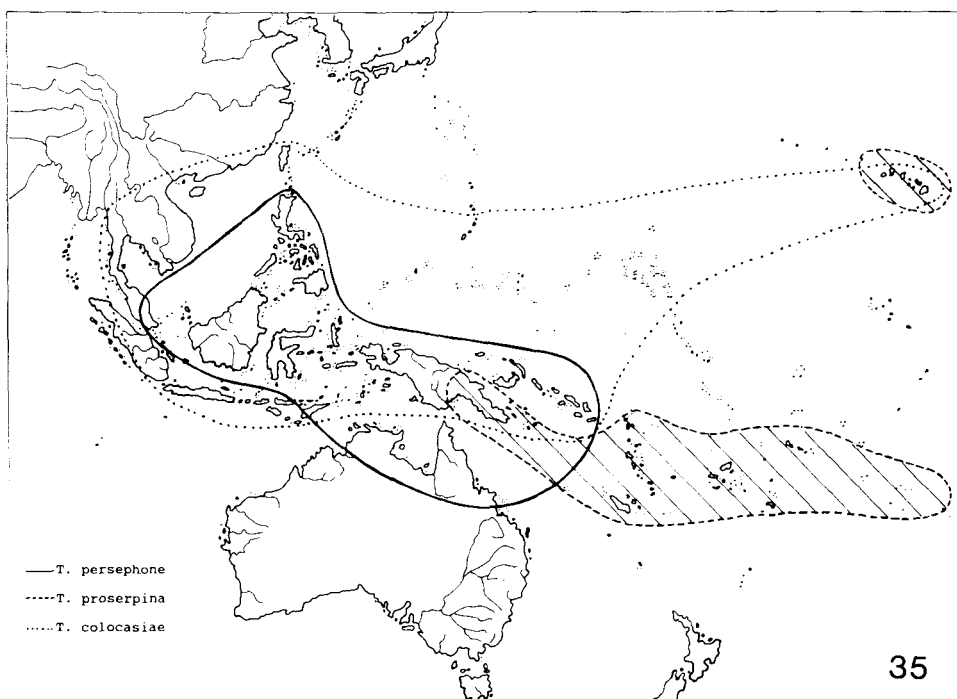


Fig. 35.—Distribution map of *Tarophagus* species.

p. 296, Table II, add 'at Hawaii under probable species of *Tarophagus*' add 'or *proserpina*'.
 p. 296, Table III, revised version is given below:

To	<i>Tarophagus</i> sp.	From	<i>Tarophagus</i> sp.	Result
Tahiti	<i>proserpina</i>	Hawaii	<i>colocasiae</i> or <i>proserpina</i>	-
Guam	<i>colocasiae</i>	Hawaii	<i>colocasiae</i> or <i>proserpina</i>	+
Hawaii	<i>colocasiae</i> or <i>proserpina</i>	Philippines	<i>colocasiae</i> or <i>persephone</i>	+
Ponape (Caroline Is)	<i>colocasiae</i>	Guam	<i>colocasiae</i>	+
Western Samoa	<i>proserpina</i>	Hawaii	<i>colocasiae</i> or <i>proserpina</i>	+
Solomon Is	<i>persephone</i> or <i>colocasiae</i>	Sikaiana	<i>persephone</i> or <i>colocasiae</i>	+
Tuvalu	<i>proserpina</i>	Samoa	<i>colocasiae</i>	-
		Fiji	<i>proserpina</i>	-