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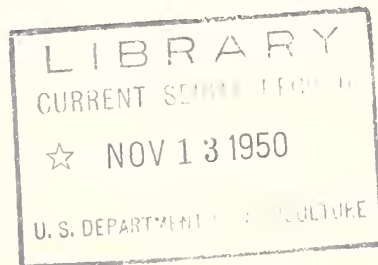
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C A C A O

A Bibliography on the Plant and Its Culture
and Primary Processing of the Bean

Compiled by
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Division of Bibliography

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PREFACE

The demand for cacao products has greatly increased during the twentieth century. At the same time diseases and pests have threatened one after another of the cacao-producing areas of the world. It has therefore become essential to reexamine every factor which might have a bearing on the problem of maintaining and increasing production, whether by improvement of methods, by seeking remedies for specific ills, or by finding areas suitable for new plantings. In addition to experiments and research conducted by governmental and private agencies in the various cacao-growing countries, broad programs of research under cooperative sponsorship were undertaken as early as 1930 at the Imperial College of Tropical Agriculture, Trinidad, and more recently at the West African Cacao Research Institute, Tafo, Gold Coast, and the Inter-American Institute of Agricultural Sciences, Turrialba, Costa Rica.

This bibliography is intended to serve students, research workers, and others concerned with the problems involved in growing healthy and productive cacao trees and in processing the beans to meet the standards set by manufacturers of cocoa and chocolate. It includes, in addition to general material on the culture of cacao in various parts of the world and certain special aspects of culture, references on the botany and pathology of the plant, its insect and other enemies, and both practical and scientific aspects of the primary processing of the cacao bean. It does not include material dealing chiefly with the processing and sale of cacao products outside the country of origin, or items of interest primarily to the historian. With only a few exceptions the bibliography is limited to holdings of the U. S. Department of Agriculture Library and published during the period 1920 to 1949. Call numbers following the citations are those of the Library.

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PRINCIPAL SOURCES CONSULTED

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U. S. Department of Agriculture Card Catalog, including Plant Science and Plant Pathology Catalogs.

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A Bibliography on the Plant and Its Culture
and Primary Processing of the Bean

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1. BARRETT, O. W. The tropical crops, a popular treatment of the practice of agriculture in tropical regions, with discussion of cropping systems and methods of growing the leading products. New York, Macmillan, 1928. 445 p., illus. 38 B27

Chapter 5 deals with cacao.

2. BOIS, D. Les plantes alimentaires chez tous les peuples et à travers les âges. Histoire, utilisation, culture. Vol. IV, Les plantes à boissons. Paris, Lechevalier, 1937. 600 p., illus. Ref. 452.8 B63

Cacao et chocolat, p. 402-437, treats of botany, culture and enemies, harvesting the beans and preparing them for market, and trade and consumption statistics.

3. BYWATERS, H. W. Modern methods of cocoa and chocolate manufacture. Philadelphia, Blakiston, 1930. 316 p., illus. 68.3 B99

Partial contents: Sect. 1, The raw material: Ch. 1, The production of cacao beans; Ch. 2, The inner structure and chemical composition of the cacao bean; Ch. 3, Commercial cacao beans and the countries from which they come; Ch. 4, The storage of cacao beans; Ch. 5, Testing the quality of the cacao beans.

4. LE CACAO dans les colonies françaises. Rev. Internat. des Prod. Colon. 7:331-351, illus. Nov. 1932. 286.8 R326

Contents: 1, En Afrique Occidentale Française; 2, Dans les territoires africains sous mandat; 3, A Madagascar; 4, Le cacao en A. E. F. [Afrique Equatoriale Française]; 5, Martinique, Guadeloupe, Hébrides.

5. CHARLES-LAUREUR, J. Le Cacao. Internat. Cong. Trop. and Subtrop. Agr., Compt. Rend. (1931) 6(2):324-338. 1932. 26 In86

World production and consumption.

6. CIFERRI, R. La futura economia agrario-coloniale Europea. Rass. Econ. Dell'Africa Ital. 29:383-404. June 1941. 261 C71

Section on cacao, p. 392-396, reviews production and consumption statistics, especially 1933-37.

7. COCOA, CHOCOLATE AND CONFECTIONERY ALLIANCE, LTD. Report of the Cocoa Conference held at Grosvenor House, London, 30th August-1st September 1949. London, 1949. 115 p. 68.39 In82

In addition to papers listed by author and title elsewhere in this bibliography, includes various untitled addresses and discussions at meeting sessions.

U.S.D.A. Library has also report of conference held in 1947, 64 p. Subjects discussed were: Aims of plant-breeding, preparation, quality and breeding of cocoa; Research work at West African Cocoa Research Institute and Imperial College of Tropical Agriculture, Trinidad; Disease control and rehabilitation.

8. COCOA RESEARCH CONFERENCE, 1945. Report and proceedings. 168 p. London, Colonial Office, 1945. 68.39 C64

Summary of recommendations, p. 9-16; Proceedings of the Cocoa Research Conference, 1945, p. 17-99; Papers presented to the Conference (in this bibliography treated separately under individual authors), p. 100-168.

9. CONFERENCE OF WEST AFRICAN AGRICULTURAL OFFICERS, 2, GOLD COAST, 1929. Proceedings. Gold Coast Dept. Agr. B. 19, 106 p. 1930. 26 G56B

Includes discussions, findings, and reports concerning cacao.

10. CONGRÈS INTERNATIONAL DES FABRICANTS DE CHOCOLAT ET DE CACAO, ANTWERP, 1930. Congrès international des fabricants de chocolat et de cacao, Anvers 1930 (du 8 au 11 septembre). Bruxelles, 1930. 68.39 C76

Consists of preparatory volume and official report.

11. DAVIES, S. H. Cocoa cultivation in the British tropical colonies. Roy. Soc. Arts J. 72:158-168. Jan. 25, 1924. 501 L847J

12. FAUCHERE, A. Guide pratique d'agriculture tropicale. II. Les grandes cultures. Paris, Challamel, 1922. 468 p., illus. (Bibliothèque d'Agriculture Coloniale). 38 F27

Le cacaoyer, p. 95-189.

GENERAL--Continued.

13. FINCKE, H. Handbuch der kakaoerzeugnisse; ihre geschichte, rohstoffe, herstellung, beschaffenheit, zusammensetzung, anwendung, wirkung, gesetzliche regelung und zählberichte, dargestellt für gewerbe, handel und wissenschaft. Berlin, Springer, 1936. 568 p., illus. Ref. Libr. Cong.

Die Rohstoffe der Kakaoerzeugnisse; A, Der Kakao, p. 30-100, discusses species and varieties of cacao, the anatomy of the bean, cultivation, diseases and pests, harvesting and preparation of the bean, and the cacao industry and trade.

14. FROST, B. Indians to Spaniards to us, the story of the triple play by which we obtained chocolate. Crown 33(12):9-11, 29, illus. Dec. 1944. 389.8 C88

15. HALL, C. J. J. VAN. Cacao. Ed. 2. London, Macmillan, 1932. 514 p., illus. 68.3 H14

Contents: Ch. 1, Historical; Ch. 2, Home country; geographical distribution of the cultivated plant; climatic conditions; Ch. 3, The chemistry of cacao and cacao soils; Ch. 4, The botanical characteristics; Ch. 5, Varieties of cacao; Ch. 6, The cultivation of cacao; Ch. 7, Selection; Ch. 8, Fermentation, washing, and drying; Ch. 9, Diseases and enemies; Ch. 10, Cacao-growing countries; Ch. 11, Some characteristics of the marketable bean.

16. HART, J. H. Cacao, a manual on the cultivation and curing of cacao. London, Duckworth, 1911. 323 p., illus. 68.3 H25C

Based largely on conditions in Trinidad.

17. HARTENBOWER, A. C. Apuntes sobre el cultivo y explotación del cacao. Hacienda 21:298-300, illus. Oct. 1926. 6 H11

18. HARVEY, M. A. R. Cacao, the chocolate tree. Pan Amer. Union. Commod. Com. Ser. 18, 15 p., illus. 1942. 150.9 C732

19. HERNANDEZ MARTIN, D. El cacao. Frutos 2(13):4-5; (14):4-5; (15):7-8; (16):4-5, illus. July-Dec. 1944. 80 F9472

20. INTER-AMERICAN ECONOMIC AND SOCIAL COUNCIL. Documentary material on cacao. Washington, Pan American Union, 1947. 2 v. 68.3 In8

Papers dealing with conditions in various cacao-growing countries and related subjects will be found in the various sections of this bibliography.

21. INTERNATIONAL COCOA CONFERENCE, LONDON, 1946. Conférence Internationale du Cacao. Londres, 1, 2 et 4 octobre 1946. Compte rendu officiel. Bruxelles, Office International du Cacao et du Chocolat, 1946? 155 p. 68.39 In82

Session on research into prevention of disease, selection of types, replanting and other matters connected with cultivation includes papers by L. E. Campbell (p. 88-89), Sir H. Tempny (p. 89-93), J. West (p. 93-96), D. H. Urquhart (p. 96-98), A. G. Beattie (p. 98-103), and R. E. D. Baker (p. 103-105).

Section on survey of world cocoa areas with particular reference to extension includes papers by J. Cadbury (p. 127-132) and Sir H. Tempny (p. 132-134).

22. JOHNSTON, J. R. El cultivo del cacao. Off. Internat. du Cacao et Choc. B. Off. 1:439-457. Dec. 1931. 68.38 Of2

Summaries in French, English, German, and Italian. Culture, diseases and pests, and preparation for market.

Reprinted in part in Asoc. Venezolana de Prod. Cacao. B. 1(4):1-10, Apr. 1936. 68.38 As5

23. KLOPSTOCK, F. Kakao; wandlungen in der erzeugung und der verwendung des kakaos nach dem weltkreis. Leipzig, Bibliographisches Institut, 1937. 138 p. Ref. (Wandlungen in der Weltwirtschaft, hft. 12). 281.368 K69

Section on culture includes discussions of plantation culture in Brazil and elsewhere, problems of plantation culture, culture by natives in the Gold Coast and other parts of tropical Africa, and problems and dangers of native culture.

24. KNAPP, A. W. The cocoa and chocolate industry: the tree; the bean; the beverage. Ed. 2, rev. and enl. London, Pitman, 1930. 188 p., illus. Ref. 68.3 K72C
25. KNAPP, A. W. Cocoa and chocolate, their history from plantation to consumer. London, Chapman and Hall, 1920. 210 p., illus. Ref. 68.3 K72
26. LANDAVERDE, A. Diez cultivos tropicales. México, D. F., Trucco, 1941. 227 p., illus. 38 L23
Ch. 2, El cacaotero, p. 33-65.
27. LECOQ, R. Cacao, poudres de cacao et farines composées alimentaires avec et sans cacao. Paris, Vigot, 1926. 180 p., illus. Ref. 68.3 L49
Partial contents: I, Description et cultures du cacaoyer; II, Récolte du cacao; III, Sortes commerciales du cacao; IV, Caractères physiques, anatomiques et chimiques de la fève de cacao; V, Conservation, nettoyage et sélection des fèves de cacao.
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Section 2, Tea, Cacao and Coffee, includes several chapters on the cacao-growing industry of the Empire, including surveys of the industry in three geographic areas and a discussion of the position and prospects of the British cacao-growing industry.
29. MANETTI, C. Il cacao, pianta dell'avvenire. Rass. Econ. dell'Africa Ital. 30:131-138. Mar. 1942. 261 C71
Consumption, geographic distribution, cultivation, and processing.
30. MERDIAN, B. Chocolate grows on trees. Agr. in the Americas 2:143-147, illus. Ref. Aug. 1942. 1 F752A
History, production in Latin America, and outlook for world trade.
31. MERDIAN, B. C. World cacao production and trade. Foreign Agr. 5:33-60, illus. Feb. 1941. 1.9 Ec7For
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33. MORALES, M. O. Cultivo racional del cacao. Agr. Trop. 5(9):11-15, illus. Sept. 1949. 26 Ag8
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34. MURRILL, W. A. Where chocolate comes from. How the cacao bean is grown and made into cocoa powder and chocolate. Sci. Amer. 122:626, illus. June 5, 1920. 470 Sci25
35. OBANDO, N. Cultivo del cacao. Bogotá, Ministerio de agricultura y comercio, 1935. 52 p., illus. Ref. 68.3 Ob1
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Brief summary of the situation relating to cacao culture and trade in each of the producing countries.
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Economic outlook in Trinidad and Gold Coast.

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41. SANCHEZ C., E. El cultivo del cacaotero. Hacienda 26(5):203-205, 256-257, illus. May-June 1931. 6 H11
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Situation and outlook as reported to conference of chocolate and cocoa interests at London, Sept. 14-16, 1948.
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Pt. 1, Der Kakaobaum, includes chapters on history, botany, cultural factors, harvesting, processing, costs and returns, chemical composition, products, world production and economic importance.
46. STAHEL, G. Aantekeningen over cacao. Surinam. Landbouwproefsta. Med. 11, 19 p. 1947. Ref. 102.5 D95
Topics discussed include cacao soils, the root system of "koffiemama" [Erythrina sp.], humus and crown structure, and dieback.
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48. TEMPANY, H. A. The threatened future of cocoa. World Crops 1:10-14. Sept. 1949. 281.8 W892
Review of world situation.
49. TISSOT, P. Améliorations récentes apportées à la culture du cacaoyer et à la préparation du cacao dans le monde. Rev. de Bot. Appl. et d'Agr. Trop. 15:103-115. Ref. Feb. 1935. 26 R323
Discusses choice of variety, ecological needs, fertilizers, planting, improvements in preparation methods, and the world cacao situation.
50. WHITMORE, H. B. World cacao-bean production and trade. U. S. Off. Foreign Agr. Relat. Foreign Agr. Rpt. 29, 27 p. Aug. 1948. 1.943 F763
Includes brief summary of situation in each of the cacao-growing countries.
51. WHYMPER, R. Cocoa and chocolate, their chemistry and manufacture. Ed. 2. London, Churchill, 1921. 568 p., illus. Ref. 68.3 W62
Contents: Pt. 1, History, botany, and agriculture of cacao; Pt. 2, Manufacture of chocolates and cocoa powders; Pt. 3, Chemistry of cacao.
52. WILSON, O. The tree that gives the chocolate. Nature Mag. 8:177-179, illus. Sept. 1926. 409.6 N214
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54. WOHLFARTH, O. F. W. Die natürlichen grundlagen des kakaobaues. Leipzig. U. Phil. Facul. Jahrb. 1923:176-178. 275.9 L532
Abstract of dissertation.
Climatic requirements, varieties, water and light requirements, yields.
55. WOODHOUSE, C. H. World supply and demand from the commercial standpoint. In Cocoa, Chocolate and Confectionery Alliance. Report of the Cocoa Conference, 1949, p. 2-8. London, 1949. 68.39 In82
Includes notes on factors affecting production in various areas.

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Contents: I, Botanisches; II, Der anbau; III, Die aufbereitung des erntegutes; IV, Das produkt; V, Weltproduktion und weltverbrauch; VI, Literatur.
57. ZIPPERER, P. Die schokoladen-fabrikation. Ein monographie der kakaofrucht und ihrer verwertung. Ed. 4. Berlin, Krayn, 1924. 338 p., illus. Ref. 68.3 Z6
H. Schaeffer and dipl.-ing. Schröder, editors.
Contents: I, Der kakaobaum; II, Fabrikation der kakao-erzeugnisse; III, Zusatzstoffe zu den schokoladen; IV, Untersuchung und beurteilung von kakaopräparaten.

North America

Mexico

58. MEXICO. DEPT. DE ESTUDIOS ECONOMICOS. El cacao. Producción, industrialización y comercio. México, 1934. 77 p. Libr. Cong.
Ch. 1 includes detailed statistics of production in Mexico.
59. MEXICO. DIRECCION DE ECONOMIA RURAL. El cacao. Mex. Dir. de Econ. Rural. Bol. Mens. 190:152-171, illus. Mar. 1942. 254.5 Ag83
Includes data on Mexican production, Brazilian specifications for cacao, world production and consumption, Mexican consumption, domestic and foreign trade, and prospects for Mexican cacao.
60. MEXICO. SECRETARIA DE AGRICULTURA Y GANADERIA. Informe de labores . . . del 1 de Septiembre de 1945 al 31 de Agosto de 1946. México, 1946. 2 v., illus. 8 M5711
Includes (v. 1, p. 366-400) account of plans for the Estación Central de Investigación y Propagación del Cacao, Cacaotán, Chiapas, with production records of more than 200 selected trees in the region of Chiapas. "Resume del Informe" for 1948/49 includes work of Instituto de Investigaciones Agrícolas in propagating promising cacao clones. Some earlier reports mention cacao culture and production.

Central America

61. ALMENGOR A., A. El cultivo del cacao en Suchitepéquez. Guatemala Sec. de Agr. Rev. Agr. 16:150-154, illus. Sept. 1939. 8 G934
Handbook for Guatemala.
Issued also in separate form, 1940. 68.3 AL6
62. ALTON, R. A. Report on a visit to Jamaica, Costa Rica and Trinidad. Brit. Guiana. Bd. Agr. J. 18:2-19. Jan. 1925. 9.6 B772J
Includes brief account of cacao cultivation in Costa Rica by United Fruit Company.
63. COSTA RICA. CENTRO NACIONAL DE AGRICULTURA. Informe anual, 1939. San José, 1940. 119 p. 102 C822
Informe del Departamento de Fitopatología y Sanidad Vegetal, by R. Méndez C., includes data on diseases of cacao.
Earlier reports are similar. Informe anual for 1934 lists four insects found on cacao.
Later reports not available for examination.
64. GÓMEZ RUEDA, C. Instrucciones para el cultivo del cacao. Rev. de Agr. Trop. [Salvador] 12:163-164. 1939. 8 R326
Brief instructions on various points of culture and sanitation.
65. HERNANDEZ, M. G. Le Cacao, ses qualités et l'importance de son rendement. Off. Internatl. du Cacao et du Chocolat. B. Off. 5(10):423-426. Oct. 1935. Libr. Cong.
Cacao cultivation in El Salvador.
Summaries in English, German, Spanish, and Italian.
66. HOLDRIDGE, L. R. Report on visit to the main cacao area in Guatemala. Cacao Inform. B. 2(3):1-3. Mar. 1950. 68.38 C11
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Abridged in Trop. Agr. 18:203-205. Oct. 1941. 26 T754
68. MANGEL N., R. Cultivo y beneficio del cacao. C. N. A. Rev. del Centro Natl. de Agr. (Costa Rica) 1:90-95, 144-147, 169-171, 206-213. May-Oct. 1936. 8 C62
General instructions for Costa Rica.

69. SAMAYOA MENDEZ, O. El cacao y su cultivo. Guatemala. Sec. de Agr. Rev. Agr. 17:325-338. Sept. 1940. 8 G934
Account of cacao culture in Guatemala, including various methods of propagating from seed.
70. STAHEL, G. De herleving der cacao-cultuur. Paramaribo? Departement Landbouwproefstation, Surinam, 1947. 12 p. 68.3 St1H
Outlook for improved production through clones imported from Trinidad for propagation and distribution.
71. TROYO CH., A. Algunos datos acerca del cacao. Rev. de Agr. [Costa Rica] 15:318, 320-323. July 1943. 8 Es1
72. U. S. INSTITUTE OF INTER-AMERICAN AFFAIRS. FOOD SUPPLY DIV. Abaca, cacao, and the African oil palm in Costa Rica; a special report. [By Vance Rogers.] Washington, 1947. 48 p., illus. 173.3 In83Ab
Section on cacao based chiefly on conditions on United Fruit Company plantations.

West Indies

73. CRADWICK, W. Cocoa. Jamaica Agr. Soc. J. 25:52-57. Feb. 1921. 8 J223
Lecture delivered at course for agricultural instructors.
74. DOMINICA. DEPT. OF AGRICULTURE. Report, 1946. Roseau, 1947. 30 p. 102 W523
Includes brief notes on cacao selection and propagation. Earlier reports occasionally mention cacao.
75. DRAKE, A. Cultivo del cacao. Rev. de Agr. [Cuba] 12:44-45. Jan. 1931. 8 Ag88Re
76. JAMAICA. DEPT. OF AGRICULTURE. Annual report for the year ended 31st March, 1948. Kingston, 1950. 23 p. 8 J227A
Reports (p. 10) propagation work and laying out of cultural experiments at Orange River Agricultural Station.
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391. BROUHS, G. Le cacaoyer et son ombrage. *B. Agr. du Congo Belge* 37:822-828. Dec. 1946. 24 K83

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392. CABRERA, L. Cacao shading requirements and practices. (Summary). *Cacao Inform. B.* 1(15):3; (16):2-3. Jan.-Feb. 1949. 68.38 C11

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394. IMPORTANCIA de la amapola en el cacao. *Dominican Repub. Sec. de Estado de Agr. y Riego. Rev. de Agr.* 35:178. Sept./Oct. 1944.

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395. KINDS, R. L'ombrage temporaire et définitif de cacaoyers, de caféiers, etc. au Congo Belge et particulièrement au Mayumbe. *Assoc. des Planteurs de Caoutchouc B.* 9:86-89. Apr./May 1922. 305.9 As7

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822. BONDAR, G. O decréscimo da produção cacaeira na Baía. Campo [Rio de Janeiro] 17(199):33-35; (200):46-48. July-Aug. 1946. 9.2 C15

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823. BONDAR, G. Podridão parda dos frutos do cacau. Campo [Rio de Janeiro] 17(195):29-33, illus. Mar. 1946. 9.2 C15

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824. BONDAR, G. A podridão parda dos frutos de cacau. Bahia Rur. 16(8):18-19, 23, illus. Aug. 1948. 9.2 B142

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832. DADE, H. A. Further notes on cushion canker of cacao. Gold Coast Dept. Agr. B. 16:135-138, illus. 1929. 24 G56B

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840. OBENG, J. J. The non-toxicity [to cacao tissues] of the secretions of *Phytophthora faberi*-Maubl. Gold Coast. Dept. Agr. B. 16:139-140, illus. 1929. 24 G56B

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846. BAKER, R. E. D., and COPE, F. W. A report on witches' broom disease in Grenada. Caribbean Comm. Monthly B. 2:327-328. June 1949. 280.9 C19

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849. BAKER, R. E. D. Witches' broom disease investigations, III-IV. Trop. Agr. [Trinidad] 20:5-12, 156-158. Ref. Jan.-Aug. 1943. 26 T754

III, Notes on the occurrence of witches broom disease of cacao at River Estate, 1939-42; IV, Further notes on the susceptibility of I. C. selections at River Estate to witches broom disease of cacao.

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851. BAKER, R. E. D., and DALE, W. T. Witches' broom disease investigations, VIII-XI. Trop. Agr. [Trinidad] 21:170-176, 196-199. Sept.-Oct. 1944. 26 T754

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854. DALE, W. T. Witches' broom disease investigations, XII. Further studies on the infection of cacao pods by *Marasmius perniciosus* Stahel. Trop. Agr. [Trinidad] 23:217-221. Dec. 1946. 26 T754

855. DALE, W. T. Witches' broom disease of cacao in Grenada. Trop. Agr. [Trinidad] 26:23. Jan./June 1949. 26 T754

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856. FREEMAN, W. G. Witch broom in Trinidad. Trop. Agr. [Trinidad] 5:287-288, illus. Nov. 1928. 26 T754

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861. MONTSERIN, B. G. Investigations on witchbroom disease of cacao. Trinidad & Tobago Dept. Agr. Admin. Rpt. 1932:49-51; 1933:45-46. 1933-34. 8 T732

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863. MYERS, J. G. Source of witch-broom infection believed to be wild cacao in Surinam. West India Com. C. 45:43-44. Feb. 6, 1930. 8 W524
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Marasmius pernicius.

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899. CIFERRI, R. Una virosis del cacao en Colombia y en la Republica Dominicana. Colombia. U. Nac. Facul. Nac. de Agron. Rev. 8(29/30):79-84, illus. Ref. Mar./June 1948. 9.4 C717

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992. SEABRA, A. F. DE. *L'Areocerus fasciculatus* a S. Thomé. *Soc. Portug. des Sci. Nat. Mém., Ser. Zool.* 2:112-114. 1922. 506 Sol1M
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Life history and control methods.
996. VUILLET, J. Note sur un insecte nuisible au cacaoyer dans l'Ouest-Africain, *Adoretus hirtellus* Cash. (Rutelidae). *Com. d'Etudes Hist. et Sci. de l'Afrique Occident. Franç. B.* 8:313-317. Ref. Apr./June 1925. *Libr. Cong.*
997. WEIDNER, H. Phosphorus gabonator Thoms. als kakaoschädling und einige bemerkungen über weitere schädliche Phosphorus-arten (Col., Ceramb. Lamiin.). *Z. f. Pflanzenkrankh.* 48:210-223, illus. Ref. 1938. 464.8 Z3
Found on cacao branches from British Cameroons.

Diptera

998. CAMPOS R., F. El gigantesco tabano *Pantophthalmus bellardii* Bell. Su larva afecta al arbol de cacao. Guayaquil, Ecuador. *Col. Nac. Vicente Rocafuerte. Rev.* 14(46/47):17-19, illus. 1932. 516 G93
Not previously reported attacking cacao trees.
999. MACFIE, J. W. S. *Ceratopogonidae* collected in Trinidad from cacao flowers. *B. Ent. Res.* 35:297-300, illus. Nov. 1944. 421 B87
Includes *Forcipomyia quasi-ingrami* and *Lasiohelea nana*, believed to be agents of pollination, and several species found on moss on cacao tree trunks.

Hemiptera

1000. BONDAR, G. Cancro dos fructos de cacao, causado por *Monalonion xanthophyllum*, Walk., "chupança de cacao." *Rodriguésia* 3:179-186, illus. Sept./Dec. 1937. 442.8 R61
Proposes name "mal de chupança" for injuries caused by this insect.
1001. BONDAR, G. O "chupança do cacao." Brazil. *Min. da Agr., Indus. e Com. B.* 17:60-63. July 1928. 9.2 Ag83
Monalonion xanthophilus.
1002. BONDAR, G. Percevejos do cacauero. *Correio Agr.* 2:234-235, illus. Aug. 1924. 9.2 C812
Dinocoris macrapis; D. amplus.
1003. *BOX, H. E. Capsid pests of cocoa in West Africa. Outline of present and proposed lines of research. *West African Cacao Res. Inst. Memo.* 12, 11 p. 1943.
Abstract in *Rev. Appl. Ent., Ser. A*, 32:287-288. Aug. 1944. 421 R325
1004. CALLAN, E. M. Cacao stink-bugs (Hem., Pentatomidae) in Trinidad, B. W. I. *Rev. de Ent.* 15:321-324. Dec. 1944. 421 R326

*Not examined.

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Bryocoropsis cotterelli.
1006. FENNAH, R. G. A preliminary list of the Pentatomidae of Trinidad, B. W. I. Trop. Agr. [Trinidad] 12:192-194. July 1935. 26 T754
Mecistorhinus (Pentatoma) picea and *Mecistorhinus* (Cimex) tripteris taken on cacao.
1007. GOLDING, F. D. Capsid pests of cacao in Nigeria. B. Ent. Res. 32:83-89. Ref. Apr. 1941. 421 B87
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1008. KNIGHT, H. H. Monalonion Herrich-Schaeffer; descriptions of cacao species from Brazil (Hemiptera, Miridae). Rev. de Ent. 10:226-230. Apr. 1939. 421 R326
Monalonion flavisignatum, n. sp., *M. bahiense*, and *M. bondari*.
1009. MAYNÉ, R., and GHESQUIÈRE, J. Hémiptères nuisibles aux végétaux du Congo Belge. Ann. de Gembleux 40:1-41, illus. Jan. 1934. 13 G28
Index refers to 66 species attacking cacao.
1010. NICOL, J. M. The present position of research on capsid pests of cacao in West Africa. Cacao Res. Conf. Rpt. & Proc. 1945:111-113. Ref. 1945. 68.39 C64
1011. SQUIRE, F. A. On the economic importance of the Capsidae in the Guinean Region. Rev. de Ent. 18:219-247. Ref. Aug. 1947. 421 R326
Deals chiefly with five species attacking cacao: *Sahlbergella singularis*, *Bryocoropsis laticollis*, *Distantiella theobroma*, *Helopeltis bergrothi*, and *Odoniella reuteri*. Discusses distribution, nature of damage, bionomics, seasonal fluctuations, resistance factors, alternative host plants, natural enemies, and possible control measures.

Helopeltis

1012. BETREM, J. G. Derrispoeder als middel ter bestrijding van de Helopeltis in de cacao-cultuur. Bergcultures 14:134-154. Feb. 3, 1940. 22.5 B45
Reports large-scale field experiments in use of derris powder against *Helopeltis* attacking cacao in Java.
1013. BETREM, J. G. Kort verslag van een proef over bestrijding van *Helopeltis* in cacao door middel van verstuiven van derrispoeder. Bergcultures 12:1790-1796, illus. Dec. 24, 1938. 22.5 B45
1014. BETREM, J. G., and OSTENDORF, F. W. Resultaten van *Helopeltis*-vangproef MJ 373 over de periode Januari 1935 tot en met November 1936. Bergcultures 11:835-840. June 5, 1937. 22.5 B45
Helopeltis-catching tests at Geta cacao plantation.
1015. BETREM, J. G., and OSTENDORF, F. W. Twee *Helopeltis*-vangproeven bij cacao op de onderneming Geta. Bergcultures 10:1456-1459. Ref. Nov. 21, 1936. 22.5 B45
Helopeltis-catching tests.
1016. BETREM, J. G. Verdere gegevens omtrent de bestrijding van de *Helopeltis* door middel van derrispoeder. Bergcultures 15:238-249. Mar. 1, 1941. 22.5 B45
Use of derris against *Helopeltis* on cacao in Java.
1017. GIESBERGER, G. Bestrijding van *Helopeltis* bij cacao met loodarsenaat. Arch. v. Koffiecult. Nederland. Indië 14:100-102. Jan. 1940. 68.28 Ar2
Use of lead arsenate to control *Helopeltis* on cacao.
1018. GIESBERGER, G. Eenige waarnemingen over de aantasting van cacao door *Helopeltis*. Arch. v. Koffiecult. Nederland. Indië 14:44-99. Jan. 1940. 68.28 Ar2
Notes on *Helopeltis* attacking cacao.
1019. JONG, J. K. DE. *Helopeltis* in cacaotuin. Bergcultures 8:658-667. July 14, 1934. 22.5 B45
1020. JONG, J. K. DE. *Helopeltis* in de cacao. Bergcultures 6:523-528. May 21, 1932. 22.5 B45
1021. LEVERT, P. Eenige gegevens over *Helopeltis*-aantasting bij cacao. Bergcultures 13:1290-1300. Sept. 16, 1939. 22.5 B45
Discusses influence of black ants (*Dolichoderus bituberculatus*) and lice, influence of *Plagiolipsis longipes*, and influence of sap composition on the extent of *Helopeltis* infestation.
1022. LEVERT, P. H. Het mier-luis-complex bij cacao en verdere gegevens over *Helopeltis*-aantasting. Arch. v. Koffiecult. Nederland. Indië 14:1-43. Ref. Jan. 1940. 68.28 Ar2
Discusses the ant-mealybug complex in cacao plantings and control of *Helopeltis*.

Helopeltis--Continued.

1023. MENZEL, R. Over de in *Helopeltis* parasiteerende sluipwesp. Thee 5:115-120, illus. Dec. 1924. 68.18 T34
A species of *Euphorus* found on *Helopeltis* on tea and cacao in Java.
1024. MENZEL, R. Over spinnen- en sluipwespen-cocons en een parasiet der cacao-*Helopeltis*. Thee 5:72-75, illus. Sept. 1924. 68.18 T34
Includes notes on a parasite of *Helopeltis*, probably of the genus *Euphorus*.
1025. MEYER, A. H. Derrisbestuiving ter bestrijding van *Helopeltis*. Bergcultures 13:1487. Oct. 21, 1939. 22.5 B45
1026. MEYER, A. H. Het *Helopeltis*-vraagstuk in de cacao. Bergcultures 11:622-635. May 1, 1937. 22.5 B45
Discussion of 16 questions dealing with the *Helopeltis* problem in Java.
1027. MEYER, A. H. Twee *Helopeltis*-vangproeven op de onderneming Getas. Bergcultures 11:150-151. Jan. 30, 1937. 22.5 B45
Helopeltis-catching tests on the Geta Estate.
1028. MILLER, N. C. E. A new Malayan species of *Helopeltis* (Rhynchota, Capsidae). B. Ent. Res. 30:343-344, illus. Nov. 1939. 421 B87
Helopeltis theobromae, n. sp., on cacao and plants of *Bixa orellana* growing nearby in the Federated Malay States.
1029. MOHR, J. C. VAN DE M. Au sujet du rôle de certaines fourmis dans les plantations coloniales. B. Agr. du Congo Belge 18:97-106, illus. Mar. 1927. 24 K83
Includes account of use of black ants, *Dolichoderus bituberculatus*, in control of *Helopeltis* on cacao in Java.
1030. PEELLEN, J. R. C. Enkele nabetrachtingen over het ter vergadering der Plantersvereniging Semarang-Kedoe behandelde agendapunt: "Bestrijding van *Helopeltis* in cacao." Bergcultures 11:878-886. June 12, 1937. 22.5 B45
Discusses trapping and other control methods.
1031. UPHOF, J. C. T. El hemiptero *Helopeltis* del cacahual y las hormigas que lo ahuyentan. Hacienda 39:11, illus. Jan. 1944. 6 H11
Natural control of *Helopeltis antonii* by *Dolichoderus bituberculatus*, and dependence of the latter on *Pseudococcus crotonis*, in Java cocoa plantations.

Sahlbergella

1032. BOX, H. E. The cacao pest situation in West Africa and the Cameroons, with special reference to *Sahlbergella singularis* Hagl. and *S. theobroma* Dist. (Hemiptera: Capsidae). Report upon a visit to French Togo, Dahomey, Nigeria and the Cameroons during the dry season, December, 1943 to March, 1944. West African Cacao Res. Inst. Tech. B. 1, 69 p. Ref. May 1944. 68.39 T12
Abstract in Rev. Appl. Ent. 33:195-196. 1945.
1033. *BOX, H. E. The *Sahlbergella* menace to Gold Coast cocoa. West African Cacao Res. Inst. Memo. 9, 8 p. 1944.
Abstract in Rev. Appl. Ent., Ser. A, 32:287. Aug. 1944. 421 R325
Reviewed in B. Agr. du Congo Belge 37:205-208. Mar. 1946. 24 K83
1034. BREDO, H. J. Contribution à l'étude de *Sahlbergella singularis* Hagl. B. Agr. du Congo Belge 22:81-98, illus. Ref. Mar. 1931. 24 K83
Biology and control measures.
1035. COTTERELL, G. S. Life history and habits, etc., of *Sahlbergella singularis* Hagl. and *Sahlbergella theobroma* Dist. Gold Coast Dept. Agr. B. 7:40-43, illus. 1924. 24 G24B
Abstract of Bulletin 3, Preliminary study of the life-history and habits of *Sahlbergella singularis* Hagl. and *Sahlbergella theobroma* Dist.
1036. COTTERELL, G. S. A new parasite of *Sahlbergella singularis* Hagl. Gold Coast Dept. Agr. B. 7:44-46, illus. 1927. 24 G56B
Euphorus sahlbergellae Wilkinson.
1037. COTTERELL, G. S. The occurrence of *Sahlbergella* spp. and other pests of cacao in Fernando Póo, San Thomé and the Belgian Congo. Gold Coast. Dept. Agr. B. 20:162-171. Ref. 24 G56B
1038. COTTERELL, G. S. Preliminary study of the life-history and habits of *Sahlbergella singularis* Hagl. and *Sahlbergella theobroma* Dist., attacking cocoa on the Gold Coast, with suggested control measures. Gold Coast Dept. Agr. B. 3, 26 p., illus. June 1926. 24 G56B

*Not examined.

1039. COTTERELL, G. S. Report on the occurrence of *Sahlbergella* spp. and other insect pests of cacao in Fernando Póo, San Thomé and the Belgian Congo. Gold Coast. Dept. Agr. B. 22:112-145, illus. Ref. 1930. 24 G56B

Includes rainfall tables for Fernando Póo, San Thomé, and Belgian Congo.

1040. FOURNEAU, L. Le *Sahlbergella* du cacaoyer à la Côte d'Ivoire. Rev. de Bot. Appl. et d'Agr. Colon. 8: 509-510. July 1928. 26 R323

Sahlbergella singularis.

1041. POSNETTE, A. F. Resistance of *Theobroma cacao* to *Sahlbergella* spp. on the Gold Coast. B. Ent. Res. 34:159-162. Ref. June 1943. 421 B87

Under experimental conditions neither *Sahlbergella theobroma* nor *Sahlbergella singularis* exercised any constant choice between shoots from young and old trees.

1042. WILKINSON, D. S. On two new parasites from West Africa bred from the cacao barksapper (*Sahlbergella*). B. Ent. Res. 17:309-311, illus. Mar. 1927. 421 B87

Euphorus sahlbergellae, n. sp., and *Mesochorus melanothorax*, n. sp.

Homoptera

1043. BALACHOWSKY, A. Contribution à l'étude de la faune du Congo Belge. Diaspines nuisibles au caféier et au cacaoyer. Rev. de Path. Veg. et d'Ent. Agr. de France 16:141-145, illus. Ref. Apr./May 1929. 464.9 Sol

Describes *Aspidiotus gracilis* sp. nov., found on cacao leaves.

1044. BALLOU, H. A. Mealy-bug on cacao. Agr. News [Barbadoes] 21:74. Mar. 4, 1922. 8 W525A

Reports collection of *Pseudococcus citri*, P. P. bromeliae, and *Philephedra broadwayi* on cacao in Grenada.

1045. CAMPOS R., F. Algo sobre las pestes reinantes del cacao. Guayaquil, Ecuador. Col. Nac. Vicente Rocafuerte. Rev. 14(46/47):79-90. 1932. 516 G93

Discusses and names *Ormenis albigyna*, n. sp., supposed carrier of witches broom disease, and considers briefly other insects injurious to cacao.

1046. HAMBLETON, E. J. Studies of hypogeic mealybugs. Rev. de Ent. 17:1-77, illus. Aug. 1946. 421 R326

Includes descriptions of the following new species found on roots of *Theobroma cacao*: *Morrisonella globocula*, from Trinidad, *M. theobromae*, from Ecuador, and *Ripersiella ornata*, from Trinidad.

1047. PICKLES, A. Scale insects of cocoa. Agr. Soc. Trinidad & Tobago. Proc. 41:579-584. Sept. 1941. 8 T73

Howardia biclavus and *Asterolecanium pustulans*.

1048. SEABRA, A. F. DE. Description d'un psyllidae ravageur des feuilles et des jeunes fruits des cacaoyers. Soc. Portug. des Sci. Nat. Mém., Ser. Zool. 2:97-100, illus. 1922. 506 SolM

Not identified.

1049. SEABRA, A. F. DE. Note sur l'habitat de l'*Aspidiotus articulatus* a S. Thomé. Soc. Portug. des Sci. Nat. Mém., Ser. Zool., 2:116-118. 1922. 506 SolM

On cacao and other cultivated plants.

1050. SILVA, P. Mais um Membracideo nocivo ao cacaueiro. Bahia Rur. 6(62):7, illus. Ref. Jan. 1939. 9.2 B142

Hoplophora porosa, Wlk. (*Hoplophorion pertusa*, Germ.) 1051. SILVA, P. Sobre a espécie de *Phrictus* (Hom., Fulgoridae), atacando o cacaueiro na Bafa. Rev. de Ent. 16:267-268. Aug. 1945. 421 R326

Phrictus diadema, not *Phrictus quinquepartitus*.

1052. STRICKLAND, A. H. Coccids attacking cacao (*Theobroma cacao*, L.), in West Africa, with descriptions of five new species. B. Ent. Res. 38:497-523, illus. Ref. Dec. 1947. 421 B87

Coccidel la spelaea, *Tylococcus westwoodi*, *Formicococcus tafoensis*, *Farinococcus loranthi*, *Newsteadia wacri*, n. spp.

1053. VAYSSIÈRE, P. Trois nouveaux Stictococcus (Hem. Coccidae). Soc. Ent. France. B. 40:282-287, illus. Dec. 26, 1935. 420 F84B

Includes *Stictococcus aliberti*, n. sp., from cacao in French Togoland.

1054. WILLIAMS, C. B. A frog hopper damaging cacao in Panama. B. Ent. Res. 13:271-274, illus. Jan. 1923. 421 B87

Clastoptera theobromae, Williams, sp. n

1055. CARTER, W. Insect notes from South America with special reference to *Pseudococcus brevipes* and mealybug wilt [of pineapple]. J. Econ. Ent. 42:761-766. Oct. 1949. 421 J822

Includes report on test of effect of mealybugs on cacao plants in an area free of virus disease.

1056. HALL, W. J. The identity of a mealybug vector of "swollen shoot" virus disease of cacao in West Africa. B. Ent. Res. 36:305-313, illus. Nov. 1945. 421 B87

Compares *Pseudococcus exitiabilis* and *Pseudococcus njalensis*.

1057. LAING, F. A new injurious mealy-bug from the Gold Coast. B. Ent. Res. 35:91-93, illus. Apr. 1944. 421 B87

Pseudococcus exitiabilis, n. sp., is reported as one of the vectors of swollen-shoot virus disease of cacao.

1058. NICOL, J., OWEN, H., and STRICKLAND, A. H. Biological control of the mealybug vectors of swollen shoot virus of cacao. Nature [London] 165:490. Mar. 25, 1950. 472 N21

Experiments using *Aspergillus* spp. against *Pseudococcus* under laboratory conditions.

1059. POSNETTE, A. F., and STRICKLAND, A. H. Parasitism of the mealybug vectors of swollen-shoot of cacao. Nature [London] 163:105-106. Ref. Jan. 15, 1949. 472 N21

Pseudococcus njalensis attacked by *Anagyrus* spp.

1060. RISBEC, J. Les parasites des *Pseudococcus* du cacaoyer, vecteurs du swollen shoot en Côte d'Ivoire. Agron. Trop. 4:578-581. Nov./Dec. 1949. 26 Ag86

Leptomastix longipennis, *Anagyrus subproximus*, *Achrysopophagus aegyptiacus*, *Coccophoctonus abengourou* n. sp., and *Thysanus* sp.

1061. SQUIRE, F. A. Entomological aspects of 'swollen shoot' of cacao. Nature [London] 162:743. Nov. 6, 1948. 472 N21

Suggests biological methods to control *Pseudococcus* species believed to be transmitters of the virus.

Hymenoptera

1062. BONDAR, G. A formiga caçarema nos cacauais. Bahia Rur. 1:346-348, illus. July 1934. 9.2 B142

Azteca charitifex.

1063. BONDAR, G. A formiga de enxerto, praga dos cacaues na Bahia. Campo [Rio de Janeiro] 1(3):50-52, illus. Mar. 1930. 9.2 C15

Damage by nests of *Azteca charitifex* and epiphytic plants associated with these nests on limbs and trunks of cacao trees.

1064. BONDAR, G. A formiga saúva, praga dos cacaues. Correio Agr. 8:29-32. Feb. 1930. 9.2 C812

Atta cephalotes.

1065. CALLAN, E. M. A note on *Phanuropsis semiflaviventris* Girault (Hym., Scelionidae), an egg-parasite of cacao stink-bugs [*Mecistorhinus* spp.]. Roy. Ent. Soc., London. Proc. Ser. A:Gen. Ent. 19:48-49. June 22, 1944. 420 L84Pa

In Trinidad.

1066. PLANK, H. K. La hormiga arriera [*Atta* spp.], los medios para combatirla en las huertas de cacao del Ecuador. Asoc. de Agr. del Ecuador B. 1(3):37-45. May 1921. 9.5 As5B

Translated from English by E. Molestina O.

1067. SILVA, P. A "formiga de enxerto" [*Azteca paraensis* var. *bondari*]. Inst. de Cacau da Bahia. B. de Divulgação 1, 21 p., illus. 1945. 63.39 In7

Includes control methods on cacao.

1068. SILVA, P., and BARBOSA, M. DA R. O Instituto de Cacau e o combate á formiga de enxerto [*Azteca paraensis bondari*]. Bahia Rur. 16(7):24-26, 23. July 1948. 9.2 B142

1069. URICH, F. W. Ants in relation to agriculture. Agr. Soc. Trinidad & Tobago. Proc. 23:227-235. June 1923. 8 T73

Cacao fields, p. 231-233.

Isoptera

1070. PATTERSON, W. H. Notes on termites in the Gold Coast. Gold Coast Dept. Agr. B. 7:35-39. 1927. 24 G56B

Termites attacking cacao, p. 37.

1071. SEABRA, A. F. DE. Quelques observations sur le *Neotermes gestri* F. Silv. et le *Microcerotermes parvus theobromae* Desn. Soc. Portug. des Sci. Nat. Mém., Sér. Zool., 2:24-28, illus. 1922. 506 SoIM
Termites attacking cacao in São Thomé.
1072. SEABRA, A. F. DE. Les termites des plantations de cacaoyers. Étude agricole. Soc. Portug. des Sci. Nat. Mém., Sér. Zool., 2:78-87, illus. 1922. 506 SoIM

Lepidoptera

1073. BONDAR, G. Larve des fruits du cacao, Marmara izortha Meyr. Off. Internatl. du Cacao et Choc. B. Off. 7:353-355. Nov. 1937. 68.38 Of2
French and English.
1074. BONDAR, G. Lepidopteros nocivos ao cacaueiro no Estado da Bahia. Correio Agr. 2:260-265, illus. Sept. 1924. 9.2 C812
Melanchroia mecinnana; Sylepta prorogata; Callicore meridionales; Myelosis duplipunctella, and several unidentified species.
1075. BONDAR, G. Traça das frutas de cacau, Marmara izortha Meyr. Campo [Rio de Janeiro] 8(90): 11-12, illus. June 1937. 9.2 C15
1076. HEURN, W. C. VAN. Waarnemingen betreffende een parasiet van het cacao-motje. Ent. Ber. 6:26-27. Nov. 1921. 420 N38B
Acrocercops cramerella parasitized by an Ichneumonid of the genus Mesostenus.
1077. NOYES, W. M. Moth pests in cocoa and confectionery. B. Ent. Res. 21:77-121. Ref. Mar. 1930. 421 B87
Discusses the moths concerned, various recommended methods of control, tests of methods, and recommendations.
1078. OTANES, F. Q. Notes on a cacao pod borer moth Acrocercops cramerella Snell. Philippine J. Agr. 7:419-424, illus. Fourth quarter 1936. 25 P543
Includes suggestions for control.
1079. SILVA, P. Novo registro e o primeiro hospedeiro de Promasipoda pinguoides T. T. (Diptera, Exoristidae) no Brasil. Rev. de Ent. 15:153-161, illus. Ref. Aug. 1944. 421 R326
Host is caterpillar of Arsenura armida, a new potential pest of cacao.
1080. SILVA, P., and HEINRICH, C. Stenoma decora Zeller (Lep. Stenomatidae), uma nova praga potencial do cacaueiro na Bafa, Brazil. Rev. de Ent. 17:361-374, illus. Ref. Dec. 1946. 421 R326
English summary.
On cacao and kapok (Ceiba pentandra).

Ephestia

1081. BONDAR, G. "Controle biológico da traça de cacau [Ephestia cautella] pelo Microbracon hebetor," por Pedrito Silva, 1947. Chacaras e Quintais 77:208. Feb. 15, 1948. 9.2 C34
Comments on the bulletin mentioned in title (item 1094).
1082. BUXTON, D. A. J. Cocoa moth (Ephestia elutella). Cocoa Res. Conf. Rpt. & Proc. 1945:156-157. 1945. 68.39 C64
1083. CHABOUSSOU, F. Contribution à l'étude d'Ephestia elutella Hübner. Rev. de Zool. Agr. et Appl. 36:20-32, 36-48, 81-90, 100-109, 154-158, 184-190, illus. Ref. Feb.-Dec. 1937. 410.9 So12
1084. CIFERRI, R. Una explicación biológica de la práctica del "pintado" del cacao. Agro 3(1/2):37-40. Jan./Apr. 1948. 9.95 Ag83
Claying of cacao beans as preventive of Ephestia infestation, and possibility of employing inert dusts for protection of stored beans.
1085. DEHUT, M. V. Produits susceptibles d'être employés dans la lutte contre la mite du cacao. Off. Internatl. des Fabric. de Choc. et de Cacao. B. Off. 3:111-117. Mar. 1933. 68.38 Of2
Summaries in English, German, Spanish, and Italian. Chiefly on the use of fumigants in warehouses.
1086. FERNANDO, M. The sources of Ephestia infestation of stored cacao in Ceylon. Trop. Agr. [Ceylon] 92:141-155. Ref. Mar. 1939. 26 T751
1087. FROGGATT, J. L. Ephestia cautella Wlk. moth pest of stored cocoa beans and copra. New Guinea Agr. Gaz. 3(2):23. Dec. 1937. 23 N453
Infestation of cacao beans attributed to storing near copra.

1088. GOLDING, F. D. Two new methods of trapping the cacao moth (Ephestia cautella). B. Ent. Res. 32:123-132. Ref. Aug. 1941. 421 B87
For use in warehouses.
1089. JOINT COMMITTEE ON CACAO INFESTATION. Report. Off. Internatl. des Fabric. de Choc. et Cacao. B. Off. 2:319-326. July 1932. 68.38 Of2
Joint committee of Manufacturers' Confectioners' Alliance and Cocoa Association of London.
Report on sources of infestation in cacao beans, with special reference to Ephestia elutella, and preventive measures.
1090. KNAPP, A. W. The cacao moth. Off. Internatl. des Fabric. de Choc. et Cacao. B. Off. 2:375-380. Oct. 1932. 68.28 Of2
Summaries in French, German, Spanish, Italian, and Portuguese.
Discusses the desirability of fumigation of cacao warehouses to combat Ephestia elutella.
1091. NICOL, J. M. Ephestia elutella and E. cautella infesting cacao. Gt. Brit. Imp. Inst. B. 33:171-174. Ref. July 1935. 26 G79
Identification of species in stored cacao.
1092. NICOL, J. M. Insect infestation of cacao beans in the producing countries, with a note on the extent to which Ephestia elutella Hub. and E. cautella Wlk. establish themselves in warehouses and factories in Great Britain. Gt. Brit. Imp. Inst. B. 39:17-25. Ref. Jan./Mar. 1941. 26 G79
1093. RANK, J. Die cacao-motte (Ephestia elutella). Off. Internatl. des Fabric. de Choc. et Cacao. B. Off. 3: 285-287. June 1933. 68.38 Of2
Summaries in French, English, Spanish, and Italian. Suggestions for control of cacao moth in warehouses.
1094. SILVA, P. Controle biologico da "traça do cacau" [Ephestia cautella] pelo Microbracon hebetor (Say). Inst. de Cacau da Bahia. B. Têc. 7, 39 p., illus. 1947. 68.39 B14B
English summary, p. 30-31.
For comments on this bulletin by G. Bondar, see item 1081.
1095. SILVA, P. Esclarecendo comentários sobre o Microbracon hebetor (Say) e a "traça do cacau" [Ephestia cautella]. Bahia Rur. 16(8):31. Aug. 1948. 9.2 B142
Reply to comments by G. Bondar on the preceding item.
1096. VAYSSIERE, P. Quelques conseils pour lutter efficacement contre la pyrale du cacao (Ephestia elutella Hbn). Off. Internatl. des Fabric. de Choc. et Cacao. B. Off. 4:401-408. Nov. 1934. 68.38 Of2
Summaries in English, German, Spanish, and Italian.
1097. WADSWORTH, R. V. Cacao beans and Ephestia elutella. Trop. Agr. [Trinidad] 10:97-100. Apr. 1933. 26 T754
Reports studies on effects of type of bean and of various processing and storage factors on susceptibility to insect attack.

Orthoptera

1098. BONDAR, G. Os insectos daninhos. XXXI. O gafanhoto (locustideo) do cacaueiro. Meroncidius intermedius, Brunner. Chacaras e Quintais, 29:27-28, illus. Jan. 15, 1924. 9.2 C34

Thysanoptera

1099. HOOD, J. D. A new Actinothrips (Thysanoptera) from Brazil. Brooklyn Ent. Soc. B. 23:147-150, illus. June 1928. 420 B79
Actinothrips bondari sp. n. from dead cacao leaves at Bahia, Brazil.

Selenothrips

1100. ADAMSON, A. M. Progress report on the introduction of a parasite of the cacao thrips from the Gold Coast to Trinidad, B. W. I. Trop. Agr. [Trinidad] 13:62-63. Mar. 1936. Ref. 26 T754
Dasyscaphus parvipennis.
1101. BONDAR, G. Ferrugem do cacáo causada por Selenothrips rubrocinctus, Giard, (Heliothrips rubrocinctus, Giard). Bahia Rur. 1:427-428. Aug. 1934. 9.2 B142
1102. CALLAN, E. M. Natural enemies of the cacao thrips. B. Ent. Res. 34:313-321. Ref. Dec. 1943. 421 B87

Reviews previous records of natural enemies of the cacao thrips, *Selenothrips rubrocinctus*, discussing those occurring in Trinidad, with comment on the importance of natural enemies in control.

1103. CALLAN, E. M. Sex ratio affected by host plant. *Nature* [London] 152:162-163. Aug. 7, 1943. 472 N21
Counts show that proportion of males of *Selenothrips rubrocinctus* is much higher on cashew than on cacao. Significance of phenomenon unknown.

1104. CALLAN, E. M. Thrips resistance in cacao. *Trop. Agr. [Trinidad]* 20:127-135. Ref. July 1943. 26 T754

Selenothrips rubrocinctus.

1105. COTTERELL, G. S. A new parasite of *Heliothrips rubrocincta*. *Gold Coast Dept. Agr. B.* 7:47-48, illus. 1927. 24 G24B

Parasite later identified as *Dasycapus parvipennis*.

1106. COTTERELL, G. S. The red banded cacao thrips, *Heliothrips rubrocinctus*, Giard. *Gold Coast Dept. Agr. B.* 13:94-99, illus. 1928. Ref. 24 G56B

1107. COTTERELL, G. S. Report on the collection and despatch to Trinidad of the parasite *Dasycapus parvipennis*. *Gold Coast Farmer* 4:172-174. Jan. 1936. 24 G563

For control of *Selenothrips rubrocinctus*.

1108. DARLING, H. S. The effect of light on the incidence of cacao thrips. *Trop. Agr. [Trinidad]* 19:151-162. Ref. Aug. 1942. 26 T754

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1142. LILIENTFELD-TOAL, O. A. VON. O preparo do cacau. *Bahia, Imprensa official do estado*, 1928. 21 p. Ref. *Libr. Cong.*
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1176. *ECKMANN, C. Über essigbakterien aus der kakaogärung. *Borna-Leipzig, Noske*, 1928. 55 p. Dissertation--Kiel.

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1178. FINCKE, H. Kleine beiträge zur untersuchung von kakaobohnen und kakaoerzeugnissen. (VI. mitteilung.) *Z. f. Untersuch. der Lebensmtl.* 56:312-334. Oct. 1928. 384 Z39

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1179. FONSECA, J. PINHEIRO DA. Fermentação do cacão. *Brazil. Min. da Agr., Indus., e Com. B.* 18:789-805. June 1929. 9.2 Ag83

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1180. FORSYTH, W. G. C. A method for studying the chemistry of cacao fermentation. *Nature [London]* 164: 25-26. Ref. July 2, 1949. 472 N21

Investigations using technique of chromatography.

1181. HARDY, F. The isoelectric theory. Its application to certain problems of crop products manufacture, and soil fertility. Pt. IV, 3. The fermentation of cacao. *Trop. Agr. [Trinidad]* 2:256-257. Nov. 1925. 26 T754

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1182. HOYNAK, S., POLANSKY, T. S., and STONE, R. W. Microbiological studies of cacao fermentation. *Food Res.* 6:471-479. Ref. Sept. 1941. 389.8 F7322

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1184. HUMPHRIES, E. C. Some problems of cacao fermentation. *Trop. Agr. [Trinidad]* 21:166-169. Ref. Sept. 1944. 26 T754

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1186. KNAPP, A. W., and WADSWORTH, R. V. The distribution of theobromine during the fermentation of cacao. *Soc. Chem. Indus. J. Trans.* 43:124T-126T. Ref. Apr. 25, 1926. 382 M31

1187. KNAPP, A. W. Experiments in the fermentation of cacao. *Soc. Chem. Indus. J. Trans.* 45:140T-142T. May 21, 1926. 382 M31

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1189. KNAPP, A. W. Scientific aspects of cacao fermentation. *Gt. Brit. Imp. Inst. B.* 33:31-49, 147-161, 306-319, 453-466; 34:154-180, 307-331, illus. Ref. Apr. 1935-July/Sept. 1936. 26 G79

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1191. LILIENFELD-TOAL, O. A. VON. Fortschritte und aufgaben der forschung auf dem gebiete der kakao-aufbereitung. *Off. Internatl. des Fabrik. de Choc. et Cacao. B. Off.* 2:437-443. Nov. 1932. 68.38 Of2

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1192. LILIENFELD-TOAL, O. A. VON. Über kakao-hefen, ein beitrage zur kenntnis der biologie der kakao-fermentation. *Tropenpflanzer* 30(2, sup.), 48 p., illus. Ref. Feb. 1927. 26 T75

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1198. PREUSS, P. Die aufbereitung des kakaos. *Tropenpflanzer* 29:343-350. Sept. 1926. 26 T75

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1199. STANER, P. La fermentation du cacao. *Agr. et Élevage* 5:97-98. June 13, 1931. 26 Ag84

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1203. STEVENS, F. L. Regarding the curing of cacao. Trinidad & Tobago. Dept. Agr. B. 21:27-35. 1925. 8 T732B
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1204. TISSOT, P. La fermentation du cacao. Rev. de Bot. Appl. et d'Agr. Trop. 16:264-276. Ref. Apr. 1936. 26 R323
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1205. VERTEUIL, J. DE. Fermentation of cacao. Agr. Soc. Trinidad & Tobago, Proc. 22:608-623. Aug. 1922. 8 T73
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