

国内委員 東京大学医学部

田中 恒男

1: 業務日程

7/28 21:30 KLMにてアムテルダムでトランジット

7/30 12:30 KLMにてラゴス着 大使館に直行

7/31 大使に表慶訪問 15:15 WTにてジョスへ出発

8/01 Dept. of Community Healthを訪問 Prof. TIWARIとEndemic Goitreの疫学調査についての打合せ、当部に所属するOUENEとOKORONKWOも立ち会ってTIWARIの指示を了承した。その後、CHCに出向き、乳児下痢症の患者を見る。

8/02 微生物学教室を訪問, Prof. SHONEKENと打合せ, その後生化学教室を訪問, Dr. SEN並びにUBON, 駐在専門員の野田氏とGOITREに関する環境要素の分析について打合せ。

8/03 Prof. IKEMEと会見, 彼は学部長職をProf. OJIに交代し, 国家計画省との交渉を終え, JICAの後援によって来年日本に研修に来ることを勧告してくれる様, 要請があった。当日, 乳児下痢の中間報告についての打合せを行った。

8/04 ジョス近郊のミヤンゴに出向。ミヤンゴは約25年前にGOITREの調査が実施された地区であり, 当時は患者は全く発見されなかったが, TIWARIの本年に実施した調査では, 学童や婦人に患者が多い結果が得られている。実際には今回住民を集めたPopulation Surveyは実施不可能であり, BASSA, L. G. A.での調査を実施する為には, 地元の幹部とのネゴシェーションが必要となる。しかし, TIWARIが8月一杯で離職する予定であり, 後任との引継が不可能なので, 本プロジェクトを展開していく為, 再度指導に来て欲しいという要請があった。

8/06 DeanのProf. OJTを訪問, GOITREの疫学調査について簡単な打合せを行った。彼は今回の携行備品としてのマイクロ・コンピュータに関心を示し, 学内での教育訓練計画を立案する様, 要請があった。午後, Chemical Pathologyの主任であるDr. ISICHEIとGOITREの患者のホルモン分析に関する打合せを行った。

8/07 ラッサ熱に関係したPANKSHIN病院を視察。地区病院として一応の設備は整っているが, マンパワーの不足や, 入院患者の減少などによって, 病院としての機能が完全に達成されていない部分もあった。午後, GOITREの疫学調査の勧告書を作成する作業を行った。

8/08 午後, 乳児下痢症についてのミーティングをSHONEKANが座長となって開催。今川医師から現在までに集積された症例の菌の分布や感受性について報告された。

8/09 GOITREに関しての今後の調査計画をTIWARIに手交。更に, ISICHEIのテクノロジストであるBANWOにも届けた。本調査計画は, 現地疫学調査, 環境要素のTrace Elementの分析, GOITRE患者の臨床生化学的分析, 地質学的検討の多面的なものである。

8/10-8/12 ナイジェリアの視察

8/13 RecommendationのSupplementを作成。

8/14 JICA Lab.での細菌培養に伴う手順のスライドを作成。

8/15 ジョス郊外のピンチに赴き、GOITREの患者と水の採集を行った。BASSAL, G. A. のBig Manが、地区の代表を集め、本調査に協力する様指示した。その後、タウン・マーケットでGOITREの婦人を触診し、BEGNIN-typeのGOITREである事を確認した。また、井戸、川、水たまりなどから水を採取、野田専門員が分析を担当する事となった。

8/16 TIWARIとISICHEIと我々で、GOITREの共同プロジェクトの計画を検討した。ただ、TIWARIは、本年8月で帰国するので、後任への申しつぎは十分出来ない。小生のRecommendationについて適切な評価を得た。今後この方針で研究を進めていく事が納得された。

8/17 ロクウィールスの抗体検査のプロセスのスライド作成。乳児下痢症についての菌検索の結果について、雨期、乾期および中間期の三区分での発現率を、統計的に検討した。但し、地域調査が行なわれていない為、母集団の確定が出来ないので、疫学的原理の推定は出来ない。

8/18 GOITREの疫学的研究についての追加コメントを、OKORRONKWOに手交。ISICHEIにも渡す様依頼した。

8/19-8/21 マンドゥグリに出張。

8/22 資料整理を行なった。

8/23 Dr. ISICHEIとGOITREに関わるChemokineticsの分析について打合せた。ジョス大学はRadio Immunoassayについての設備を持たない為Enzymeassayで実施するとの返答を得た。但し、その実技の指導を派遣して欲しいとの要請があった。返答は保留している。その後、DeanのProf. OJI, SHONEKAN, IKEMEらに帰国の挨拶をした。OJIとIKEME, GOITREの疫学についての調査について、また来て欲しいとの要請を受けた。

8/24 WTにてラゴスへ出発。直ちに大使館へ直行。

8/25 KLMにてアムステルダムへ出発。アムスでトランジット。

8/26 KLMにて東京へ出発。

8/27 16:30東京新国際空港着。

**Some Proposals on the UNIJOS/JICA
Research Project on the ENDEMIC
GOITRE in the PLATEAU STATE.**

Prof. T. TANAKA (THE UNIV. of TOKIO)

INTRODUCTION

The Endemic Goitre is very serious problem on health in the world. As the Expert Committee of WHO, the prevalence of Endemic Goitre is so high in the TROPICAL AFRICA. Dr. WILSON, D.C. pointed the prevalence of the Goitre in NIGERIA, especially in the Northern Part, was about 46 % at the time of 1954. He emphasized that all of surveyed area in nine districts lied on the granites of the pre-Cambrian basement Complex, and it were associated with water which drain off those rocks. And he stressed that the prevalence in relation to the Iodine content of water supplies in the districts of different geological character was brought out as Table 1.

Table 1: Relation between prevalence of Endemic Goitre
and Iodine content of water-supply.

WILSON, D.C. in 1954.

Place	Source of Water	No. of subject	Prevalence on Endemic Goitre	Iodine content in water microgr./l.
ZAGUN	older Granite	162	46 %	0.6 - 0.7
MIANGO	basaltic lava flows	150	NIL	5.0
VOM	Pre-Cambrian Granite	250	3 %	0.6
ABAKALIKI	Deep water shaft	301	NIL	92.0

EKPECHI reported that an incidence of Goitre among females ranging up to 60 % in some of the market area of eastern Nigeria. There appeared to be no relationship between the geological nature of the soil and the incidence of the Endemic Goitre. And the iodine content of the water did not correlate with the incidence of Goitre. He examined on dietary habits in the area, this indicated that " much unfermented cassava was eaten in villages with a high incidence of goitre". According to the experiment, fairly large daily supplements of iodine partially overcome the effect of cassava on the thyroid gland. He stressed that the cyano-

genetic glycosides present in cassava were proposed as responsible for the Goitres. To determine whether there is a marked difference in the goitrogenic property of cassava prepared in the wet and dry seasons. Such a data GREER, M.A. and ASTWOOD, E.B. were developed and reported. And whereby the goitrogenic content of foods was assayed using human subjects. This data was published in 1948.

On this project, Professor TIWARI showed that the prevalence in the closed area in JOS was 18.9 % as average on school children in BASSA L.G.A.. The result was shown as Table 2.

Table 2: Prevalence of Goitre in BASSA district.

(by TIWARI and others.)

School	No. of Examined	Suffering the Goitre	Prevalence(%)
ZAGUN	339	89	26.3
BINCI	103	20	19.4
JENGRE	422	78	18.5
MIANGO	240	22	9.2

According to the report, there is some inconsistent phenomena with the WILSON's report. The reason might not be clear. As I investigate the town market in BINCI at 15th in Aug., some adult female have a nodular goitre. I palpated the swelled thyroid, and it is cleared as nontoxic goitre. However, it is not clear whether they are suffered from hypothyroidism or not. In the reference on Goitre, it is produced by a mechanism in which the anterior lobe of the pituitary is concerned as well as the thyroid gland, which is acted on by pituitary thyrotropic or thyroid-stimulating hormone (TSH).

Therefore, it should be developed the research project on endemic goitre so intensively in future. The purpose of the joint project is to establish the control measure on endemic goitre. In order to do it, we should define the goitrogene factors and compose the prophylaxis measure.

PROPOSAL

At first, we should to define the prevalence of endemic goitre, and to clear the goitrogene factors in the district. In order to do the programme, we should survey epidemiologically, and experiment on the mechanism of endemic goitre. However, the goitrogene factors are so many and it would be very difficult to detect the cause of endemic goitre so simply. We must try to do the programme continuously. I propose that the studying plan is as follows:

1: the screening examination on the Endemic Goitre should be done for the school children and student in selected districts, and checking the physical features and type of the Goitre should be checked, at first.

The way for selecting the district should be sampling by the multi-stage and classificational method by the community character.

2: the population survey should be done at the same district. The screening examination for the adult should be done. The screening examination are composed as the clinical investigation and health questionnaire. Moreover, the questionnaire on heredity should be done. The most important item is the disturbance on daily life, especially on work, house-work and childcare. And their property is the most important evidence for the epidemiological study and chemical pathological study, too.

3: the chemical analysis of trace element on the natural environmental factors, ex. soil, water, human excrement, plant and grass, vegetables and so on; relating to Iodine deficiency is very important way. Furthermore, it should be analysed on food (including mother's milk, cow-milk and goat-milk), and drink intaking daily.

4: the chemical pathological analysis of human specimen collecting from the child and adult suffering from the Goitre should be done. And it should be clear on the hormonal dynamics and action of antithyroid substance. As GREER et al. stressed that there is a marked difference in the goitrogenic property of Cassava prepared in the wet and dry seasons.

Therefore the chemical pathological work relates with the biochemical analysis on the environmental factors. However, the chemical pathological analysis is so difference from the chemical environmental analysis. but their combination is the key concept on the goitrogenous factors relating to the circulation of substance in and out of the body. In order to search the goitrogenic factors, we should use the radio-immuno assay, hormonal analysis and Atomic absorption analysis and so on. However, to collect the specimen from the patient of whom lives in normal social life except the admitting the hospital. is so difficult. But, the instruments has not yet been settled.

5: to make the Information Net work system is very important. The computer should be done for the purpose of disease control

The Data-Base is so valuable for the health care service.

On the other hand, statistical analysis is most important way for developing the prophyraxis for the Endemic Goitre and other diseases.

- 6: In the case of field work, we should request to set the informant or co-ordinator in the community. Because of such a matter, the resident refuse the request on the survey at some times, especially in the case of collection of human specimen. In order to collaborate with the resident in community, it should be necessary to set the informant (head of the community or interpretator on veteran of Hausa-English language).
- 7: To analyse the sanitary condition is very importance. Human waste is a part of subsistence circulation in eco-system. Therefore, it would give an influence ont the Iodine circulation. And we should clear the circulation of goitrogene factors as a point of ecological Viewpoint.
- 8: It should be analysed the socio-economical situation and cultural system, especially on marridge system to relate to here-dity and religion. Dietary pattern is decided under the racial culture. Such a matter is related to goitrogene factors.

As above, we should examine the community survey on the influence of the Endemic Goitre and should develop the control on Goitre. We should recommend the control measure to the state government. On the other hand, it is very important to clear the mechanics on progress the stage of Goitre from the view point of chemical pathology, especially by radio-immunoassey and hormonal analysis.

Meanwhile, we should make a content of epidemiological study on the endemic goitre as soon as possible. I would like to do it untill next week, would you kindly to discuss it with us.

P.S.: In the teaching hospital, you have not any specialist on Goitre and in the department of Community Health you don't have any specialist on epidemiology and statistitian. If possible, you should employ such specialists in the University. It is very important to be a specialist on Goitre, Epidemiology and Statistics. Andmore, you have not any new equipment on Radio-immunoassey or Enzaim-immunoassey for chemical analysis on human specimen. This project has been doing cooperation with the JICA. If you have any trouble, please contact to the JICA via Dr. TAKAHASHI, H. as a coordinator of JICA.

ANNEX:

they reported the age-wise prevalence below 16 yrs. old is higher than 16 yrs. old and above, moreover the prevalence in MIANGO's school children is defined as 9.2 % of the suffering with Goitre. Such a data is so different from WILSON's result. However, it couldn't define the reason of differentiation among them. Meanwhile, it is very interesting matter to occur such a contradictory phenomena. As prof. TIWARI described that the Endemic Goitre in the districts closing to JOS does not define as the toxic type. And he tried to collect the water in daily life in order to detect the Iodine relating to goitrogenic substance. According to the Half Yearly report on UNIJOS/JICA research project, there are some constrains in carrying out the work. On today's situation, it is a matter of course. The purpose of the project is oriented to prophyraxis the Endemic Goitre at finally. In order to do it, we should define the goitrogene factors as soon as possible, and establishing the way for prophyraxis on Goitre is profitable for the resident. But, the goitrogene factors among adult and children is so different. In general, the persons suffering from the Endemic Goitre are more likely to produce cretins, deaf-mutes and mental defectives. Moreover, heredity is related to the cause of Goitre Sequelae in progeny of goitrous parents are classified as five categories. These are as follows;

- 1: Congenital Thyroid Aplasia
- 2: Familial Congenital Goitrous Cretinism
- 3: Acquired Athyroidism
- 4: Acquired Hypothyroidism
- 5: Endemic Cretinism

The surveyed districts on this project are found the adult suffering from the Endemic Goitre so often. But the causes on occurrence are so different among the adult and children. I supposed the children suffering from the Goitre would may be caused as the sequelae in progeny of goitrous parents. On the case of the survey, the type of Goitre is not classified yet. There might be influenced by many goitrogene factors. In order to prote t from goitrogenetic influence, we should try to detect the goitrogene factors. As the survey method is comparing method in natural. Therefore, we should examine in many districts and to analyse a property , environmental factors and living condition between the high prevalence district and low or nil prevalence districts.

Date: 8th, Aug., 1984.

**Plan for the Epidemiological
Survey on Endemic Goitre in the
Plateau State.**

made by professor T. TANAKA

Purpose of the survey: 1) to clear the situation on incidence and prevalence on Endemic Goitre among the resident in the state and detect the cause of the disease, and still more to establish the control (or prophylaxis) measure against the endemic goitre.

Procedure of the Study: 1) to detect the incidence and prevalence on the Endemic goitre among the school children and student in the state.

2) to detect the incidence and prevalence on the Endemic Goitre among the resident at selected area.

3) to estimate the cause of Endemic Goitre in the State by the analysing data of the trace element in water, soil, food and human excreta and host factors including socio-economical conditions and genetic conditions.

4) to compare the attribution of community among the highly prevalence and lower prevalence district.

5) to clear the nature of Endemic Goitre in the State.

6) to continue the co-hort survey in future.

7) to detect the control measure for the prophylaxis, and treating the patient in the community.

8)

Concrete Programme: 1) to perform the screening examination on Goitre among the school children and student in each districts and analysing the incidence and prevalence ratio.

2) to clear the clasification on the nature of Goitre.

3) to perform the population survey in the selected districts as the grade of prevalence on Goitre.

4) to analyse the attribution of community and compare among the highly prevalence district with low prevalence district by statistically.

5) to examine on physico-chemical functions of patient and healthy people and to check the genetic factors.

6) to analyse the trace elements, especially on Iodine, in environmental factors, ex. water, soil, dietary food, and others.

7) to search on the sanitary conditions, dietary pattern, and living customs.

8) to detect the sequelae in progeny of goitrous parents.

9) to compose the model pattern on the mechanism of Endemic Goitre.

Method: 1) Screening Method is oriented to Medical diagnostic method.

- 2) Questionnaire is used by interviewing method. however, if the contents in the interviewing items dosen't fill enough, it should be correct the items.
- 3) the collected data should be analysed by stochastic method.
- 4) Trace elements are analysed by chemical analysing method.
- 5) Physico-chemical dynamics in human body is analysed by clinical chemo-pathological method.

The time schedule should be planned up so early.

My comment: This programme is so large scale and it is not so easy to perform as the reason for long time and many man-power. At first, we should do the field survey at the school and community in some district. Such a survey, it is necessary to cooperate with various kind of the scientific field. As the information on the endemic status on Goitre, we should select the district for the screening and interviewing survey.

I would like to request to you to give me your comments on my plan. It is very sorry, I have no any time to complete the plan. If possible, I would like to cooperate the survey.

Thank you, Professor I.C.Tiwari.

Prof. T. TANAKA, M.D., Ph.D., DPH



Supplement the Epidemiological study on the ENDEMIC GOITRE

Prof. T. TANAKA,

On the Screening Examination: It should be operated as several times in a year at the sampled districts and it is clear the incidence on GOITRE.

On analysis of the Environmental Factors, especially on Water and Foods: we should decide the specific point and it should be used by specific collecting bottle (like as ^{twice a month} Pettenkofer's collecting bottle). On measuring, the collected water is divided as three or five lots and all of the divided samples are measured the content of Trace Element, especially on IODINE.

The analysing data is calculated statistically and confirm the reliability of the value.

Such a value, I expect there might be seasonal variation, and the difference of dosis of Trace Element is so remarkable between the wet and dry seasons.

The estimated value on intaking dosis of Trace Element is applied as the Mean of statistical population through the year, and it should be needed to use the Quality Control Method. We should analyse in order to investigate on the changing process on prevalence in the area by using x-chart in QC Theory. According to the method, if the Mean of prevalence on Goitre continue to increase, the prevalence in future might be expected as so high prevalence and contrally, it continue to decrease as three points over the prevalence would be stable in future.. However, the variance is expected so difference among the month.

Andmore, the Foods intake is also different by season, and it should be analyse like as Water.

On Clinical Examination: We should follow the Clinical Pathological feature on the patient suffering from Goitre by retrospective and prospective investigation. And it should be added the Load Test on Ca. and Phosphate Reabsorption Test, too. The Pathological Feature of the Goitre is examined by Biopssy histrologically.

On the arrangement of the Data: it should be analysed on the relationship among the Goitrogene Factors and Prevalence, we should

analyse it by the Multivariate Analysis (ex. Factor Analysis, Path Analysis and so on) and Life-table Method. In order to get the enough data, we should operate continuously the Field Survey for a long time. As the result, we would like to make a formal report and would be published as publicly.

Thank You So Much for your Cooperation ^S an a Counter-Part.

野 田 千代一

生 化 学

University of Jos, Permanent State, No.10

P. O. Box 1318, Jos, NIGERIA

University of Jos, Jos, Plateau State, NIGERIA

概 要

都立衛生研究所の土屋悦輝先生とともにイオンクロマトを生化学の研究室に設置し、デモンストレーションといくつかの検体の分析を行う。土屋先生の帰国後は、原子吸光分析装置とイオンクロマトの使用法の教授を主眼としながら、自分でも若干のリサーチを行いわずかながら知見を得た。

仕事内容

1984年6月4日、都衛研の土屋先生と Jos に到着、機材の贈呈式のあとイオンクロマトアナライザー（ICA と略す）の設置を行う。7月3日・4日の両日、JICA プロジェクトグループのうち興味のある人を呼んで ICA のデモンストレーションを行う。7月12日に土屋先生が Jos を離れてからは原子吸光分析装置（AAS と略す）と ICA の使用法を数人に教えながら、自分でも若干の検体の分析を行う。

1. AAS, ICA 使用法の教授

AAS は日立 180-80 型、ICA は横河電機 IC 100 型である。JICA-UNI JOS プロジェクトチームのうち AAS あるいは ICA の使用を希望しているのは、Biochemistry, Zoology, Chemistry, Chemical, Pathology, Community Health, Geology の各研究室であり、それぞれの研究室から最高ひとりの定員で訓練することにした。もっとも Biochem. は機械の管理を任されている場所なので、複数を訓練することにした。現在までに Chemistry, Chemical Path. から各ひとり、Biochem から 2 人に AAS を、Community Health からひとりに ICA の使い方を教えた。残念なことに、ほぼ全員が 9~10月に1か月の休暇をとり、訓練が中断されたので、Biochem の Dr Ubom (只日本にて研修中) を除いてはひとりも信頼して機械を任すまでには到っていない。また私の台慢から Hg, As, Sn の分析に着手できずにいる。

2. サンプルングおよび測定

Jos の約 50km 北西に Binchi という場所があり、その周辺で甲状腺腫の患者が見出せる。Binchi 周辺の 7 つの村から 11 検体（井戸、泉、河川水）を 8 月 29 日から 10 月 31 日まで、原則としては 2 週間おきに採取し、いくつかの微量元素について測定を行った（表 1）。また同様に Jos 市内でも 7 か所から採水、測定した。その結果は表 2 に示す。検体数が少く、結論を出すには到っていない。

以上が4か月間の仕事の内容である。今後は訓練をさらに徹底して行い、機械の維持・管理まで任せられる人材を養成しなくてはならない。またHg, As,そして特にSnの分析にとりかかることも急務である。甲状腺腫関係では、発病地と健全地との両方において、サンプリングの範囲を広げ、さらに検体数を増やし、統計処理による比較(特にT)を行うことで甲状腺腫発現の解明の一助となるよう努力することが望まれる。11月からは、サンプリングの時期を2週間おきから1か月おきとする。これは検体の数からみて、2週間おきというのが物理的に困難であるためと、今までの調査で2週間では含有元素にほとんどが変化が現れないからである。

最後に、水分析関係は今やっと軌道にのってきたというところなので、結果が出るまでには少し時間がかかると思う。そして一番大切なことは、大学スタッフが自ら機械を操作し、保守まで責任をもってやれるようになることだと思うので、私としては彼らが功を焦って機械を壊すことのないようひきしめて行くつもりである。分析結果が少くても当分の間はご容赦願いたい。

表-1 甲状腺腫発生村から採取した水サンプル中の微量元素量

単位: I⁻だけ $\mu\text{g/l}$ 他 mg/l

採取地	I ⁻	F ⁻	Cl ⁻	No ₂ ⁻	No ₃ ⁻	Po ₄ ³⁻	Br ⁻	So ₄ ²⁻	K	Ca	Mg	Na	Zn	Cu	Fe	Mn	Cd	総硬度
ASSAK (ST)	0.5	0.1	0.5	0.0	0.3	0.0	0.0	0.6	0.7	0.2	0.1	1.3	0.011	0.002	0.45	0.016	0.000	0.9
BIMBOPO (W)	0.0	0.1	0.6	0.0	4.4	0.0	0.0	1.2	4.1	2.5	0.2	4.2	0.005	0.001	0.37	0.050	0.000	7.1
BIMBOPO (W)	0.0	0.7	14.2	0.0	52.6	0.2	0.0	9.1	3.6	17.9	1.6	8.1	0.000	0.000	0.70	0.023	0.000	51.5
BINCHI (W)	0.0	0.3	0.9	0.0	1.9	0.2	0.0	1.2	2.1	4.3	2.7	8.3	0.012	0.006	0.54	0.062	0.002	22.2
BINCHI (W)	2.4	0.2	3.6	0.0	0.1	0.0	0.0	6.9	7.1	24.5	2.2	8.8	0.018	0.000	2.75	0.141	0.000	70.6
DUTSENKURA (ST)	0.0	0.1	0.2	0.0	1.7	0.0	0.0	0.4	0.6	0.2	0.1	1.4	0.000	-	0.15	0.009	0.000	0.9
IBANDI (ST)	0.0	0.2	0.7	0.0	0.3	0.0	0.0	0.4	1.3	1.0	0.9	2.9	-	0.000	1.60	-	0.000	6.4
KISANCHI (SP)	0.0	0.2	1.7	0.0	0.9	0.0	0.0	1.7	1.1	3.1	1.4	7.9	0.003	0.000	0.45	0.014	0.000	13.7
KISANCHI (W)	0.0	0.2	3.9	0.0	0.5	0.2	0.0	1.0	2.5	2.9	1.1	6.0	0.005	0.000	0.50	0.027	0.000	11.9
KISHI-II (W)	0.0	0.3	3.0	0.0	9.7	0.5	0.0	2.2	2.1	3.2	0.9	8.3	0.014	0.000	1.03	0.028	0.002	11.8
KISHI-II (W)	0.0	0.2	6.7	0.0	3.9	0.5	0.0	0.6	2.3	3.1	0.5	8.2	0.010	0.000	0.57	0.018	0.000	9.9

注: ST - Stream

W - Well

SP - Spring

数値は2~5回の平均値。

表-2 JOS市内から採集したサンプル中の微量元素

単位: I⁻のみ $\mu\text{g}/\text{L}$ 他 mg/L

採取地	I ⁻	F ⁻	Cl ⁻	No ₂ ⁻	No ₃ ⁻	Po ₄ ³⁻	Br ⁻	So ₄ ²⁻	K	Ca	Mg	Na	Zn	Cu	Fe	Mn	Cd	総硬度
DOGONDUTSE (W)	0.0	0.2	1.5	0.0	4.5	0.0	0.0	1.1	1.5	0.1	0.1	4.0	0.008	0.000	0.05	0.013	0.003	0.7
JARAWA (W)	2.7	0.1	4.2	0.0	14.1	0.0	0.0	1.0	2.9	1.8	0.3	6.9	0.020	0.000	0.19	0.036	0.000	5.8
JOS RIVER (R)	0.0	0.1	1.1	0.0	1.5	0.0	0.0	0.7	1.5	0.2	0.1	2.3	0.005	0.000	0.19	0.004	0.003	0.9
LIBERTY (D)	1.5	0.2	0.8	0.0	0.1	0.0	0.0	0.6	1.3	0.8	0.3	1.1	0.000	0.000	0.40	0.011	0.000	3.3
NARAGUTA (ST)	3.9	0.1	1.7	0.0	0.4	0.0	0.0	0.6	1.4	1.0	0.5	3.8	0.007	0.005	0.61	0.065	0.002	4.6
TIN MININGØ (P)	7.0	0.2	0.6	0.0	0.1	0.0	0.0	0.5	0.6	0.8	0.2	0.9	0.005	0.003	0.16	0.016	0.000	2.9
TIN MININGØ (P)	1.3	0.2	0.4	0.0	0.0	0.0	0.0	0.3	0.7	0.9	0.3	0.9	0.010	0.014	0.26	0.039	0.000	3.5

注: w - Well
 R - River
 D - Dam
 ST - Stream
 P - Pond

数値は2~5回測定の平均値。

角 坂 照 貴

ジョス大学医学研究協力計画 衛生昆虫

名古屋市名東区猪高町猪子石延珠4の1 鬼頭マンション30B

愛知県愛知郡長手町岩体 愛知医科大学 寄生虫学教室

愛知医科大学 寄生虫学教室 (電話 05616-2-3311)

研究協力期間 昭和59年 9月20日～12月3日

9月21日ラゴス着, 温度管理品を除き全部紛失

携行機材を捜すため Jos 出発変更し 9月25日まで Lagos 待機

9月26日 Lagos 出発したが雷雨のため Jos に着陸できず 9月27日早朝着

研究概要

衛生昆虫に関する指導は高橋リーダーがすでにブユに関してこれを進められてきた。私も着任後これを引き継ぎ

- 1) オンコセルカ症媒介種 (*S. damnosum*) の Jos 大学周辺地域での分布
- 2) 他のブユ相の検索
- 3) オンコセルカ症の存在の確認

を行う計画を立てた。

Medical Entomology group

衛生昆虫チームは Prf. M. O. E. Iwuala をリーダーとしてブユ関係は Dr. D. M. Roberts (イギリス), カ関係は Dr. R. Irving-Bell (イギリス), オンコセルカ症は, Dr. C. O. E. Onwuliri が中心となって各々の Project を進めている。今日まで Project 1～Project 11 (資料参照) を進めているが次年度には Project 12～Project 13 を加える予定。

我々は Jos 周辺地域の 18ヶ所でブユ幼虫蛹の採集を行ない 16種類を同定した。この中にはオンコセルカ症媒介種である。 *S. damnosum* の breeding Site が 2ヶ所含まれていた。1ヶ所は、昨年リーダー等が *S. damnosum* を発見した場所であるが (Assob River), 今回、新しい breeding Site と思われる場所を見つけることができた。(Ibandi, Bassa. District, Plateau. State)

この地区の住民の話しによると、Goitre も存在し、また陰囊水腫も多数存在すると聞いている。今後 Goitre 調査と共に衛生昆虫関係でオンコセルカ症、フィラリア症の調査も行なう必要があると思われる。ブユの生態調査を行なっている大学院学生グループにはこの地区で *S. damnosum* の分析調査を更に続行願いたい。

オンコセルカ症の予備調査と考え Pambegma 周辺の数ヶ所 (KAURU Gar madi. Kubau. Dam-Wata. Kuli. Rikochi. Kubau.) および Mongu 周辺 (Mo ngu, Gindiri, Lere, Karjel) で住民への聞き込みを行なった。

方法としては、村のChiefまたは、Primary SchoolのHead Masterに意見を聞いて、それらしき患者が存在する場合には案内させる。数ヶ所では、ClinicのDoctorにも意見をもとめた。これらにより、オンコセルカ症患者と確定できる者はいなかったがかなり広範囲にフィラリア症と思われる陰囊水腫、象皮病患者が存在していた。

Mongu近くのGindiriでのPrimary Schoolにある失明者リストを見ると、ほとんどMeasles, Smallpox (1963-4年に発病1-3才)によるものであった。

MonguにはMongu leprosy & Rehabilitation Centerがありここでオンコセルカ症の情報が得られる可能性あり、入院中の患者の中に背腰部に皮膚状症のあるオンコセルカ症患者1名に会えた。

Jos周辺地域におけるブユ相

*Onchocerca volvulus*によって起こるオンコセルカ症は西アフリカにおいては *Similium damnosum* によって媒介されていると考えられる。すでにWHOは、1974年以来ボルタ川流域でコントロールを開始している。NigeriaにおいてもW.R Crosskey等の報告によりオンコセルカ症の存在が知られているがWHOのコントロール地域には入れられていない。Jos大学においてもDr. Robertsを中心に学生等が媒介種の生態分布を明らかにしつつある。

以下は我々が明らかにした Jos周辺地域でのブユ相と分布地である。

- | | |
|-----------------------------|---------------------------|
| 1. <i>Similium damnosum</i> | 13. <i>S. schoutedeni</i> |
| 2. <i>S. m hargreavesi</i> | 14. <i>S. hirsutum</i> |
| 3. <i>S. vorax</i> | 15. <i>S. loutetense</i> |
| 4. <i>S. cerviorutum</i> | 16. <i>S. walshi</i> ? |
| 5. <i>S. alcocki</i> | |
| 6. <i>S. aureosimile</i> | |
| 7. <i>S. unicornutum</i> | |
| 8. <i>S. mcmahoni</i> | |
| 9. <i>S. ruficorne</i> | |
| 10. <i>S. colasbelcouri</i> | |
| 11. <i>S. dentulosum</i> | |
| 12. <i>S. adersi</i> | |

1. Assob river

1. Assob river

	5/10/84	12/10/84	30/10/84
S. damnosum	Larvac 64, cocoon 40	Larvac 66, cocoon 90	Larvac 280, cocoon 78
S.m.hargreavesi	cocoon 33	226	107
S. vorax	3	21	60
S. cerviorutum	3	3	24
S. alcocki			1
S. aureosimile	1		
S. unicornutum			6
S. colaobelcour		1	1
S. schoutedeni			25
S. hirsutum	1	1	
S. walshi ?	1		2

2. Ibandi (R. Buja)

	13/10/84	31/10/84
S. damnosum	Larvac 104, cocoon 41	Larvac 181, cocoon 49
S.m.hargreavesi	135	1010
S. mcMahon	6	23
S. cerviorutum	3	13
S. adersi		3
S. loutetense		1
S. unicornutum		2
S. walshi		3

3. Wild life Park (Jos)

S. m.hargreavesi

S. aureosimile

S. alcocki

4. Bimbop river (Binchi)

S. unicornutum

S. mcmahoni

S. m.hargreavesi

S. aureosimile

S. alcocki

S. schoutedeni

5. Bassa stream (Bassa Local Government road)

S. m. hargreavesi

S. ruficorne

S. alcocki

S. aureosimile

S. hirsutum

6. Kagoro

S. colasbelcouri

S. vorax

7. Rafi river
 - S. m.hargreavesi
 - S. vorax
 - S. unicornutum
 - S. alcocki

8. near Rafi stream
 - S. alcocki
 - S. walshi ?

9. Bauch road near Jos
 - S. m.hargreavesi
 - S. ruficorne

10. Kofin KANO Forest Reserve
 - S. m.hargreavesi
 - S. ruficorne

11. near SAMINAKA
 - S. m.hargreavesi

12. Kurra fall
 - fall S. denlulosum
 - S. m.hargreavesi
 - S. vorax

- river in village
 - S. m.hargreavesi

13. Little Mongu

S. m.hargreavesi

S. ruficorne

S. adersi

S. mcmahoni

14. Mongu

S. m.hargreavesi

15. Panyam river

S. m.hargreavesi

S. mcmahoni

S. adersi

S. ruficorne

16. Upper Assob river

S. m.hargreavesi

S. alcocki

S. unicornutum

S. ruficorne

S. cervicatum

S. vorax

17. R.KADUNA (Garne - JAL)

S. m.hargreavesi

S. cerviorutum

S. ruficorne

S. aureosimile

S. mcmahoni

18. Gorma - Dom

S. m.hargreavesi

S. vorax

S. cerviorutum

S. ruficorne

S. sp. (Rif 9本)

資料 1

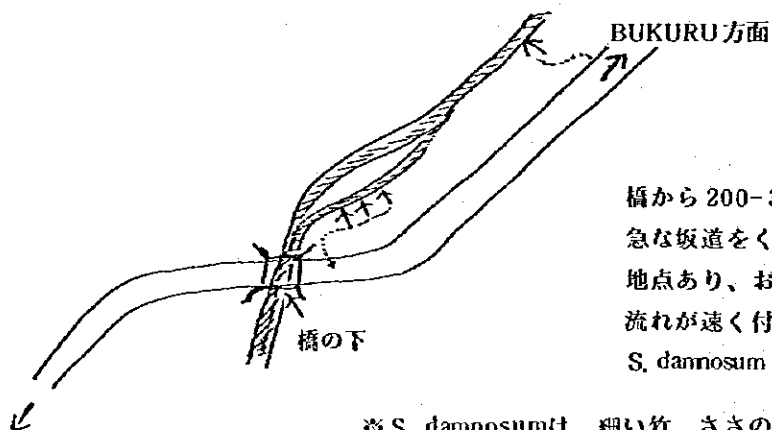
採集地点略図

Assob river

(Driver SUNDAY)

NARAGUTA

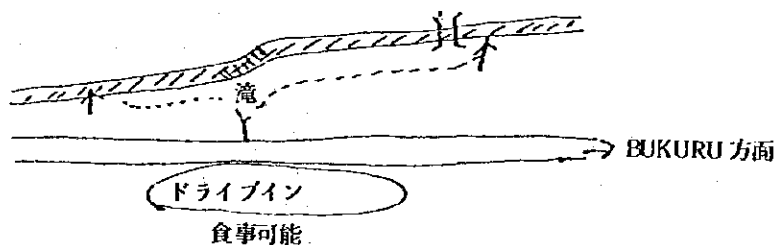
SHEET 168参照



橋から 200-300 m で道路横から急な坂道をくだると採集容易な地点あり、おりた地点よりすぐ下流は流れが速く付着物が多いため多くの S. dannosum 採集可能

※ S. dannosum は、細い竹、ささの葉、草木の根に多く付着

更に下流



食事可能

サボテンの間の水道を下流に向うと更に下流の川に出る。

Upper Assob

(Driver, SUNDAY)

Garma-JAL

R. KADUNA
Garma-Dam

流れなし
(11月)

すぐ下流に流れ有り

ASSOB

R. KADUNA
車ですぐそばまで行ける

Garma-JAL

Garma-Dam

峠をおりていく

Wild life park

(Driver SUNDAY)

カバ舎下流と思われる所で道を流れが横ぎっている。

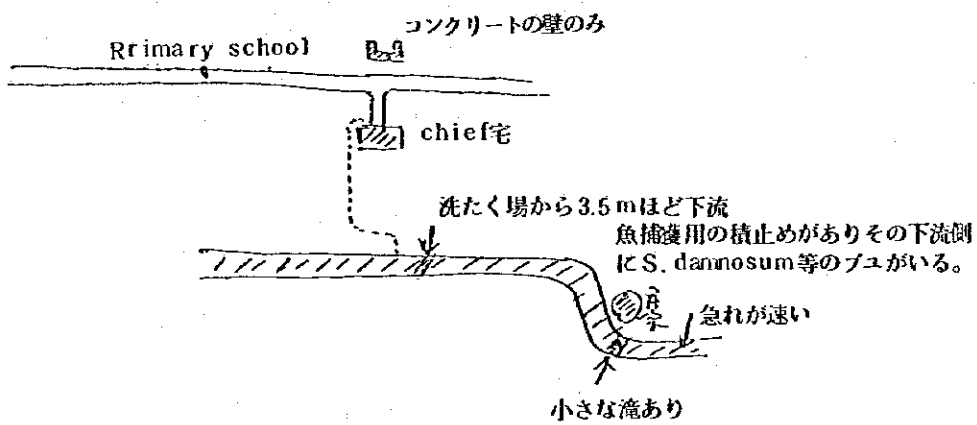
Bimbop rivsr

Binchiのchiefの所でベンジャミン氏にガイドを願う。

Ibandi

(Driver:ゴドウィン)

Binchi, kishi IIを通り更に峠をくだる。



Bassa

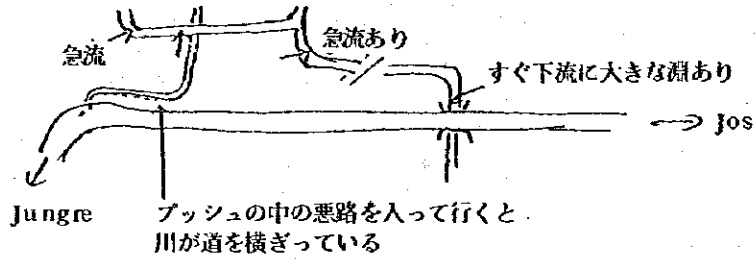


KAGORO

(Driver, ゴドウィン)

Rati river

(Driver SUNDAY)

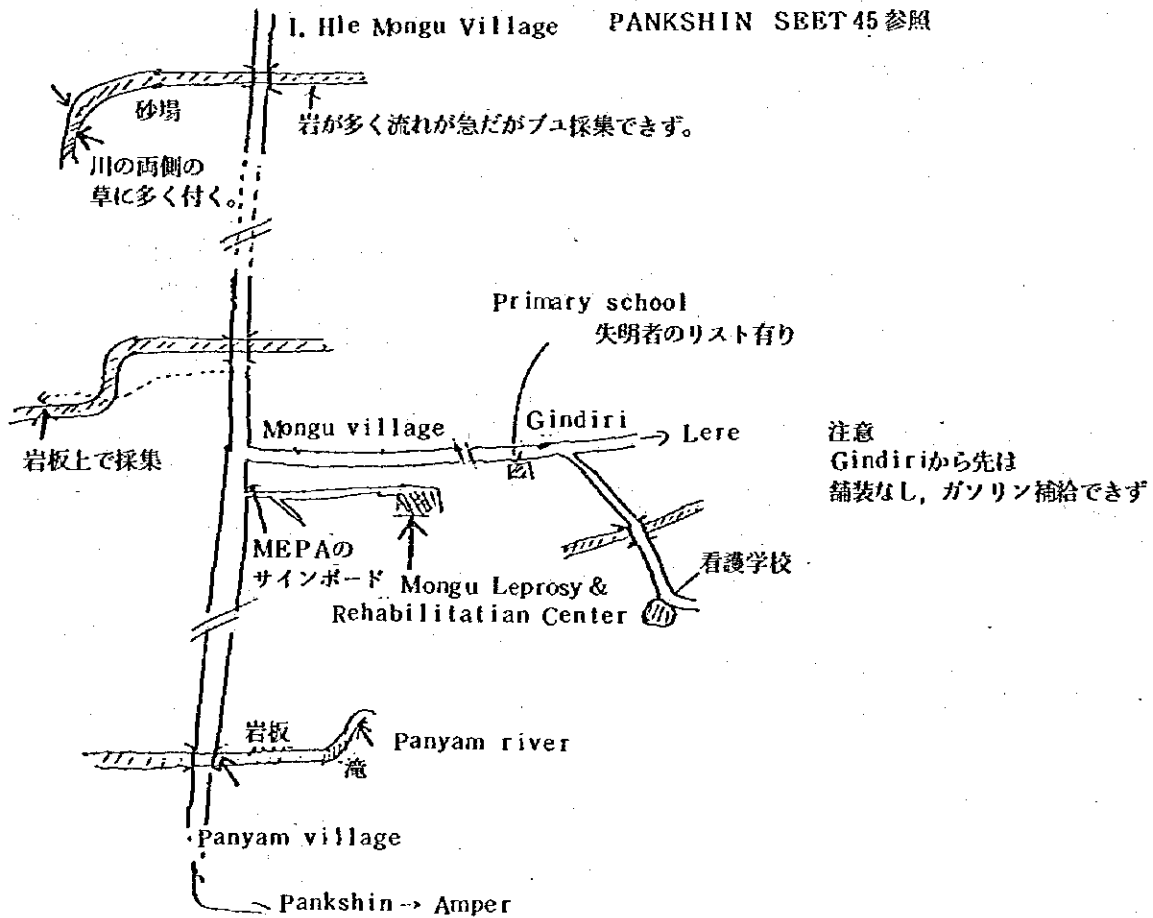


Little Mongu

(Driver: SUNDAY)

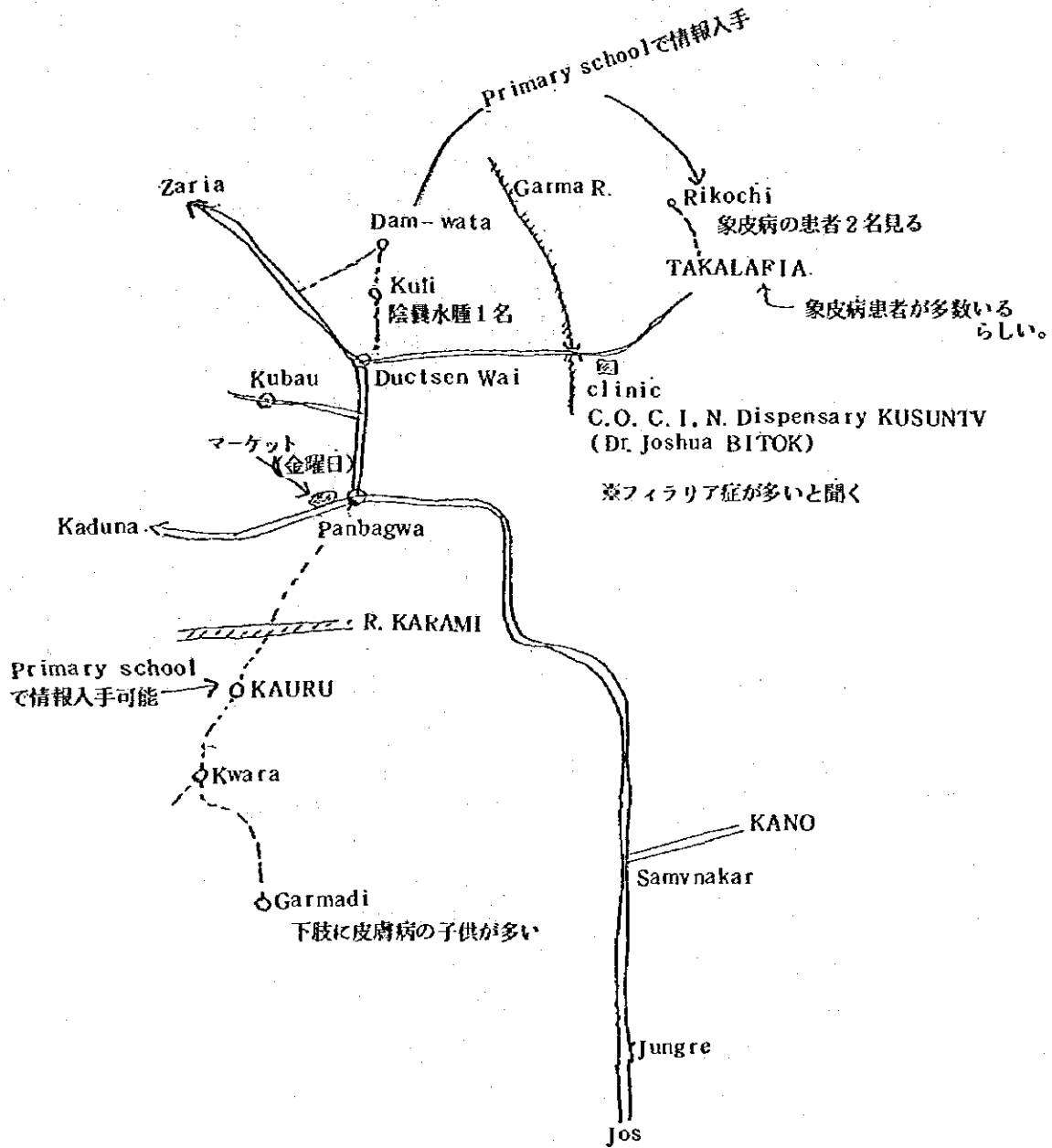
Mongu

Panyam river



Panbegwa 周辺

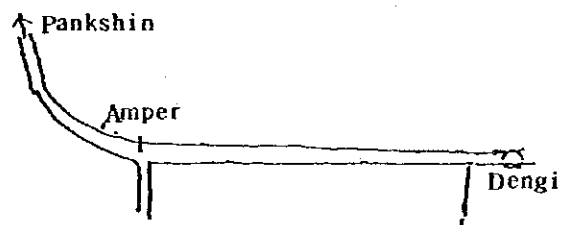
(Driver : SUNDAY)



Karfel

Pankshin SHEET45参照

(Driver SUNDAY)



Karfel

日曜日マーケットデイ
(chief 宅で情報入手)
象皮病有り

Kurra fall

(Mr. 高橋と同行)



滝へ
岩板上で採集

橋の上流
(左側)

Kurra village

入口のPolice station で入場許可
(名前を書く)

UNIVERSITY OF JOS, NIGERIAPHASE III PROJECT PROPOSALS ON UNIJOS - JICA COLLABORATIVE
RESEARCH PROJECTS ON MEDICAL ENTOMOLOGY (1984/85)

(A)

In furtherance of the Research Works for phases I and II, the following Projects are listed for continuation into the Phase III period, i.e. 1984-1986:

- Project 1: "Studies On The Distribution Of Black-flies (Simulium spp) On Jos Plateau"
- Prof. M.O.E. Iwuala and Mr. M. Maduabum
- Project 2: "Effect Of Water Velocity On Black-fly Relative Abundance"
- Dr. D.M. Roberts and M.Sc. Student
- Project 3: "Effect Of Temperature And Relative Humidity On Pupal Survival Of Black-flies"
- Dr. D.M. Roberts and Mr. D. Boakye
- Project 4: "Distribution Of Immature Mosquitoes Associated With The River System In Jos Plateau"
- Dr. R.J. Irving Bell and M.Sc. Student
- Project 5: "Study Of Seasonal And Vertical Distribution Of Tree-hole Mosquito Breeding"
- Dr. R.J. Irving-Bell
- Project 6: "Studies On The Prevalence And Distribution Of Onchocerciasis In Plateau State"
- Dr. C.O.E. Onwuliri, Mr. B. Nwoke and M.Sc. Student

- Project 7: "Study Of The Seasonal Abundance And Population Characteristics Of Immature Stages Of Black-flies In Jos Plateau Area"
- Prof. M.O.E. Iwuala and Mr. M. Maduabum
- Project 8: "Effect Of Predators And Type Of Substrate On The Relative Abundance Of Immature Black-flies"
- Dr. D.M. Roberts and M.Sc. Student
- Project 9: "Studies On The Dispersal Of Adult Black-flies"
- Dr. D.M. Roberts and Dr. R.J. Irving-Bell
- Project 10: "Niche Distribution In Relation To Physiological Adult Population Of Black-flies And Mosquitoes"
- Dr. R.J. Irving-Bell, Dr. D.M. Roberts, and Dr. J.I. Akoh
- Project 11: "Some Factors Influencing The Endemicity Of Onchocerciasis In The Jos Plateau, Nigeria"
- Dr. C.O.E. Onwuliri, Dr. I.A. Lawal and Mr. B.E. Nwoke

(B)

In addition to the fore-going Projects, it is intended to commence two new Projects (12 & 13) during the 1984-86 period. The detailed proposals on the new Projects are as follows:

Project 12: "A Study Of Age Composition Of Mosquito Populations
Of The Jos Plateau"

Researchers: Dr. J.O.A. Onyeka, Prof. M.O.E. Iwuala and
 Mr. G.I. Anyanwu

Equipment Required:

- 1 Transmission microscope and accessories
 - 1 Stereoscopic microscope and accessories
 - 4 Bait traps (2 No.10 Trinidad - 2 cylindrical cantraps)
 - 2 Portable battery operated suction apparatus
 - 2 Battery operated aspirators
 - 1 Cold Box and freeze packs
- Glassware and chemicals
Entomological pins & other labelling materials

Introduction:

The differences in age composition of female mosquitoes help to a large extent in determining the epidemiological effectiveness of the populations. Since each blood meal affords another chance of the female's becoming infected the importance of each age group consequently increases in relation to the increase of its physiological age (Detinova, 1962). In other words the older a particular age class of the mosquito population the higher its infectivity rate (Beklemishev, 1944).

The technique of age determination of mosquitoes based on a count of the number of dilatations on the ovariole marking the sites of previously ovulated follicles has been described in detail by the Soviet workers, Detinova (1959, 1962) and Beklemishev et al (1959). The technique originally developed in Russia, has been successfully applied in the epidemiological studies of some mosquito populations in certain parts of Africa, notably Tanzania (Detinova & Gillies, 1964; Gillies & Wilkes, 1965). In Nigeria, information on the epidemiological effectiveness of mosquito vector population based on their age composition is very scanty. This work is designed primarily to help in providing such information.

It is hoped that such information will, among other things, be useful in assessing the effectiveness of large scale control programmes.

Method:

Throughout the year, mosquitoes will be collected from Urban and Rural settlements in different parts of Plateau State, using the various Bait traps located at relevant sites. Traps are to be baited with different animal species including large mammals (eg. goat, sheep, dog, pig), small mammals e.g. rabbit) and birds. Whenever possible, man will be used as bait. Resting mosquitoes will be collected from their resting sites (vegetation, burrows etc.) using sweep net and portable battery operated suction apparatus. Mosquitoes will be taken back to the laboratory in cold boxes where they will be immediately identified and dissected. Parity will be determined using Detinova's (1962) method of ovarian tracheation. Detailed age-grading will be based on Polovodova's method (in Detinova, 1962) of the presence of dilatation on the follicular tube. For nulliparous mosquitoes the stage of the ovary will be determined using Christopher's (1911) method. Results of age composition will be analysed for the different species of mosquitoes. The effect of seasonal variation on the age composition will also be noted.

Project 13: "Host Feeding Preferences and Feeding Patterns
Of Mosquitoes Of The Jos Plateau"

Researchers: Dr. J.O.A. Onyeka, Prof. M.O.E. Iwuala
and Mr. G.I. Anyanwu

Equipment Required:

- 5 Stable traps (for large bait animals e.g. dog, pig (Bates 1946)
- 3 Cylindrical lard can traps (for small bait animals)
- 3 No. 10 Trinidad Traps
- 2 Battery operated aspirators
- 2 Portable battery operated suction apparatus

Introduction:

Information on mosquito host feeding preferences and feeding patterns in nature is of considerable ecological and epidemiological interest (Reisen et al 1979) ; such information is necessary in assessing the relative importance of various mosquito species as pests of man and animals and is of value in determining their roles as vectors of diseases (Downe, 1960). The host range of many West African Anopheline mosquitoes in general is fairly well documented (Bruce-Chwatt et al 1966) but the Culicines of this region have received less attention despite the fact that they have been implicated in the transmission of several arboviruses (Bres et al 1969; Hamon et al 1971). In Nigeria relatively few records are available on host preferences (e.g. Service, 1964) and blood meal sources (e.g. Davis & Philip 1931, Service 1963, 1965) of mosquitoes. The present study therefore is to document the attraction of various mosquito species of the Jos Plateau to different animals, as well as determine the host range of these mosquitoes.

Method:

Host preferences - Traps baited with different animal species will be placed at relevant rural sites. Exit traps will be put out at sunset and emptied at sunrise. Trapped mosquitoes will be collected using battery operated aspirator and taken to the laboratory where they will be sorted out. Host feeding patterns - Engorged mosquitoes will be collected from day-time resting sites using sweep net and hand-held power aspirator. Mosquitoes will be taken to the lab for identification. Where immediate identification is not possible, mosquitoes will be transferred to the deep freezer unit at -70°C and identified later. The abdomen (gut contents) will be smeared on to Whatman No. 1 Filter paper and stored in a dessicator at room temperature. Samples will later be sent to the Immunology Laboratory Imperial College London for analysis using serological methods.

Professor H.O.E. Iwuala,
Team Leader, JICA Medical Research Group.

MEDICAL ENTOMOLOGY PROJECTBUDGET 1985

<u>ITEM</u>	<u>QUANTITY</u>	<u>COST</u>
1. Transmission microscope, Nikon Optiphot, with binocular head, phase contrast objectives and condenser.	1	N 3,000
2. Drawing tube for Optiphot.	1	500
3. Micrometer eyepiece for Optiphot.	1	100
4. Stereo microscope, Nikon SMZ-10.	1	2,000
5. 20x eyepieces for SMZ-10.	1 pr	120
6. Nikon fibre optic illuminators, with bifurcated cord and spare bulbs.	2	2,000
7. Olympus OM2 camera.	1	200
8. Olympus copy stand & lighting set & spare bulbs.	1 set	150
9. Olympus varimagmi finder & cable release.	1 each	50
10. Olympus Auto 310 flash unit & hot shoe.	1	50
11. Portable battery powered aspirator & 12 v battery.	2	200
12. Cold box.	2	50
13. Large insect storage boxes.	5	50
14. Dry ice block maker (4 oz or 8 oz blocks) & gas regulator & CO ₂ cylinder.	1 each	500
15. Electric motors (6 or 12v) with 6" propellor (e.g. model aircraft motor) & 12 v battery (+ transformer if necessary)	8 sets	300
16. Desk top computer + programmes for statistics & spare discs/ cassettes.	1	4,000
17. Specimen tubes with plastic caps, 50 x 12 mm.	1000	250
18. " " " , 50 x 19 mm.	1000	300
19. " " " , 50 x 25 mm.	1000	400
20. Polystyrene box with lid, 12 x 18 cm approx.	100	50
21. Polystyrene cup with lid, 200 ml.	500	200
22. Insect pins, 4 cm with glass head.	1000	100
23. Polythene bags (heavy weight), 25 x 35 cm.	1000	200
24. Insect netting.	20 m	100
Total		N 14,870

DEPARTMENT OF ZOOLOGY
FACULTY OF NATURAL SCIENCES
UNIVERSITY OF JOS, JOS, NIGERIA

SECOND ANNUAL PROGRESS REPORT OF THE RESEARCH PROJECT TEAM
ON MEDICAL ENTOMOLOGY AND PARASITOLOGY IN COLLABORATION
WITH THE JAPANESE INTERNATIONAL COLLABORATIVE AGENCY
(J.I.C.A.) PROJECTS 1983/84

As a follow-up to the first Annual Report on the JICA - UNI JOS Collaborative Projects on Medical Entomology, and Parasitology, the following is the Progress Report so far for the 1983/84 period.

Altogether nine (9) academic staff, and six (6) Postgraduate Research students participated in the Projects from October 1983 to September 1984. They consist of the following:

Professor H.O.E. Iwuala	Department of Zoology
Dr. D.H. Roberts	" " "
Dr. R. Irving Bell	" " "
Dr. C.O.E. Onwaliri	" " "
Dr. J. Akoh	" " "
Mr. G.E. Anyanwu	" " "
Professor I.C. Tiwari	Department of Community Medicine
Mr. R.O.A. Shonekan	Department of Medical Microbiology
Dr. H. Takahashi	J.I.C.A. Research Project

Postgraduate Students

Mr. H. Maduabum	Department of Zoology
Mr. D. Boakye	" " "
Dr. I.A. Lawal	" " "
Mr. B.E. Ihoke	" " "
Mr. I. Sesay	" " "
Mr. J.A. Ogidi	" " "

A total of eleven (11) sub-projects were mapped out for investigation work (i.e. inclusive of the earlier six sub-projects covered in the 1982/83 Report).

The position so far regarding each Project is as follows:

PROJECT 1: "Study of distribution of Blackflies (Simulium species)
on the Jos Plateau"

- Prof. H.O.E. Iwuala, Mr. H. Maduabum, and
Dr. H. Takahashi

Introduction

During the phase I aspect of this study, a total of 13 rivers in the Upper Plateau area were consistently sampled for black-fly breeding over an eight month period (April - November, 1983)

Three of the rivers (River Assob, River Farin Ruwa and Garbo River) were the only ones found positive for Simulium breeding, and the greatest intensity of breeding was recorded between June and August, 1983.

Recent Work

The bi-weekly sampling exercise was maintained from November 1983 till the end of September, 1984. Also the physical characteristics of the various rivers (especially their p^H , temperature, Dissolved oxygen, and conductivity measurements) have been monitored on a regular basis over the past year. Such river measurements as flow rate, depth and width etc. were also considered.

Results

At the moment, a total of nine species of Simulium have been recorded from the various rivers. These are S. adersi, S. alcocki, S. aureosimile, S. cervicornutum, S. colas-belcouri, S. hargreavsi, S. macmahoni, S. schoutedini and S. vorax. Most of these were found in River Assob, with a few species recorded from Rivers Farin ruwa and Garbo.

Physico-chemical measurements from the Rivers showed the pH range to vary between 8.05 and 9.2. Oxygen concentration in ml/litre ranged from 2.45 to 9.6, with significant fluctuations recorded for various rivers in different months. The conductivity measurements were exceedingly low for most rivers, but fairly high in the case of Rivers Assob, Wangu and R. Foron. As for temperature measurements, this remained fairly consistent for most of the period, with the range being between $22^{\circ}C$ and $34^{\circ}C$.

Future Work

In extension of this work, it is intended to study in detail the seasonality of breeding and the factors conditioning the spread and activities of the black-flies in and around the rivers in the Upper Plateau area.

PROJECT 2: "Effect of Water Velocity On The Relative Abundance Of Immature Black-Flies"

- Dr. D.H. Roberts and an M.Sc. Student

Introduction:

Unbiased sampling of immature black-flies is extremely difficult because of the highly localised distribution of the different species within the river. This seems to be primarily due to:-

- a) localised substrate differences - this has already been studied by Dr. D.H. Roberts;
- b) localised differences in the water velocity - this will be studied in the present project, to find the preferred water velocity of each species during their larval and pupal stages.

Method:

The water velocity meter only arrived at the beginning of the wet season, so the experiment cannot start until the end of the next dry season (January - March 1985 when the water velocity will be stable. The equipment has however been tested in the River Assob. 20 sites will be chosen in the river (five different velocity ranges, with four replicates for each) and the black-flies will be trapped using polythene string substrates, which will be replaced every two weeks for six replicates.

PROJECT 3: "Effect Of Temperature And Humidity On Black-Fly Pupal Survival"

- Dr. D.H. Roberts, Mr. D.A. Boake, Mr. J.A. Ogidi

Introduction:

Two experiments have been carried out:

1. On low temperatures: Transport of pupae from the field to the laboratory requires:- a) Prolonging the pupal stage as far as possible using low temperatures, but at the same time; b) obtaining maximum survival and minimum after effects to the adult. The optimum conditions were investigated in this experiment.
2. On high temperatures: Under natural conditions, the pupae may be exposed to the air for several days due to changes in the water level and they should therefore have evolved a tolerance to high temperatures. This is investigated in the second part of the experiment.

Results:

Exp. 1 (Low temperatures)

The project started in January 1983. Four temperatures were tested:- 0, 4, 8 and 12°C, to study their effect on pupal survival, adult emergence and adult longevity in Simulium squamosum (a member of the S.dannosum complex). The pupae were exposed to these temperatures for different time periods between 1 - 7 days, then returned to the ambient temperature (approx. 20°C). Survival was greatest at 8°C and lowest at 0°C. When the pupae were divided into young (with pale cuticles)

and old (dark cuticle), there was no difference in survival at 0 and 8°C, but the young survived better at 12°C and the old at 4°C. Pupation was found by both field and laboratory experiments to be diurnal, with a major peak in the morning (6 - 9.00 h) and a smaller peak in the evening. Adult emergence extended over a 4 day period. The longevity of the adults was generally not significantly affected by the temperature at which the pupae had been reared.

The ideal temperature for transport of the pupae is therefore considered to be 8°C.

Exp. 2. (High temperatures)

The project started in January 1984. Five temperatures were investigated: 20, 25, 30, 35 and 40°C. The experiment was carried out on S. hargreavesi, since S. squamosum was found to have too low an abundance. The effect of the temperatures on pupal survival, adult emergence and adult survival was investigated. Pupal survival decreased as the temperature increased, so that none survived at 40°C. Survival sharply decreased between 30 - 35°C. Since the air temperature in the sun (i.e. excluding the effect of insolation) is often between 30 - 35°C, the pupae would only survive exposure in shady conditions. Pupation in S. hargreavesi was diurnal with a major peak between 12 - 15.00 h and a lesser peak between 6 - 9.00 h. Pupal eclosion had a distinct peak between 15 - 18.00 h.

Publications:

1. Bockye D.A. (1983) - Effects of pupal storage at low temperatures on pupal survival, adult emergence and longevity in the Simulium damnosum (Theobald) complex (Diptera: Simuliidae). H.Sc. thesis, University of Jos.
2. Ogidi J.A. (1984) - Effects of high temperatures on pupal survival, rate of adult emergence and adult longevity of Simulium hargreavesi. H.Sc. thesis, University of Jos.
3. Bockye D.A. & D.H. Roberts - Low temperature storage and pupal survival in the Simulium damnosum (Diptera: Simuliidae). Submitted for publication in Ann. Trop. Med. Parasit.

PROJECT 4: "Distribution Of Immature Mosquitoes Associated With Two Riverine Sites

- Dr. R.J. Irving-Bell and Mr. I. Sessay

Introduction

Two rivers were selected for the study, based on (a) abundance of trees, (b) diversity of habitats: The Assob River, (70 km. from Jos), where it flows down the edge of the Jos Plateau through guinea savana woodland;

The Kagoro River (110 km. from Jos) where it passes through an isolated patch of rain forest over a granite boulder bed; this is at the base of the Jos Plateau.

Research Staff

A co-ordinated study is being undertaken by:

Dr. R.J. Irving-Bell, Senior Lecturer, who is sampling the Assob River site; Mr. I. Sesay, an M.Sc. student who has undertaken the sampling of the Kagoro River site for part of the year, as his research project under the supervision of Dr. Irving-Bell.

Mr. Sesay is in receipt of a W.H.O. student award.

Method

Monthly or bi-monthly sampling of both sites began in January 1984. Initial breeding habitats available were rock pools and mud-pools. In March additional habitats in the form of tree holes and leaf axils became water-filled owing to the early start of the rains.

The trees/shrubs comprising the habitats have been identified, courtesy of Dr. P. Buckley, Dept. of Geography. Unfortunately the leaf axil habitats available are limited to Pandanus sp., only at the Assob. At the Kagoro site, the banana plants and oil palms present nearby did not retain water in their leaf axils.

Interim Results

A. KAGORO RIVER SITE

Mr. Sesay has completed 10 visits (sampling occasions) from Jan. to June. His thesis entitled "Mosquito breeding habitats: Distribution and relative abundance of species at a Kagoro forest stream in Northern Nigeria" is currently undergoing examination. A copy of his abstract is attached.

No sampling was possible in July and August owing to lack of transport. Dr. Irving-Bell has resumed sampling of this site from September using private transport.

B. ASSOB RIVER SITE

Samples collected so far are shown in Table 1. Species identifications for the collections of Jan. to May have been completed; a list of species is given by Table 2. Reference collections of (a) pinned adults, (b) larvae in lactic acid and (c) males in ethanol, have been made.

Anticipated procedure for project completion

1. Monthly collections at both sites will continue until Dec. 1984.
2. The difficulties in taxonomy need to be resolved. Dr. Irving-Bell

ABSTRACT: "Mosquito Breeding Habitats: Distribution And Relative
Abundance Of Species At A Kegoro Forest Stream In
Northern Nigeria"

- Dr. R.J. Irbing-Bell and Mr. I. Sesay

Studies were carried out to determine the distribution and relative abundance of immature stages of mosquitoes associated with a stream in Kegoro Forest, a Northern guinea savanna rain forest. The effects of season and other environmental parameters such as water depth, pH, predators, dissolved organic matter, nitrates and water colour, on the occurrence and abundance of immature stages were also determined. The habitats studied were rock pools, mud pools and tree holes. Each habitat when available, was sampled once or twice monthly from January to June 1984. Culex decens was the most abundant species, followed by Anopheles rhodesiensis. Cx. duttani and Cx. univittatus were the least encountered, followed closely by Cx. trifilatus. Rock pools were generally more productive with slightly higher temperatures and fewer predators than mud pools. The occurrence of some species was observed to be related to season, for example, Aedes vittatus which was encountered in rock pools as expected, and tree holes. Uranotaenia masonaensis was present only in the wet season. Cx. decens and Cx. tigripes on the other hand, were observed to be absent in mud pools during the wet season. An. rhodesiensis in mud pools, and Cx. decens in rock pools, were not observed to be affected by season with regard to occurrence, but their abundance was conspicuously reduced in the wet season.

From results obtained on the analysis of the effects of depth, pH, predators, dissolved organic matter, nitrates and water colour, none was found to be a significant factor in determining abundance of immature stages of mosquitoes in rock pools. However a significant difference was obtained in the abundance of immature stages of mosquitoes between rock pools and mud pools.

TABLE 1. MOSQUITO SAMPLES COLLECTED JAN. - OCT. 1984 (ASSOB RIVER SITE)

Sampl. occ.:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Date:	Jan. 27th.	Feb. 1st.	Feb. 22nd.	Feb. 29th.	Mar. 18th.	Mar. 29th.	Apr. 26th.	May 5th.	May 15th.	June 2nd.	June 24th.	July 15th.	Aug. 18th.	Sept. 18th.	Oct. 28th.
--- ROCK POOLS ---															
No. of pools	5	5	6	5	5	5	5	5	2	5	2	2	0	5	5
Σ mosquitoes/pool	233	447	140	145	196	230	118	44	36	124	5	53	-	63	159
--- MUD POOLS ---															
No. of pools	7	5	5	5	4	5	5	5	3	5	3	3	0	3	5
Σ mosquitoes/pool	50	192	134	79	77	84	140	17	8	41	227	5	-	3	112
--- TREE HOLES ---															
No. of samples	-	-	-	-	-	-	5	5	6	5	5	6	5	5	5
Σ mosquitoes/sample	-	-	-	-	-	-	20	18	9	19	11	7	8	11	1
--- LEAF AXILS ---															
No. of samples	-	-	-	-	-	-	5	2	5	5	5	5	5	5	5
Σ mosquitoes/samples	-	-	-	-	-	-	3	3	27	63	43	67	28	30	32

* Those pools with larvae + pupae, i.e. excluding barren pools or pools with only mosquito eggs.

** One sample = 1/2 cup of tree hole water

*** One sample = water from 10 leaf axils of Pandanus

TABLE 2. LIST OF SPECIES IDENTIFIED, JAN. TO MAY, WITH PRESENCE (+) BY HABITAT (ASSOD RIVER SITE)

	ROCK POOLS	MUD POOLS	TREE HOLES	LEAF AXILS
<u>Anopheles</u>				
<u>barberellus?</u>		+		
<u>funestus</u>		+		
<u>gambiae s.l</u>	+	+		
<u>pretoriensis</u>	+	+		
<u>rhodesiensis</u>	+	+		
<u>rufipes</u>	+	+		
<u>Uranotaenia</u>				
<u>Fusca</u>	+	+		
<u>mashonensis</u>	+	+		
<u>ornata</u>				+
<u>shillitoni?</u>				+
<u>Aedes</u>				
<u>aegypti</u>	+		+	
<u>africanus?</u>			+	
<u>apicoargenteus</u>			+	
<u>bambusae?</u>			+	
<u>fowleri</u>	+			
<u>fuscifer?</u>			+	
<u>heischi?</u>				+
<u>lambornii</u>			+	
<u>luteoccephalus</u>			+	
<u>sinosoni</u>			+	+
<u>stokesi</u>			+	
<u>vittatus</u>	+			
<u>Culex</u>				
<u>annulifloris</u>		+		
<u>bifaeniorhynchus</u>		+		
<u>cinerellus</u>	+		+	
<u>decens</u>	+	+		
<u>duttoni</u>	+			
<u>ethiopicus</u>		+		
<u>fatigans</u>	+	+		
<u>horridus</u>			+	
<u>insignis?</u>	+	+		
<u>nebulosus</u>			+	
<u>salisburicensis</u>		+		
<u>sinaiticus?</u>	+	+		
<u>sinosoni</u>	+	+		
<u>tigripes</u>	+	+		
<u>trifilatus</u>	+	+		
<u>univittatus</u>	+	+		

? = not confirmed by presence of adults.

has consulted two experts in the U.K. and has collected reprints on new species of Culex and Aedes described from West Africa since the publication of the major taxonomic reference book by Edwards in 1941. She has applied to the Commonwealth Institute of Entomology for further reprints, using personal funds. The following procedure is required: (a) Translation of papers from French to English; (b) Permanent mounts of larvae and male genitalia to be prepared for reference and confirmations of identities.

3. Analyses of results. These will include a comparison of the two sites, and an examination of the relationships between species and habitat characteristics, as well as analysis of abundance in relation to predators and rainfall.

Difficulties

1. Lack of readily available transport or funds for use of personal vehicle.
2. Shortage of specimen tubes, rearing containers and insect boxes.
3. Difficulties and no financial help for the acquisition of literature and translations.
4. Lack of expert technical help for e.g. preparation of reference slides and pinned specimens.
5. Lack of computer facilities for quick analyses of data.

PROJECT 5: "Seasonal and Vertical Distribution Of Tree-hole Mosquitoes"

The most suitable site for this study is the Kagore Forest 110 km. from Jos. The project cannot be undertaken unless transport is guaranteed, and unless an M.Sc. student is willing to undertake the study. Assuming that these conditions are satisfied, it is envisaged that oviposition traps would be constructed and positioned over the period Jan. to March 1985, and that sampling be performed in the wet season from March/April, continuing over the first half of the following dry season to December, 1985.

PROJECT 6: "The Prevalence and Distribution Of Onchocerciasis On The Jos Plateau"

- Dr. C.O.E. Onwuliri, Dr. I... Lawal and B.E. Nwoke

Eight villeges on the foot of Jos Plateau, Nigeria located at various distances from the Assab River have so far been surveyed for the prevalence and distribution of human onchocerciasis.

A total of 1077 people were examined out of which 177 (10.86%) had Onchocerca volvulus microfilariae in their skin snips. The highest infection rate was obtained in a small settlement, Atukum Tozo II where 10(27.8%) of 36 persons examined showed positive skin-snips. At Hadaki 24.14% of the people were infected. It was apparent that villages closer to the river had higher infection rates than villages farther away. Consequently in Atukum Tozo II which was only about 1 km from the river 27.8% infection rate was recorded, whereas in Dogon Hill 3.5 km away, the infection rate recorded was only 1.2%.

There was no significant difference in infection rates between males and females in some of the villages since both groups have equal chances of being bitten by infected flies. However, the overall infection rate was higher in males than females. 554 females have so far been examined, of which 52 (9.40%) had infection and 65 (12.40%) of the 523 males examined were infected.

Work is still in progress for other aspects of this project while additional villages are surveyed for onchocerciasis.

PROJECT 7: "Study of the seasonal abundance and Population Characteristics of Immature stages of black-flies in Jos Plateau Area"

- Prof. H.O.B. Iwuola, Mr. N.A. Nduebum and Dr. H. Takahashi

Introduction and Methodology:

As a follow-up to preliminary studies on the distribution of black-flies in the Upper Plateau area (see Project 1), quantitative studies on the seasonal abundance of different types of black-flies breeding in the River Assob (Riyom L.G.A., Plateau State) was commenced in November, 1983.

Larvae and pupae of the insects were sampled on a regular fortnightly basis using polythene strips and berasmus palm fronds as substrates.

Also natural trailing vegetation found at the banks of the river were sampled for the immature stages of the black-flies. Other forms of fauna closely associated with the immature insects were collected from the water and from submerged rock surfaces for study and assessment.

The quantitative sampling was undertaken consistently from November 1983 to the end of September, 1984 on a regular bi-weekly basis.

Results/Observations

The results of the sampling of immature simuliids are summarised in tables 1 - 4.

Table I below indicates the relative abundance of Simulium pupae collected per 90cm² on the two substrates of polythene strips and Borassus palm fronds respectively for the period November 1983 to March, 1984.

Blackfly species	Nos/90cm ² on Substrates		Overall Total
	Polythene strips	Borassus Palm Frond	
<u>S. hargreavesi</u>	409	433	842
<u>S. Cervicornutum</u>	97	53	150
<u>S. nomahoni</u>	29	20	49
<u>S. schoutedini</u>	16	17	133
<u>S. alcocki</u>	36	29	65
<u>S. varax</u>	9	3	12
<u>S. adersi</u>	0	3	3
<u>S. colac-balcuri</u>	4	7	11
<u>S. aureosinife</u>	9	17	26
<u>S. walshi</u>	0	1	1
TOTAL	609	583	1192

TABLE 2 SEASONAL CHANGES OF SIMULIID PUPAE ON POLYTHENE STRIP SUBSTRATE FROM ALL THE SITES (I, II & III)

Species	Y E A R							OVERALL TOTAL
	1 9 8 4		1 9 8 4		1 9 8 4		1 9 8 4	
	APR	%	MAY	%	JUN	%	JUL	
<u>S. hargreavesi</u>	55	90.164	68	83.951	11	68.75	0	134
<u>S. cervicornutum</u>	3	4.918	10	12.346	5	31.25	0	18
<u>S. schoutedini</u>	0		2	2.469	0		0	2
<u>S. alcocki</u>	2	3.279	1	1.234	0		1	100
<u>S. varax</u>	1	1.639	0		0		0	1
<u>S. darnosum s.l</u>	0		0				0	0
MONTHLY TOTALS	61		81		16		1	159

TABLE 3: SEASONAL CHANGES OF SIMULIID PUPAE ON BORASSIAS
LEAF FROND SUBSTRATE FROM ALL THE SITES (I, II & III)

Species	Y E A R								OVERALL TOTAL
	APR	%	MAY	%	JUN	%	JUL	%	
<u>S. hargreavesi</u>	45	83.333	48	85.714	20	80	0		113
<u>S. cervicornu- tua</u>	7	12.963	7	12.500	3	12	1	25	18
<u>S. schoutedini</u>	0		1	1.786	1	4	1	25	3
<u>S. alcocki</u>	2	3.704	0		0		0		2
<u>S. vorax</u>	0		0		0		0		0
<u>S. damnosum s. 1</u>	0		0		1	4	2	30	3
MONTHLY TOTALS	54		56		25		4		139

TABLE 4: Results of the sampling of natural vegetation for the period April to July 1984 are shown below:

Species	Y E A R								OVER- ALL TOTAL
	APR	%	MAY	%	JUN	%	JUL	%	
<u>S. hargreavesi</u>	16	88.888	81	91.011	12	70.569	13	27.660	122
<u>S. cervicornu- tua</u>	1	1.556	6	6.741	1	5.882	0		8
<u>S. alcocki</u>	0		1	1.124	1	5.861	0		2
<u>S. vorax</u>	1	1.556	0		3	17.647	14	29.787	18
<u>S. schoutedini</u>	0		1	1.124	0		0		1
<u>S. damnosum s. 1</u>	0		0		0		20	42.553	20
MONTHLY TOTALS	18		89		17		47		171

Results of the rock final collections showed Coleopteran beetles (Family Psephenidae) and Ephemeropteran larvae (Family Heptageniidae) to be the most preponderant forms associated with the immature simuliids. A few forms of Odonata and Trichoptera were also recorded at the breeding sites of the insects.

further Investigations

The quantitative sampling of the simuliidae will be stepped up in subsequent months into the 1984/85 period. Also potential biological control agents will be sampled and screened from water samples in the insects' breeding sites.

PROJECT 8: "Effect Of Predators and Type Of Substrate On The
Relative Abundance Of Immature Black-Flies."

- Dr. D.H. Roberts & Mr. J.O. Davies-Cole

Introduction

Preliminary studies on the effect of substrate flexibility on black-fly abundance seemed to show that inflexible substrates were colonised by predators and so had few black-flies. Consequently, the relationship between the flexibility of the substrate, predator abundance and black-fly abundance was studied.

Results:

Five types of substrate with different degrees of flexibility were tested:- inflexible, inflexible but articulated, limited flexibility, flexible in one plane, flexible in several planes. Colonisation of these substrates was compared in two ranges of water velocity:-

1. High water velocity. This experiment was carried out in January - March 1984. 8 black-fly species were collected, but the three most abundant were: Simulium hargreavesi, S.verax and S.cervicornutum.

S. vorax preferred the inflexible substrates; S.hargreavesi preferred the inflexible but articulated substrates; S.cervicornutum had no significant preference. Very few predators were collected in these high water velocities, so that they are unlikely to have affected the the relative abundance of the black-flies.

2. Moderate water velocity. This experiment will be carried out in January - March 1985 (by Dr. D.H. Roberts). It is expected that the predators will be much more abundant in these velocities and thus affect the black-flies substrate preferences.

Publication:

1. Davies-Cole J.O. (1984) - Investigations on the effect of substrate flexibility and predators on the relative abundance of the immature stages of the black-fly (Diptera: Simuliidae).

PROJECT 9: "Dispersal Of Adult Black-Flies"

- Dr. D.H. Roberts & Dr. R.J. Irving-Bell

Introduction

Little is known about the dispersal of black-flies, because collecting has largely been limited to using human bait. Information from this is extremely limited because:-

- a) Only a small part of the population is being sampled (the biting females).
- b) The method is highly biased, being very vulnerable to differences in the attractiveness and efficiency of the collectors, and to local microhabitat differences.

In this experiment, vehicle-mounted nets will be used, which have the advantage of:-

- a) being unbiased and therefore sampling the whole population.
- b) being very efficient in collecting black-flies at low densities.

Method:

The experiment cannot start until the equipment is received from JICA. It is hoped to start at the end of 1985. Two vehicles with nets mounted on their roof racks will be driven in opposite directions along a 20 km stretch of road at right angles to the river Assob. The catch will be emptied every 2 km, so that the fly abundance will be monitored at 2 km intervals away from their breeding site.

PROJECT 10: "Niche Distribution In Relation To Physiological State Of Adult Populations Of Black-flies And Mosquitoes"

- Dr. R.J. Irving-Bell D. Akell, Dr. Roberts

This study requires extensive preliminary work in testing the methods proposed, particularly with regard to black-fly collecting. The components for constructing a mechanical aspirator have not yet arrived (see method A). With regard to method B, the use of artificial resting shelters, these have been found to be effective for the collection of resting mosquitoes in the dry season on the University Campus; however small covered buckets were used rather than the cardboard boxes proposed. Since plastic buckets are attractive to petty thieves, it is proposed that a preliminary trial using cardboard boxes be carried out in a woodland site near the University. This is necessary to determine the number needed to obtain reasonable sample sizes, and also to decide on sampling frequency.

Therefore the project as outlined in the proposal is unlikely to begin until Oct./Nov. 1985, by which time it is hoped preliminary trials will have indicated a suitable experimental design.

PROJECT 11: "Some Factors Influencing Endemicity Of Onchocerciasis In The Jos Plateau, Nigeria"

- Dr. C.O.E. Onwuliri, B.E. Nwoko and Dr. I.A. Lawal

Results indicate that proximity to the breeding sites and exposure

...

JICA