

# インド国におけるゴマ遺伝資源の探索収集

古明地通孝<sup>1)</sup>, 河瀬眞琴<sup>2)</sup>, M. N. KOPPAR<sup>3)</sup>

- 1) 農業研究センター・作物開発部・資源作物育種研究室
- 2) 農業生物資源研究所・遺伝資源第一部・植物探索導入研究チーム
- 3) インド国立植物遺伝資源事務局

## Field Study and Collection of Sesame Germplasm in India, 1992

Michitaka KOMEICHI<sup>1)</sup>, Makoto KAWASE<sup>2)</sup>  
and M. N. KOPPAR<sup>3)</sup>

- 1) *Resource Crop Breeding Laboratory, Department of Crop Breeding, National Agriculture Research Center, Kan'nondai 3-1-1, Tsukuba, Ibaraki 305, Japan*
- 2) *Laboratory of Plant Germplasm Introduction, Department of Genetic Resources I, National Institute of Agrobiological Resources, Kan'nondai 2-1-2, Tsukuba, Ibaraki 305, Japan*
- 3) *National Bureau of Plant Genetic Resources, Pusa Campus, New Delhi 110012, India*

### Summary

We made a field study and collection of sesame (*Sesamum indicum* L.) in India from September 23 to October 18, 1992. India is thought to be one of the most important places for the genetic diversity of *S. indicum*. The itinerary and the trip route are shown in Table 1 and Fig. 1, respectively. We collected a total of 185 seed samples, of which 163 were those of *S. indicum* and its relatives (Table 2). The collection trip was started from South India to North India. Morphological variation of *S. indicum* was rather small in the Deccan Plateau of South India so far as observed. The so-called tropical type, which was characterized by tri-lobed leaves on the lower nodes, a single capsule per leaf axis, two carpels per capsule and branching habit on higher nodes, was commonly grown there. Plants with uni-lobed leaves or those having four carpels per capsule were rarely found admixed in the fields. The seed color varied as black, dark brown, brownish white and white. Local farmers in some villages near Raichur, Karnataka informed us that they grew two distinct types of black seeded sesame : a

usual type and a bitter type. They used the bitter sesame for a medicinal purpose as well as for oil extraction. In North India, *S. indicum* plants having different morphological characteristics were usually found mixed even in a small field. We observed alternately or oppositely fruited plants having one or three capsules per axis, and those of branching or non-branching types. A few plants which had semi-wild or weedy traits were also collected in a village near Jhansi, Uttar Pradesh. They had small fruits and the upper carpel of each fruit was easily dehiscing. It became clear through the interviews to the local farmers that *S. indicum* was widely used as a material for various food preparations rather than an oil source. For example, it is cooked for sweets, stuffing, topping, seasoning and so on. As an oil crop, sesame has been replaced by sunflower and soybean, since its productivity is lower. Local cultivars of this crop are, however, still grown often on a small scale, because of its importance in the traditional food habit in India.

**KEY WORDS** : sesame, *Sesamum indicum* L., germplasm collection, India

## 1. 目的および調査地選定理由

ゴマ油は食用油のなかで最も抗酸化性が強く、高い品質評価を受けている。またゴマに含まれる抗酸化性等物質は、油の品質保持に寄与するだけでなく、摂取した場合、生体内において過酸化反応抑制<sup>1, 2)</sup>、変異原性抑制<sup>3)</sup>等の機能性を有することも認められてきている。このように優れた特性を持つ作物でありながら、ゴマの生産地はアジア、アフリカの発展途上国が多く、古い作物であるにもかかわらず品種開発が遅れている。また、国際研究機関においてもゴマの遺伝資源の保存リストは作られておらず、わが国のゴマ遺伝資源の保有は著しく少ない。国際的にも、またわが国にとってもゴマ遺伝資源の収集保存は重要かつ緊急の課題である。

ゴマの起源地にはアフリカ説とインド説とがある。インドには8種の野生種が確認されており<sup>4)</sup>、作付面積が220万ヘクタール(1989年FAO統計)に及ぶ世界最大のゴマ生産国である。ゴマ遺伝資源の調査収集の対象地域としては大いに期待される地域である。

## 2. 経過

インドの植物遺伝資源の代表機関であるNBPGR(国立植物遺伝資源事務局)と共同で調査・探索を実施した。事前の協議で、今回は栽培種(*Sesamum indicum* L.)を収集することとした。その期間は9月23日から10月18日までの26日間で、日程および行程の概略図をそれぞれ Table 1, Fig. 1 に示した。

**Table 1. The itinerary of the mission**  
**探索収集の日程**

Date	Place	Article
1992		
SEP 23	Tokyo (Narita) → (by air)	(via Singapore)
24	→ Delhi	visit to the Embassy of Japan visit to the ICAR visit to the NBPGR
25	Delhi → Pune	by ari
26	Pune	preparation for the field trip
27	Pune → Solapur	}
28	Solapur → Bijapur	
29	Bijapur → Darwad	
30	Darwad → Bellary	
OCT 1	Bellary → Raichur	
2	Raichur → Gulbarga	
3	Gulbarga → Latur	
4	Latur → Nanded	
5	Nanded → Pune	
6	Pune → Dhule	
7	Dhule → Indore	
8	Indore → Bhopal	
9	Bhopal → Sagar	
10	Sagar → Jhansi	
11	Jhansi → Agra	
12	Agra → Delhi	
13-16	Delhi and surroundings	seed cleaning and quarantine inspection at NBPGR visit to the Embassy of Japan visit to NBPGR
17	Delhi → (by air)	
18	→ Tokyo (Narita)	

[Note]

NBPGR : National Bureau of Plant Genetic Resources

ICAR : Indian Council of Agricultural Research



Fig. 1 The exploration route for collecting sesame germplasm in India  
 インドにおけるゴマ遺伝資源の探索収集ルート

### 3. 収集・調査方法

#### 1) 調査収集地域の概況

デリーでのNBPGRとの打ち合わせのなかで、①インドからの植物移出の際の検疫に最低5日を要するので帰国の5日前にはデリーに戻らなければならないこと、②本年はゴマの成熟が例年より早いことなどの事情や状況説明を受け、南から調査収集することとし、インド国内航空でデリーからボンベイ市の南東約100kmのプナ市に直行した。プナ市で車（小型のバン）を借り上げ、9月27日から10月12日にデリーに戻る間、連日車で移動し、収集活動を行った。この間の車での移動距離は合計5,100kmであった。

前半の調査ではプナ市を起点にマハラシュトラ州、カルナタカ州北部を中心とするいわゆるデカン高原の北部地域を一周した。この地域は標高400～800mの台地で森林がほとんどなく、点在する秃げた低い岩山に象徴される乾燥した地域である。主な夏作物は綿花、ソルガム、ササゲ、リョクトウ、ヒマワリ、ラッカセイ、雑穀等で、乾燥が進んだところではトウジンビエ、キマメ、ゴマ等が栽培され、間混作が多い。水系は複雑でわかりにくい、トウガラシやニンニク、タマネギが栽培される地帯（ダルワール近く）や水稻、サトウキビの栽培も一部で見られる。

後半の調査はプナ市より北上し、マハラシュトラ州、マディヤ・プラデシュ州の西部、ウッタール・プラデシュの一部、ラジャスタンのごく一部、ハリアナ州の一部を抜け、デリーに至る地域である。南北1,000kmにおよび、地形的にも、気象的にも多様であった。基本的に乾燥の程度、水利によって農業が特徴づけられているのは南部と同じであるが、インドールからサガルを過ぎる約400kmは近年に導入された大豆が主作物となって延々と続き、サガルからジャンスイに向かう途中には野生稲やジュズダマの成育地もみられた。このような地帯は山に木が多いことから降水量が多い地域と推察された。

#### 2) 収集の方法

車中で見つけたゴマ畑や、農夫に聞いて案内してもらったゴマ畑で形態的な特徴を調査しながら朔果または種子を収集した。

立毛状態の植物体を主な対象とし、抗酸化性等の有用成分の探索を目的としているので、外見は同じでも畑全体から多くの個体を収集するようにした。明らかに遺伝的形質（1節当りの朔果数、1朔果当りの心皮数）の異なる個体は分別収集した。朔果の形、茎の毛の濃密等で異なると思われる個体もあったが、識別性が絶対的でない形質については分別せずに混合収集した。

すでに収穫を終えて乾燥中のもの、農家の貯蔵種子、あるいは市場（バザール）で売られている種子なども一部入手した。

乾燥している地域はゴマの畑が多いので国道からゴマ畑を散見することができ、そのような地帯では、収集地点は一定の距離をおいて収集した。特異な個体を見いだした時は、その特異性が付近の畑で普遍的に見られるものであるか否かの確認等も行った。水稻、サトウキビ、ヒマワリ、ダイズの栽培地帯では国道からゴマ畑を見つけることは困難であった。そのよう

な所では、集落で道端の人に情報を聞くことにより、わずかに栽培が残っているゴマ畑にたどり着くことができた。このようにして時間はかかるがゴマの栽培密度の低いところでも収集することができた。

#### 4. 調査・収集の成果

##### 1) 収集の結果

本探索の結果、ゴマ163点、その他作物22点を収集した (Table 2)。163点のゴマの内、160点は栽培型で、そのほとんどは収集した地方の在来種と考えられる。また、ゴマと外見的にほとんど区別出来ないが、成熟が早く、裂開し易い小型の朔果をつける雑草的なゴマを2点収集した (種は未同定であるが、*Sesamum indicum* の原始的な型と思われる)。この雑草的なゴマは、栽培型のゴマ畑の中に見いだされた。その特徴は、成熟するとともに各朔果の二つの心皮のうちの一つが裂開し、種子を自然に分散させている点にある。すなわち、葉腋より斜め上方に突きだした朔果の茎側 (上面側) の心皮は裂開しており、圃場で見るときには種子がほとんど残っていなかったが、外側 (下面側) の心皮には種子が残っており、栽培型のゴマとともに収穫されている。種子は黒色で表面がざらついており、縁が角張っている。花色は、紫色と白色の両者が見いだされた。残る1点は栽培ゴマとは明らかに異なる野生種で、種は未同定である。ゴマ以外の収集品は、アワ (*Setaria italica*) 7点、インドビエ (*Echinochloa frumentacea*) 2点、センニンコク (*Amaranthus hypochondriacus*) 1点、ソルガム (*Sorghum bicolor*) 1点、トウジンビエ (*Pennisetum americanum*) 1点などの雑穀、ケツルアズキ (*Vigna mungo*) 2点、リョクトウ (*Vigna radiata*) 1点、モスビーン (*Vigna aconitifolia*) 1点、ササゲ (*Vigna unguiculata*) 1点のマメ類、それ以外にパン・コムギ (*Triticum aestivum*)、ドゥラム・コムギ (*Triticum durum*)、エンマー・コムギ (カプリ・タイプ) (*Triticum dicoccum*)、ヒマワリ (*Helianthus annuus*)、オクラ近縁 (*Abelmoschus tuberculatus*) 各1点であった。

##### 2) 収集地域におけるゴマ遺伝資源の特徴

今回の調査地域を便宜的に南部と北部にわけると、

南部、すなわちデカン高原ではゴマの形態的な変異はあまりなく、いわゆる熱帯型が普通に見られた。熱帯型の特徴は、葉腋当たり1朔果 (1朔型)、1朔果当たり2心皮で、茎の上部で分枝し、下位の葉は3裂という特徴を持つ。ごくまれに1朔果当たり4または3心皮、あるいは全縁の葉を持つ個体が畑の中に混在しているのが見いだされた。小林<sup>4)</sup>はゴマの原始的な形態はこの熱帯型で、野生種が多数存在するアフリカにおいても熱帯型のゴマにはあまり大きな形態的な変異がみられないと述べているが、インドのデカン高原においても形態は単調であった。これらの地域では白色、黒色あるいは焦げ茶色の種皮色の在来種が栽培されている。

ところが、カルナタカ州北東部の村で、農夫から黒色の品種には2種類あるという情報を得た。ひとつは普通の味、他のひとつは苦いという。苦い品種はその油を食用だけでなく薬用にも利用するという。今回、この苦いという種子を入手することができたので、その特性

解明に関心が持たれる。苦いゴマの情報は特定の成分など生化学的な面では多様性を含んでいる可能性を示唆するものである。

北部に進むにつれさまざまな形態的特徴の個体が混在している畑が見られるようになった。すなわち葉腋当たり1朔果から3朔果（3朔型）、茎の朔果の着生は互生的あるいは対生的、茎は無分枝あるいは茎の中・下部からの分枝等である。小林<sup>4)</sup>によると3朔型は1朔型の朔果の付け根の両側にある花外密腺が朔果に進化したものであり、また、対生型は互生型の進化したものである。調査地域では1朔果当たりの心皮数は2心皮が主流で4心皮はまれであった。また、種皮色は白色が一般的であった。北上するにつれ3朔型の混入は多くなったが、全個体が3朔型のような改良品種を栽培している畑は見あたらなかった。

南部ではまれにみられる3朔型をなぜ選抜しないのか不思議であったが、北部で多くの農家を訪問するなかで、3朔型、あるいは対生的に朔果をつける個体を意識的に選抜しているいくつかの農家に会った。また、すでに収穫したところで、3朔型と1朔型とを分けて乾燥しているところがあったので、なぜ両型を栽培するのか疑問に思い、1朔型のメリットは何か聞いたところ、今後、3朔型に代えたいとのことであった。このようなところでは年を経るにつれ在来種が変遷してゆくものと思われる。

ゴマの生育状況を見ると、南部（デカン高原北部）のゴマの生育は不良であった。石礫が多い条件の悪い畑にゴマが栽培され、乾燥に強いといわれるゴマでも萎凋しているような状況であった。熱帯型ゴマはわが国では2 m以上に伸長し上位で分枝するためほとんど倒伏する。インドでも湿潤と思われるところでは2.3 m位まで伸長しており、熱帯型ゴマが伸長しやすい特性を有するのは明らかである。しかし、このような熱帯型ゴマも乾燥地では1 m前後の草丈に抑制されている。熱帯型が乾燥地において最も適応したタイプであるため残存し、乾燥条件が多様性を規制しているとも推測されるが、南部のゴマが形態的な多様性に乏しい背景、要因等については残された課題である。

### 3) インドにおけるゴマの食文化

ゴマは古い作物でさまざまな伝統的調理に用いられている。甘いお菓子、チュットニイ（トウガラシの入った辛い付け合せ）、野菜や肉料理のためのマサラ（香辛料ミックス）、ロティ（無発酵パン）やお菓子のトッピングなどの食品・用途を開き取ることができた。また、ゴマは1月14日のサンクランテのお祭りとも結びつき、この祭りではゴマは欠くことのできない食品素材となっている。このような食文化のもとで自家用、あるいは集落の特定の農家で栽培されている例が多く、1筆の畑面積は小さいがそこで遺伝資源を収集することができた。

ゴマ油が選択的に調理に使われるのはマンゴーのピクルス（トウガラシ味の漬物）であるが、このための消費量は量的には多くはないと思われる。ほかにはゴマ油でなければならない伝統的な調理はないようである。

加工食用油脂では、パナスパティ（植物性硬化油）を生産するときゴマ油を最低5%混ぜることが義務づけられており、そのためのゴマ油の消費量が5~10万トンといわれる<sup>5)</sup>。

以上がゴマでなければならない用途で、これら以外の一般油料としては、ゴマの収量が低

いという理由で大きな面積を栽培していたところがヒマワリやダイズに急速に置き換えられている。その意味では遺伝的侵食（genetic erosion）に直面している作物である。強い抗酸化性に示されるような他の油料作物にないゴマの優れた特性を考えると、今後も遺伝資源としてより広い収集、評価、保存が是非とも必要である。

## 5. 収集した遺伝資源の今後の取扱い

収集した遺伝資源は NBPGR と日本側とに折半した。日本に持ち帰った遺伝資源は植物防疫検査後、2つに分け、一部をオリジナルシードとして農業生物資源研究所の貯蔵施設に保存し、他を農業研究センターで所持し、特性評価を行うとともに増殖し、ジーンバンクに移管する。

## 6. 所感

今まで、ほとんど情報の得られていなかったインドにおいて、NBPGR と共同でデカン高原北部からデリーに至るゴマ栽培地域を調査し、探索収集を行うことができたことは非常に好運であった。

インドは世界最大のゴマ栽培国であるが、油料用としてはゴマの収量が低いことからヒマワリ、ダイズに代わりつつあり、栽培が減少していることを知った。また、農家によっては3朔型のゴマを選抜しているところがあることを知った。栽培の減少により在来型のゴマが失われ、また、一部選抜等が行われる中で、原始型のゴマから改良ゴマへと変遷してゆくことが考えられる。このような状況のなかで短期間であったが、貴重なゴマ遺伝資源を収集することができたと確信し、今後の特性評価のなかで抗酸化性物質等の高い有用素材が見いだされることを期待している。

本探索では野生種あるいは雑草性のようなものを3点収集したが、デカン高原南部やインド北西部のオリッサ州では野生種および雑草性のゴマが分布しているとの情報を得た。今後、栽培種、野生種を問わずより広い範囲でさらに探索収集することが望まれる。

NBPGR との情報交換のなかで、インドは独自に遺伝資源の探索収集の年次計画を持っており、それと日本の計画とがジョイントできるならば、今後も共同探索の受け入れは可能とのことであった。年次計画を立案する際に事前折衝が重要であることを示唆するものである。

収集遺伝資源の日本への持ち帰りに当たって、移出側のインドにおける植物防疫に予想外の日数（5日）を要し、実際の探索日数を当初計画より短縮せざるを得なかった。日本の植物防疫検査を例に、短時間でを行うよう要請したが、インドの植物防疫検査における規則とのことで受け入れられなかった。インドにおける探索ではこの日数を予め計画に入れておく必要がある。

## おわりに

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Table 2 A list of seed samples collected in India (1992)

a) Cultivated sesame and its relatives

Col. No.	Date	Species name	Local name	Sample P/in <sup>1)</sup>	Status <sup>2)</sup>	Locality (altitude)	Crop season	Cultural practice	Usage	Diseases & pests	Topo- <sup>3)</sup> graphy	Site <sup>4)</sup>	Drain- <sup>5)</sup> age	Characteristics	Notes
0001	SEP 27	<i>Sesamum indicum</i> L.	TIL	P	④?	URULIKANCHAN, 29 km E from PUNE toward SOLAPUR, MAHARASHTRA (550 m)	end JUN to mid-OCT	irrigated	food	virus limited	③	①	③	3LL, 1C/LA, 2C/C, mixcropped with <i>Sorghum bicolor</i> , several types mixed.	black clay
0002	"	"	DESI TIL	"	③	KURKUMBH, 79 km E from PUNE toward SOLAPUR, MAHARASHTRA (600 m)	early JUL to mid-OCT	rainfed	food, oil	insects	④	"	"	1LL, 1C/LA, 2C/C, 80 cm H, slightly hairy, long capsule, mixcropped with <i>Cajanus cajan</i> .	sandy loam
0003	"	"	"	"	"	"	"	"	"	"	"	"	"	1LL, 1C/LA, 2C/C, much hairy, med. capsule, in the same field as 0002.	"
0004	"	"	"	"	"	"	"	"	"	"	"	"	"	1LL, 3C/LA, 2C/C, varied hairiness, med. capsule, in the same field as 0002.	"
0005	"	"	HAURI (or TIL)	"	"	SOMICHINCHOLI, 101 km E from PUNE toward SOLAPUR, MAHARASHTRA (540 m)	"	"	food	"	"	"	④	Primitive type?, 3LL, 1C/LA, 2C/C, HNB, 102 cmH, 70 cmLC.	rocky sand
0006	"	"	HAURI	"	"	BHIGWAN, 128 km E from PUNE toward SOLAPUR, MAHARASHTRA (550 m)	-	-	-	-	"	-	-	White seeds.	village market
0007	"	"	"	"	"	"	-	-	-	-	"	-	-	Brown seeds.	"
0009	"	"	TIL	"	"	VANAGALI, 143 km E from PUNE toward SOLAPUR, MAHARASHTRA (550 m)	end JUN to SEP/OCT	rainfed	food, sold for oil	insects in fruits	"	①	④	1C/LA, 4C/C, abnormally wrong growth by drought, mixcropped with <i>C. cajan</i> & <i>Dolichos biflorus</i> .	brown loam (stony)
0010	"	"	"	"	"	"	"	"	"	"	"	"	"	1C/LA, 2C/C, in the same field as 0009.	"
0011	"	"	-	"	"	GAIKWADVASTI, 153 km E from PUNE toward SOLAPUR, MAHARASHTRA (540 m)	-	"	-	-	"	②	③	3LL, HNB, 1C/LA, 2C/C, varied hairiness, abnormally wrong growth.	brown loam
0012	"	"	-	"	"	"	-	"	-	-	"	"	"	3LL, HNB, 1C/LA, 4C/C, abnormally wrong growth.	"
0013	SEP 28	"	BILE ELLU	"	"	DHULKHED, 36 km S from SOLAPUR toward BIJAPUR, KARNATAKA (430 m)	early JUL to early OCT	"	-	insects	③	①	④	Primitive type, 3LL, HNB, 1C/LA, 2C/C.	sandy brown loam
0014	"	"	"	"	"	DHULKHED, 35 km S from SOLAPUR toward BIJAPUR, KARNATAKA (420 m)	"	"	food	-	"	-	-		farmstore
0015	"	"	"	"	"	"	"	"	"	-	"	-	-		another farmstore
0021	"	"	BILI ELLU	"	"	BALLOLTI, 53 km S from SOLAPUR toward BIJAPUR, KARNATAKA (460 m)	end JUN to early OCT	"	food, oil	-	"	①	④	Several plant types mixed in a field, wrong growth caused by no rainfall.	
0022	"	"	"	"	"	"	"	"	"	-	"	-	-		farmstore

Table 2 (continued)

Col. No.	Date	Species name	Local name	Sample P/in <sup>1)</sup>	Status <sup>2)</sup>	Locality (altitude)	Crop season	Cultural practice	Usage	Diseases & pests	Topo- <sup>3)</sup> graphy	Site <sup>4)</sup>	Drain- <sup>5)</sup> age	Characteristics	Notes
0023	"	"	"	"	"	"	"	"	"	-	"	①	④	2C/C & 4C/C mixed, 97 cm H, 80 cmLC, another field than 0021.	brown sandy loam
0024	"	"	"	"	"	HORTI, 68 km S from SOLAPUR toward BIJAPUR, KARNATAKA (530 m)	-	-	-	-	"	-	-	White seeds.	weekly bazar
0025	"	"	"	"	"	"	-	-	-	-	"	-	-	"	"
0029	"	"	BILLE ELLU	"	"	TIKOTA, 21 km S from BIJAPUR, KARNATAKA (690 m)	end JUN to early OCT	rainfed	food	-	"	①	④	White seeds, 2C/C.	rocky brown loam
0030	"	"	"	"	"	"	"	"	-	"	"	"	"	3C/C.	"
0031	"	"	"	"	"	BIJJARGI, 35 km W from BIJAPUR, KARNATAKA (680 m)	early JUL to early OCT	"	-	-	"	"	"	Primitive type, 3LL, HNB, 2C/C, mixcropped with <i>Vigna aconitifolia</i> .	rocky brown loam
0032	"	"	"	"	"	"	"	"	-	-	"	"	"	Primitive type, 3LL, HNB, 4C/C, mixcropped with <i>V. aconitifolia</i> .	"
0033	"	"	"	"	"	GHONASAGI, 44 km W from BIJAPUR, KARNATAKA (620 m)	JUN/JUL to early OCT	"	food	-	"	-	-	White seeds.	farmstore
0034	"	"	"	"	"	"	"	"	"	-	"	-	-	"	another farmstore
0035	"	"	KARI ELLU	"	"	"	"	"	"	-	"	-	-	Blackish brown seeds, old variety, 4 months crop.	farmstore
0037	"	"	BILE ELLU	"	"	"	end JUL to early OCT	"	"	-	"	①	④	3LL, HNB, 4C/C, in a field near a grape field.	sandy brown loam
0038	SEP 29	"	BILI ELLU	"	"	ARJUNAGI, 40 km S from BIJAPUR toward JAMAKHANDI, KARNATAKA (570 m)	JUN 20 to early OCT	"	"	-	"	"	③	White seeds, 1-3LL, HNB, 2C/C, 130 cmH, 80 cmLC, tropical type.	red soil
0039	"	"	"	"	"	"	"	"	"	-	"	"	"	White seeds, 1-3LL, HNB, 3-4C/C, 130 cmH, 80 cmLC, tropical type.	"
0040	"	"	"	"	"	BIDRI, 53 km S from BIJAPUR toward JAMAKHANDI, KARNATAKA (540 m)	early JUL to mid-OCT	"	"	-	"	"	"	White seeds, curved fruits were observed in the field.	farmstore
0041	"	"	"	"	"	NAVALAGI, 26 km W from JAMAKHANDI, KARNATAKA (580 m)	MAY to mid-SEP	"	"	insects	"	-	-	White seeds.	farmstore (brown loam)
0042	"	"	KARE ELLU	"	"	"	MAY to early	irrig- ated*	"	"	"	①	③	Blackish brown seeds, 1C/LA, 200 cmH, 160 cmLC, 2C/C.	once 15 days
0043	"	"	BILI ELLU	"	"	LOKAPUR, 25 km S from MUDHOL toward DHARWAD, KARNATAKA (570 m)	-	-	"	-	"	-	-	White seeds.	village market
0044	"	"	KARE ELLU	"	"	"	-	-	"	-	"	-	-	Blackish brown seeds.	"

Table 2 (continued)

Col. No.	Date	Species name	Local name	Sample P/In <sup>1)</sup>	Status <sup>2)</sup>	Locality (altitude)	Crop season	Cultural practice	Usage	Diseases & pests	Topo- <sup>3)</sup> graphy	Site <sup>4)</sup>	Drain- <sup>5)</sup> age	Characteristics	Notes
0046	"	"	-	"	"	HONGAL, 129 km S from MUDHOL toward DHARWAD, KARNATAKA (660 m)	? to early OCT	irrigated	-	-	"	-	-	Capsule shape & anthocyanin pigmentation on stem varied, 108 cmH, 60 cmLC, HNB.	at edge of groundnut field
0048	SEP 30	"	KARI ELLU	"	"	NALAVADI, 26 km E from HUBLI toward GADAG, KARNATAKA (610 m)	mid-JUL to mid-OCT	rainfed	food	-	"	①	③	1C/LA (rarely 3C/LA), 2C/C, LNB, 60 cmH, 40 cmLC, mix-cropped with <i>Setaria italica</i>	black cotton soil
0049	"	"	BILI ELLU	"	"	DUNDUR, 46 km E from HUBLI toward GADAG, KARNATAKA (640 m)	end JUL to OCT	"	food, oil	-	"	"	"	1&3LL, 2&4C/C, LNB, 70 cmH, 24 cmLC, mixcropped with <i>Allium cepa</i> .	black cotton soil
0050	"	"	BILE ELLU	"	"	NAGAVI, 13 km SE from GADAG, KARNATAKA (730 m)	mid-JUL to mid-OCT	"	food, medicine <sup>a</sup>	-	"	"	"	3L, HNB, 1C/LA, 2C/C, 95 cmH, 73 cmLC.	black soil for massage
0051	"	"	"	"	"	"	"	"	"	-	"	"	"	3L, HNB, 1C/LA, 2C/C, in the same field as 0050.	"
0052	"	"	"	"	"	"	"	"	"	-	"	"	"	3L, HNB, 3C/LA, 2C/C, a limited number of plants in the same field as 0050.	"
0053	"	"	KARE ELLU	"	"	"	JUN to late SEP	"	"	-	"	-	-	Black seeds, harvested a few days ago.	red soil
0054	"	"	ELLU	"	"	"	-	"	"	-	"	-	-	Black and white seeds mixed, being dried after harvest.	
0055	"	"	KARE ELLU	"	"	"	-	"	"	-	"	-	-	Black seeds, being dried after harvest.	
0057	"	"	BILE ELLU	"	"	GINIGERA, 111 km E from KOPPAL toward HOSPET, KARNATAKA (540 m)	mid-JUN to SEP/OCT	"	"	-	"	①	③	Tropical type, mixcropped with <i>V. radiata</i> , <i>C. cajan</i> & <i>Pennisetum americanum</i>	red soil
0058	OCT 1	"	KARE ELLU	"	"	DOMMUR, 11 km N from BELLARY toward RAICHUR, KARNATAKA (440 m)	early JUL to mid-OCT	"	food	-	"	"	"	1C/LA, 2C/C, 130 cmH, 90 cmLC, HNB(relatedly).	red stony soil
0059	"	"	-	"	"	TEKKALAKOTE, 44 km N from BELLARY toward RAICHUR, KARNATAKA (410 m)	-	"	-	virus serious	"	"	"	Tropical type, HNB, 98 cmH, 85 cmLC.	black soil
0062	"	"	KARE ELLU, MANCHI-NULLU	"	"	MADIRA, 55 km NE from SIRUGUPPA toward ADONI, ANDHRA PRADESH (370 m)	early AUG to JAN	"	food	-	"	-	-	Blackish brown seeds.	farmstore of Mr. Gundappa
0063	"	"	BILE ELLU	"	"	PADDATUMBALAM, 22 km N from ADONI toward RAICHUR, ANDHRA PRADESH (400 m)	JUN to OCT	"	"	virus serious	"	①	③	Mixcropped with cotton and <i>V. radiata</i> .	brown sandy soil
0064	"	"	MANCHI-NULLU	"	"	MALIPALLI, 33 km N from ADONI toward RAICHUR, ANDHRA PRADESH (380 m)	early JUN to early OCT	"	-	virus limited	"	"	"	Tropical type, black seeds, 3L, 150 cmH, 120 cmLC, 1C/LA, 2C/C, mixcropped with cotton and <i>C. cajan</i> .	
0065	OCT 2	"	ISH ELLU, CHITT ELLU	"	"	SULTANPUR, 28 km NW from RAICHUR, KARNATAKA (360 m)	JUN to SEP	"	food, oil	-	"	-	-	60 cmH, bitter type.	farmstore ISH means poison.

Table 2 (continued)

Col. No.	Date	Species name	Local name	Sample P/In <sup>1)</sup>	Status <sup>2)</sup>	Locality (altitude)	Crop season	Cultural practice	Usage	Diseases & pests	Topo- <sup>3)</sup> graphy	Site <sup>4)</sup>	Drain- <sup>5)</sup> age	Characteristics	Notes
0066	"	"	ENTANE ELLU	"	"	SIRWAR, 42 km W from RAICHUR toward LINGSURUR, KARNATAKA (410 m)	end JUN to early OCT	"	food	virus limited	"	-	-	White seeds, harvested yesterday.	
0067	"	<i>Sesamum</i> sp.	-	"	①	KAUTAL, 29 km S from SIRWAR toward LINGSURUR, KARNATAKA (460 m)	-	-	-	-	"	②	③	Large purple flower, mixed sporadically in a sunflower field.	red soil
0068	"	<i>Sesamum indicum</i> L.	KARE ELLU	"	③	"	mid-JUN to mid-OCT	rained	food	-	"	"	"	Black seeds, mixcropped with <i>V. radiata</i> & <i>C. cajan</i> .	sweet type
0069	"	"	"	"	"	"	early JUN to mid-SEP	"	"	-	"	-	-	Black seeds.	bitter type, farmstore
0070	"	"	BILE ELLU	"	"	"	mid-JUN to early SEP	"	"	-	"	-	-	White seeds.	farmstore
0071	"	"	KARE ELLU	"	"	AIDNAL, 5 km NNE from LINGSUGOR toward SHORAPUR, KARNATAKA (520 m)	end JUN to end OCT	"	"	virus limited	"	①	③	Typical type, 3LL, 1C/LA, 2C/C, 195 cmH, 135 cmLC, black seeds, stem color varied, mixcropped with <i>V. radiata</i> , <i>V. aconitifolia</i> , <i>C. cajan</i> & <i>Guizotia abyssinica</i> .	red soil
0072	"	"	ELLU	"	"	SHANTPURA, 33 km NNE from LINGSUGOR toward SHORAPUR, KARNATAKA (390 m)	end JUN to mid-OCT	"	"	-	"	"	"	Tropical type, 3LL, 1C/LA, 2C/C, HNB, mixcropped with <i>Arachis hypogaea</i> , <i>V. radiata</i> , <i>V. unguiculata</i> , <i>C. cajan</i> & <i>V. aconitifolia</i> .	red soil
0073	"	"	BILE ELLU	"	"	ULKAL(K), 9 km N from SHORAPUR toward GULBARGA, KARNATAKA (440 m)	late JUN to early OCT	"	"	-	"	-	-	3-4C/C, on a cattle tailer just after harvest.	
0074	OCT 3	"	SIDE ELLU	"	"	KERI-BHOSGA, 9 km N from GULBARGA toward ALAND, KARNATAKA (490 m)	end JUN to early OCT	"	"	-	"	①	③	White seeds, mixcropped with <i>C. cajan</i> , 1C/LA, 4C/C.	black soil
0075	"	"	"	"	"	"	"	"	"	-	"	"	"	White seeds, mixcropped with <i>C. cajan</i> , 1C/LA, 2C/C.	"
0076	"	"	"	"	"	"	"	"	"	-	"	"	"	White seeds, mixcropped with <i>C. cajan</i> , 3C/LA, 2C/C.	"
0077	"	"	JAWARI ELLU (BILE ELLU)	"	"	PATTANA, 19 km W from GULBARGA toward ALAND, KARNATAKA (500 m)	end JUN to mid-OCT	"	food, cash crop	-	"	"	"	White seeds, 1C/LA, 3-4C/C, mixcropped with <i>C. cajan</i> , <i>P. americanum</i> , <i>Helianthus annuus</i> & <i>Hibiscus cannabinus</i> .	black soil JAWARI means local.
0078	"	"	"	"	"	"	"	"	"	-	"	"	"	White seeds, 1C/LA, 2C/C, in the same field as 0077.	"
0079	"	"	"	In (one plant)	"	"	"	"	"	-	"	"	"	White seeds, 2-3C/LA, 2C/C, in the same field as 0077.	"

Table 2 (continued)

Col. No.	Date	Species name	Local name	Sample P/In <sup>1)</sup>	Status <sup>2)</sup>	Locality (altitude)	Crop season	Cultural practice	Usage	Diseases & pests	Topo- <sup>3)</sup> graphy	Site <sup>4)</sup>	Drain- <sup>5)</sup> age	Characteristics	Notes
0080	"	"	(ELLU)	P	"	ADAGANCHI, 28 km NW from ALAND toward ALAND, KARNATAKA (510 m)	-	-	-	-	"	-	-	Being dried after harvest.	
0081	"	"	BILE ELLU	"	"	TALAKARNI, 5 km N from ALAND toward OMERGA, KARNATAKA (520 m)	late JUN to early OCT	rained	food	-	"	①	③	1C/LA, 4C/C, LNB.	black soil being harvested
0082	"	"	"	"	"	"	"	"	"	-	"	"	"	1C/LA, 2C/C(3C/C rarely on 2C/C plants), in the same field as 0081.	"
0083	"	"	PANDHARI TIL	"	"	MANNALI, 21 km E from OMERGA toward BASAVA KALYAN, KARNATAKA (560 m)	early JUN to end SEP	"	"	-	④	-	-	Mostly 2C/C, rarely 4C/C, LNB.	bundles are being dried
0084	"	"	TIL	"	"	MIRKHAL, 34 km N from BASAVA KALYAN, KARNATAKA (580 m)	early JUN to early SEP	"	oil, food	-	"	-	-	White seeds.	farmstore
0085	"	"	"	"	"	"	early JUN to mid-SEP	"	"	-	"	-	-	"	"
0086	"	"	"	"	"	KHARUSA, 86 km from BASAVA KALYAN toward AUSA, MAHARASHTRA (640 m)	mid-JUN to early OCT	"	-	-	③	①	③	White seeds, 3LL, 1C/LA, 2C/C.	black soil
0087	"	"	"	"	"	AUSA, 90 km from BASAVA KALYAN toward LATUR, MAHARASHTRA (640 m)	JUN to early OCT	"	-	-	"	"	"	White seeds, 3LL, 1C/LA, 2C/C, hairiness on fruits varied.	just after harvest
0088	"	"	"	"	"	"	"	"	-	-	"	"	"	White seeds, no branching, 3C/LA, 2C/C, hairiness on fruits varied, in the same field as 0087.	"
0090	OCT 4	"	"	"	"	5 km W from the central part of LATUR, MAHARASHTRA (630 m)	end JUN to late SEP	"	oil, food	-	"	"	"	White seeds, LNB, being dried after harvest.	reddish brown soil
0092	"	"	"	"	"	RAMEGAON, 25 km W from LATUR, MAHARASHTRA (650 m)	end JUN to mid-SEP	"	"	-	"	"	-	LNB, mostly 1C/LA, rarely 3C/LA, 2C/C.	
0093	"	"	"	"	"	BORGAON, 29 km W from LATUR, MAHARASHTRA (650 m)	end JUN to SEP	"	-	-	"	-	-	2C/C, 1C/LA & 3C/LA(rarely oppositely).	dried on the roof
0094	"	"	"	"	"	SHIRALA, 35 km W from LATUR, MAHARASHTRA (640 m)	end JUN to mid-SEP	"	oil, food	-	"	-	-	1C/LA, 2C/C.	
0095	"	"	"	"	"	BHOISAMUDRA, 15 km NNW from LATUR, MAHARASHTRA (610 m)	end JUN to late SEP	"	"	-	"	-	-	Tall >140 cmH, 1C/LA, 2C/C, rarely 3C/LA, 4C/C mixed.	blackish brown soil
0096	"	"	"	"	"	MANDAPUR, 44 km NE from LATUR toward AHMEDPUR, MAHARASHTRA (610 m)	end JUN to end SEP	"	"	-	"	-	-	White seeds, 1C/LA.	blackish brown soil

Table 2 (continued)

Col. No.	Date	Species name	Local name	Sample P/In. <sup>1)</sup>	Status <sup>2)</sup>	Locality (altitude)	Crop season	Cultural practice	Usage	Diseases & pests	Topo- <sup>3)</sup> graphy	Site <sup>4)</sup>	Drain- <sup>5)</sup> age	Characteristics	Notes
0098	"	"	PANDHRA TIL	"	"	SHIRUR TAJBAND, 56 km NE from LATUR toward AHMEDPUR, MAHARASHTRA (550 m)	early JUN to mid-SEP	"	"	-	④	-	-	White seeds, 1C/LA (3C/LA mixed), 110 cmH, 50 cmLC.	dried on the roof
0099	"	"	"	"	"	"	"	"	"	-	"	-	-	Being dried on another house's roof than 0098.	
0100	"	"	TIL	"	"	BALAGA, 14 km NE from AHMEDPUR toward NANDED, MAHARASHTRA (510 m)	mid-JUN to lete SEP	"	"	-	"	①	③	3 types mixed:(1C/LA, 2C/C); (2C/LA, 2C/C);(1C/LA, 4C/C). 1C/LA, 2C/C was collected.	dried after harvest
0101	"	"	"	"	"	"	"	"	"	-	"	"	"	3C/LA, 2C/C.	
0102	"	"	"	P two plants	⑥	MALAKULI, 25 km NE from AHMEDPUR toward NANDED, MAHARASHTRA (530 m)	? to mid-OCT	"	-	-	④	②	"	3C/LA, 170 cmH, 57 cm LC. LNB, hairiness on fruits varied, improved type?	blackish brown soil
0103	"	"	GOPI TIL	P	③	SONKHED, 53 km NE from AHMEDPUR toward NANDED, MAHARASHTRA (430 m)	late JUN to mid-SEP	"	-	-	③	-	-	White seeds, farmers believe high yield.	
0104	"	"	DHAUNDA TIL	"	"	"	early JUL to late SEP	"	-	-	"	-	-	Brownis white seeds.	
0105	OCT 6	"	HAURI	"	"	MANCHAR, 89 km N from PUNE toward NASHIK, MAHARASHTRA (610 m)	end JUN to late OCT	"	food, oil	none	"	①	④	Tropical type, hairiness of fruits varied, 1C/LA, 2C/C, mixcropped with <i>A. hypogaea</i> .	greish sandy loam
0106	"	"	HAWRI	"	"	AKLAPUR, 113 km N from PUNE toward NASHIK, MAHARASHTRA (630 m)	? to late OCT	"	-	-	④	②	"	1C/LA, 2C/C, HNB & LNB mixed, mixcropped with <i>V. radiata</i> , <i>V. acconitifolia</i> , <i>D. biflorus</i> & <i>G. abyssinica</i> .	brown loam
0107	"	"	GOPI	In (one plant)	"	WADALIBHOI, 54 km NE from NASHIK toward DHULE, MAHARASHTRA (680 m)	late JUN to early OCT	"	food	-	③	①	③	Densely fruited type rarely found in the field, now selected by a local farmer.	brown loam
0108	"	"	TIL	P	"	"	"	"	"	-	"	"	"	Frequent type in the same field as 0107.	"
0109	"	"	-	"	"	SOUNDANE, 97 km NE from NASHIK toward DHULE, MAHARASHTRA (490 m)	? to early OCT	"	-	virus limited	"	"	"	Tropical type, thick stem, HNB, 210 cmH, 132 cmLC.	blackish brown loam
0110	"	"	-	"	"	"	"	"	-	-	"	"	"	Densely fruited, non-branching type, 150 cmH, 40 cmLC, in the same field as 0109.	"
0111	"	"	-	"	"	"	"	"	-	-	"	"	"	3C/C, mixed in the same field as 0109.	"
0112	OCT 7	"	-	"	③?	DEOBANA, 18 km NE from DHULE toward INDORE, MAHARASHTRA (240 m)	"	"	-	-	"	"	"	1-3C/LA mixed, rarely oppositely fruited, 220 cmH, 70 cmLC.	"
0113	"	"	-	"	③	WARUT, 29 km NE from DHULE toward INDORE, MAHARASHTRA (240 m)	"	"	-	-	"	"	"	LNB, 1C/LA, 2C/C, 150 cmH, 60 cmLA.	sandy greish loam

Table 2 (continued)

Col. No.	Date	Species name	Local name	Sample P/In <sup>1)</sup>	Status <sup>2)</sup>	Locality (altitude)	Crop season	Cultural practice	Usage	Diseases & pests	Topo- <sup>3)</sup> graphy	Site <sup>4)</sup>	Drain- <sup>5)</sup> age	Characteristics	Notes
0114	"	"	DIWADI TIL	"	③	SULIA, 82 km NE from DHULE toward INDORE, MAHARASHTRA (190 m)	mid-JUN to mid-OCT	"	oil, food	-	"	②*	"	White seeds, HNB, large fruits	'slightly
0115	"	"	TILLI	"	"	DINGWA, 34 km NE from SENDHWA toward INDORE, MAHARASHTRA (240 m)	JUN to mid-OCT	"	oil	-	④	①	"	120 cmH, 1C/LA, 2C/C.	
0116	"	"	"	"	"	"	"	"	"	-	"	"	"	1C/LA, oppositely fruited, in the same field as 0115.	
0117	"	"	"	"	"	"	"	"	"	-	"	"	"	3C/LA, 2C/C, in the same field as 0115.	
0118	"	"	"	"	"	"	"	"	"	-	"	"	"	Taller than 200 cmH, 1C/LA, 2C/C.	
0119	"	"	"	"	"	"	"	"	"	-	"	"	"	1C/LA, 2C/C, oppositely fruited, in the same field as 0118.	
0120	"	"	"	"	"	"	"	"	"	-	"	"	"	3C/LA, 2C/C, in the same field as 0118.	
0121	OCT 8	"	"	"	"	HATAMBA, 45 km NE from INDORE toward BHOPAL, MADHYA PRADESH (510 m)	early JUL to early OCT	irrigated	oil, food	-	③	"	"	1C/LA, 2C/C, MNB, capsule shape varied, mixcropped with <i>Glycine max.</i>	greish brown soil
0122	"	"	"	"	"	"	"	"	"	-	"	"	"	3C/LA, in the same field as 0121.	"
0123	"	"	"	"	"	SONKATCH, 65 km NE from INDORE toward BHOPAL, MADHYA PRADESH (470 m)	early JUL to late OCT	"	food, oil	-	"	"	"	1C/LA, 2C/C, mixcropped with <i>G. max.</i>	blackish brown soil
0124	"	"	"	"	"	"	"	"	"	-	"	"	"	3C/LA, 2C/C, in the same field as 0123.	"
0125	"	"	"	"	"	TANNODA, 104 km NE from INDORE toward BHOPAL, MADHYA PRADESH (520 m)	JUN/JUL to early OCT	"	oil, food	capsule borer	"	"	④	White seeds, 1C/LA, 2C/C, 155 cmH, 100cmL.C.	"
0126	"	"	"	"	"	"	"	"	"	"	"	"	"	White seeds, 3C/LA, 2C/C.	"
0128	"	"	SUFAID TILLI	"	③?	PILIKARAR, 71 km SE from BHOPAL toward HOSHANGABAD, MADHYA PRADESH (320 m)	early JUL to late OCT	rained	"	-	"	"	"	3C/LA, MNB, mixcropped in <i>G. max</i> field.	"
0129	"	"	"	"	"	"	"	"	"	-	"	"	"	3C/LA, non-branching, in the same field as 0128.	"
0130	"	"	"	"	"	"	"	"	"	-	"	"	"	1C/LA, oppositely fruited, in the same field as 0128.	"
0131	"	"	"	"	"	"	"	"	"	-	"	"	"	Tropical type, in the same field as 0128.	"
0132	OCT 9	"	TILLI	"	③	MORIKOLI, 65 km NE from BHOPAL toward SAGAR, MADHYA PRADESH (410 m)	JUN to early OCT	"	food, oil	virus, insects	"	"	③	White seeds and some brown ones mixed, HNB.	greish clay



Table 2 (continued)

Col. No.	Date	Species name	Local name	Sample P/In <sup>1)</sup>	Status <sup>2)</sup>	Locality (altitude)	Crop season	Cultural practice	Usage	Diseases & pests	Topo- <sup>3)</sup> graphy	Site <sup>4)</sup>	Drain- <sup>5)</sup> age	Characteristics	Notes
0133	"	"	"	"	"	MENDKI, 72 km NE from BHOPAL toward SAGAR, MADHYA PRADESH (410 m)	early JUL to late OCT	rainfed, broad-casting	-	capsule borer	"	"	④	MNB, 1C/LA, 2C/C.	"
0134	"	"	"	"	"	"	"	"	-	"	"	"	"	MNB, 2-3C/LA, 2C/C, in the same field as 0133.	"
0135	"	"	"	"	"	KJAKHEDI, 100 km NE from BHOPAL toward SAGAR, MADHYA PRADESH (400 m)	-	rainfed	-	-	"	"	"	145 cmH, 95 cmLC, 1C/LA, 2C/C, several plant types mixed, mixcropped in <u>g. max</u> field.	"
0136	"	"	"	"	"	"	"	"	-	-	"	"	"	Incomplete 3C/LA, 2C/C, in the same field as 0135.	"
0137	"	"	"	"	"	BAHADARPUR, 165 km NE from BHOPAL toward SAGAR, MADHYA PRADESH (580 m)	early JUL to early OCT	"	food, oil	-	"	"	③	Being dried after harvest, 1C/LA, 2C/C, oppositely fruited plants mixed rarely.	brown loam
0138	OCT 10	"	"	"	"	MOTHI, 16 km NE from SAGAR toward JHANSI, MADHYA PRADESH (480 m)	early JUL to late OCT	"	food, oil, fodder	capsule borer, virus	④	"	"	1C/LA, 2C/C, oppositely fruited.	blackish brown loam
0139	"	"	"	"	"	"	"	"	"	"	"	"	"	1C/LA, 2C/C, alternately fruited, in the same field as 0138.	"
0140	"	"	"	"	"	"	"	"	"	"	"	"	"	2-3C/LA, 2C/C, grown in the central part of the same fields as 0138.	"
0141	"	"	"	"	"	"	"	"	"	"	"	"	"	2C/LA, 3C/C, grown at the edge of the same fields as 0138.	"
0142	"	"	SUFAID TILLI	"	"	PALI, 38 km N from SAGAR toward JHANSI, MADHYA PRADESH (460 m)	"	"	oil, food	-	③	"	"	Mixcropped with <u>P. americanum</u> .	brown loam
0143	"	"	TIL	"	"	GONA, 76 km N from SAGAR toward JHANSI, UTTAR PRADESH (390 m)	early JUL to end OCT	rainfed, broad-casting	"	-	"	"	"	White seeds, 1C/LA, 2C/C, branching and non-branching types mixed.	greish loam
0144	"	"	"	In (one plant)	"	"	"	"	"	"	"	"	"	3C/LA, oppositely fruited, in the same field as 0143.	"
0146	"	"	TILI	P	"	BIGHA, 12 km N from LALITPUR toward JHANSI, UTTAR PRADESH (360 m)	early JUL to early OCT	rainfed	food, oil	-	"	"	"	White seeds, 1C/LA, 2C/C, alternately fruited.	light brown clay
0147	"	"	"	"	"	"	"	"	"	-	"	"	"	White seeds, 1C/LA, 2C/C, oppositely fruited, in the same field as 0146.	"
0148	"	"	"	"	"	"	"	"	"	-	"	"	"	White seeds, 3C/LA, 2C/C, opositely & alternately fruited plants mixed, in the same field as 0146.	"

Table 2 (continued)

Col. No.	Date	Species name	Local name	Sample P/in. <sup>1)</sup>	Status <sup>2)</sup>	Locality (altitude)	Crop season	Cultural practice	Usage	Diseases & pests	Topo- <sup>3)</sup> graphy	Site <sup>4)</sup>	Drain- <sup>5)</sup> age	Characteristics	Notes
0149	"	"	TILI (SUFAID TILI)	"	"	JAMALPUR, 31 km N from LALITPUR toward JHANSI, UTTAR PRADESH (350 m)	early JUL to mid-OCT	"	"	-	④	②	"	White seeds, non-branching, 3C/LA, mixcropped with V. mungo.	reddish brown loam
0150	"	"	"	"	"	"	"	"	"	-	"	"	"	White seeds, 1C/LA, 2C/C, alternately fruited, in the same field as 0149.	"
0151	"	"	"	"	"	"	"	"	"	-	"	"	"	White seeds, 1C/LA, 2C/C, oppositely fruited, in the same field as 0149.	"
0152	"	"	TILI (KARA TILI)	"	"	"	"	"	"	-	"	"	"	Black seeds, branching type?, in the same field as 0149.	"
0153	"	"	TILI (SUFAID TILI)	"	"	"	"	"	"	-	"	-	-	White seeds.	farmstore
0154	"	"	TILI	"	"	BAHWARISAR, 41 km N from LALITPUR toward JHANSI, UTTAR PRADESH (360 m)	"	"	oil, food	-	③	①	③	3C/LA.	sandy red loam
0155	"	"	"	"	"	"	"	"	"	-	"	"	"	1C/LA, oppositely fruited, in the same field as 0154.	"
0156	"	"	"	"	"	"	"	"	"	-	"	"	"	1C/LA, 2C/C, alternately fruited, white & black seeds mixed, most frequent type in the same field as 0154.	"
0157	OCT 11	"	"	"	"	SIMARDA, 11 km N from JHANSI toward AGRA, UTTAR PRADESH (270 m)	"	irrigated	"	-	"	"	"	White seeds, 1C/LA, 2C/C, alternately fruited.	"
0158	"	"	"	"	"	"	"	"	"	-	"	"	"	White seeds, 1C/LA, 2C/C, oppositely fruited, in the same field as 0157.	"
0159	"	"	"	"	"	"	"	"	"	-	"	"	"	White seeds, 3C/LA, 2C/C, alternately fruited, in the same field as 0157.	"
0160	"	"	"	"	"	"	"	"	"	-	"	"	"	White seeds, 3C/LA, 2C/C, oppositely fruited, mostly non-branching type, in the same field as 0157.	"
0161	"	<i>Sesamum indicum</i> L. ? semi-wild or weedy type	(TIL)	"	②?	"	"	"	"	-	"	"	"	Black seeds, early maturing, 1C/LA, 2C/C, deep purple petal, alternately fruited, small easily dehiscing fruits, LNB, in the same field as 0157.	"

Table 2 (continued)

Col. No.	Date	Species name	Local name	Sample P/In: <sup>1)</sup>	Status <sup>2)</sup>	Locality (altitude)	Crop season	Cultural practice	Usage	Diseases & pests	Topo- <sup>3)</sup> graphy	Site <sup>4)</sup>	Drain- <sup>5)</sup> age	Characteristics	Notes
0162	"	"	"	"	"	"	"	"	"	-	"	"	"	Black seeds, early maturing, white petal, oppositely fruited?, small easily dehiscent fruits, in the same field as 0157.	"
0163	"	<i>Sesamum indicum</i> L.	TIL ?	"	③?	"	"	"	"	-	"	"	"	Tropical type, HNB, short internodes, in the same field as 0157.	"
0164	"	"	TILI	"	③	"	"	"	"	-	"	"	"	3C/LA, HNB.	"
0165	"	"	"	"	"	"	"	"	"	-	"	"	"	1C/LA, 2C/C, oppositely fruited, large capsule.	"
0166	"	"	CHOUFARA TILI	"	"	BADAUNKALAN, 54 km N from JHANSI, MADHYA PRADESH (230 m)	early JUL to late OCT	rained	"	-	"	"	②	3C/LA, 2C/C, oppositely fruited, non-branching type.	brown loam rather wet land
0167	"	"	TILI	"	"	"	"	"	"	-	"	"	"	1C/LA, 2C/C, alternately fruited, in the same field as 0166.	"
0168	"	"	"	"	"	"	"	"	"	-	"	"	"	1C/LA, 2C/C, oppositely fruited, in the same field as 0166.	"
0169	"	"	"	"	"	"	"	"	"	-	"	"	"	3C/LA, 2C/C, alternately fruited, in the same field as 0166.	"
0170	"	"	"	"	"	about 10 km N from GWALIOR toward AGRA, MADHYA PRADESH (260 m)	"	"	"	-	"	"	③	1C/LA, 2C/C, HNB, alternately & oppositely fruited plants mixed.	red sandy loam
0171	OCT 12	"	"	"	"	PORI, 30 km NW from AGRA toward MATHURA, UTTAR PRADESH (210 m)	late JUL to mid-OCT	"	oil	-	"	"	②	3C/LA, 2C/C, oppositely fruited, 160 cmH, 50 cmLC, mixed with <i>P. americanum</i> & <i>Sesbania sesban</i> .	brown loam rather wet land
0172	"	"	"	"	"	"	"	"	"	-	"	"	"	1C/LA, 2C/C, oppositely & alternately fruited plants mixed, 165 cmH, 125 cmLC, in the same field as 0171.	"
0173	"	"	TIL	"	"	GOVARDHAN, 11 km W from MATHURA toward ALWAR, UTTAR PRADESH (210 m)	early JUL to mid-OCT	irrigated broad-casting	sweets oil	-	"	"	"	1C/LA, 2C/C, oppositely fruited, 129 cmH, 90 cmLC, the most frequent type in the field.	greish brown loam
0174	"	"	"	"	"	"	"	"	"	-	"	"	"	1C/LA, 2C/C, alternately fruited, in the same field as 0173.	"
0175	"	"	"	"	"	"	"	"	"	-	"	"	"	3C/LA, 2C/C, oppositely fruited, in the same field as 0166.	"

Table 2 (continued)

Col. No.	Date	Species name	Local name	Sample P/In: <sup>1)</sup>	Status <sup>2)</sup>	Locality (altitude)	Crop season	Cultural practice	Usage	Diseases & pests	Topo- <sup>3)</sup> graphy	Site <sup>4)</sup>	Drain- <sup>5)</sup> age	Characteristics	Notes
0176	"	"	TILLI	"	"	SUNDARAVALI, 71 km W from MATHURA toward ALWAR, RAJASTHAN (230 m)	end JUN to end SEP	rained	oil, food	-	"	-	-	Being dried on the roof after harvest.	
0179	"	"	TILLI (DESI TILLI)	"	"	RANOTA, 85 km W from MATHURA toward ALWAR, RAJASTHAN (260 m)	early JUL to mid-OCT	"	"	-	"	①	②	1C/LA, 2C/C, alternately fruited, the most frequent type in the field.	brown loam
0180	"	"	TILLI (CHOUPHALI TILLI)	"	"	"	"	"	"	-	"	"	"	3C/LA, 2C/C, MNB, in the same field as 0179.	"
0181	"	"	"	"	"	"	"	"	"	-	"	"	"	3C/LA, 2C/C, non-branching type, in the same field as 0179.	"
0182	"	"	TILLI	"	"	"	"	"	"	-	"	"	"	Anthocyanin pigmentation, several plant shapes mixed, in the same field as 0179.	"
0183	"	"	TILLI (CHOUPHALI TILLI)	"	"	DHADOLI, 119 km W from MATHURA toward ALWAR, RAJASTHAN (290 m)	mid-JUL to mid-OCT	rained, broad-casting	oil, food	-	"	"	"	3C/LA, 2C/C, branching & non-branching type mixed.	light brown loam
0184	"	"	TILLI	"	"	"	"	"	"	-	"	"	"	1C/LA, 2C/C, alternately fruited.	"
0185	"	"	"	"	"	"	"	"	"	-	"	"	"	1C/LA, 2C/C, oppositely fruited.	"

## [Notes]

- 1) Sample: P(population), In(individual)  
 2) Status: ①wild, ②weedy, ③landrace, ④improved, ⑤breeder's line, ⑥others  
 3) Topography: ①swamp, ②flood plain, ③plain level, ④undulating, ⑤hilly ⑥mountainous, ⑦others  
 4) Site: ①level, ②slope, ③summit, ④depression  
 5) Drainage: ①poor, ②moderate, ③good, ④excessive

## [Abbreviation]

- HNB: high node branching  
 LNB: low node branching  
 MNB: middle node branching  
 C/LA: capsule(s) per leaf axis  
 C/C: carpel(s) per capsule  
 cmH: plant height (cm)  
 cmLC: height of lowest capsule (cm)  
 1LL: uni-lobed leaf  
 3LL: tri-lobed leaf

Table 2 (continued)

## b) Miscellaneous plants

Col. No.	Date	Species name	Local name	Sample P/In <sup>1)</sup>	Status <sup>2)</sup>	Locality (altitude)	Crop season	Cultural practice	Usage	Diseases & pests	Topo- <sup>3)</sup> graphy	Site <sup>4)</sup>	Drain- <sup>5)</sup> age	Characteristics	Notes
0008	SEP 27	<i>Amaranthus hypochondriacus</i> L.	RAJGIRA	P	③	WHIGWAN, 128 km E from PUNE toward SOLAPUR, MAHARASHTRA (550 m)	-	-	-	-	④	-	-		village market
0016	SEP 28	<i>Triticum dicoccum</i> Schubl.	JAWE GODI	P	"	DHULKHED, 35 km S from SOLAPUR toward BIJAPUR, KARNATAKA (420 m)	-	-	food	-	③*	-	-		farmstore 'slightly
0017	"	<i>Triticum aestivum</i> L.	KIRTI GODI	"	④	"	-	-	"	-	"	-	-		"
0018	"	<i>Triticum durum</i> Desf.	GODI	"	③	"	-	-	"	-	"	-	-		"
0019	"	<i>Sorghum bicolor</i> Moench	BILI JOLA	"	"	"	SEP to DEC/JAN	rained	"	-	"	-	-	White seeds, sown on blackish brown soil.	"
0020	"	<i>Setaria italica</i> (L.)P.Beauv.	NAVANE	"	"	"	JUN to SEP/OCT	-	"	-	"	-	-		"
0026	"	<i>Vigna radiata</i> (L.)Wilczek.	HESARU	"	"	HORTI, 68 km S from SOLAPUR toward BIJAPUR, KARNATAKA (530 m)	APR to JUL	-	"	-	③	-	-		weekly bazar
0027	"	<i>Vigna aconitifolia</i> (Jacq.) Marechal	MUKUNI	"	"	"	JUN to OCT	-	"	-	"	-	-		"
0028	"	<i>Helianthus annuus</i> L.	-	"	"	"	-	-	oil	-	"	-	-	At least 3 types mixed.	"
0036	"	<i>Setaria italica</i> (L.)P.Beauv.	NAVANE	"	"	GHONASAGI, 44 km W from BIJAPUR, KARNATAKA (620 m)	end JUN to end OCT	irrigated	food	-	"	-	-		farmstore
0045	SEP 29	<i>Vigna unguiculata</i> (L.)Walp.	ARASANDI	"	"	LOKAPUR, 25 km S from MUDHOL toward DHARWAD, KARNATAKA (570 m)	JAN to MAR/APR	"	"	-	"	-	-	Plants are also used as fodder.	village market
0047	SEP 30	<i>Setaria italica</i> (L.)P.Beauv.	NAVANE	"	"	NALAVADI, 26 km E from HUBLI toward GADAG, KARNATAKA (610 m)	mid-JUL to mid-OCT	rained	"	-	"	①	③	Long- and short-bristle types mixed, mixedcropped with <i>Sesamum indicum</i> .	black cotton soil
0056	"	"	HAR NAVANE	"	"	NAGAVI, 13 km SE from GADAG, KARNATAKA (730 m)	JUL/AUG to NOV	"	"	-	"	-	-		farmstore HAR:soft
0060	OCT 1	"	HAL NAVANE	"	"	MADIRA, 50 km NE from SIRUGUPPA toward ADONI, ANDHRA PRADESH (370 m)	mid-JUN to mid-OCT	"	"	-	"	-	-	Long bristles, plants with & without anthocyanin pigmentation mixed.	black soil
0061	"	"	"	"	"	"	"	"	"	-	"	-	-	Short bristles, in the same field as 0060.	"
0089	OCT 3	"	VARAI	"	"	AUSA, 90 km from BASAVA KALYAN toward LATUR, MAHARASHTRA (840 m)	(JUN) to (SEP)	"	"	-	"	①	③	Sporadically found in a field of <i>S. indicum</i> (0087 & 0088) & <i>Sorghum bicolor</i> .	brown soil

Table 2 (continued)

Col. No.	Date	Species name	Local name	Sample P/In <sup>1)</sup>	Status <sup>2)</sup>	Locality (altitude)	Crop season	Cultural practice	Usage	Diseases & pests	Topo- <sup>3)</sup> graphy	Site <sup>4)</sup>	Drain- <sup>5)</sup> age	Characteristics	Notes
0091	OCT 4	<i>Echinochloa frumentacea</i> Link	BAGAL	"	"	RAMEGAON, 25 km W from LATOR, MAHARASHTRA (650 m)	JUN to end SEP	"	"	-	"	-	-	Being dried after threshed.	
0097	"	<i>Vigna mungo</i> (L.) Hepper	UDID	"	④?	MANDAPUR, 44 km NE from LATOR toward AHMEDPUR, MAHARASHTRA (610 m)	late JUN to late SEP	"	"	-	"	-	-	"	
0127	OCT 8	<i>Abelmoschus tuberculatus</i> Pal et Singh	-	"	①	36 km SE from BHOPAL toward HOSHANGABAD, MADHYA PRADESH (460 m)	-	-	-	-	"	①	③	A weed in a <i>Glycine max</i> field.	blackish brown loam
0145	OCT 10	<i>Vigna mungo</i> (L.) Hepper	URDA	"	"	GONA, 76 km N from SAGAR toward JHANSI, UTTAR PRADESH (390 m)	-	-	food	-	"	"	"	Mixcropped with <i>S. indicum</i> .	greish loam
0177	OCT 12	<i>Pennisetum americanum</i> (L.) Leeke	BAJRA	"	"	SUNDARAVALI, 71 km W from MATHURA toward ALWAR, RAJASTHAN (230 m)	end JUN to end SEP	rained	food	-	"	-	-		farmstore
0178	"	<i>Echinochloa frumentacea</i> Link	BATTI	"	"	"	"	"	"	-	"	-	-		"

[Notes]

1) Sample: P(population), In(individual)

2) Status: ①wild, ②weedy, ③landrace, ④improved, ⑤breeder's line, ⑥others

3) Topography: ①swamp, ②flood plain, ③plain level, ④undulating, ⑤hilly ⑥mountainous, ⑦others

4) Site: ①level, ②slope, ③summit, ④depression

5) Drainage: ①poor, ②moderate, ③good, ④excessive