BALADY STRAINS OF EGYPTIAN VEGETABLES

I. COLLECTION FROM APRIL 21 TILL MAY 24, 1985.

Q.P. VAN DER MEER

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1. Introduction

Collection of land races of Egyptian vegetables was initiated within the scape of an agreement between, on the one side, the Egyptian Government, represented by the Horticultural Research Institute and the Field Crops Research Institute (both in Giza), and on the other hand the International Board for Plant Genetic Resources (IBPGR) in Rome. In the agreement mention is made of Allium, Brassica, Raphanus, Cucurbitaceae and Abelmoschus.

Egyptian land races, mostly anonymous local strains, are indicated by the adjective 'Balady' which means: of the country-side, so 'balady' is the general term to distinguish local strains from modern Egyptian and foreign varieties.

When preparing the first collection tour(s) priority was given to Alliaceous and Cucurbitaceous crops and their wild relatives. This is referred to in Dr. W.A. Ayad's duty-travel report on a visit to Giza from 14-21 April, 1985. However when starting the collection in practice it was established that by then it was too early for harvesting seeds of these crops from farmers' fields. Therefore seeds were requested from farm stores and seed shops, not only of Alliums and Cucurbitaceae but also of all the other species mentioned above. This decision is elucidated in paragraphs 4, 5 and 6. More general information on evironmental conditions and vegetable growing is given under 2 and 3. Finally the collection tour is described and some suggestions are given that could be of considerable value for the optimum accomplishment of the vegetable seed collection project in 1985 and 1986.

2. Geography, soil, climate, water, natural vegetation

Egypt is situated between 21^{o} and 32^{o} north latitude and 25^{o} and 35^{o} east longitude. The altitude ranges between less than -100 m (Qattara Depression in the North-West) and more than +2000 m (Mountain range between the Nile and the Red Sea; mountains in the Sinai).

Deserts cover more than 95% of the country. The acreage of arable land amounts to only some per cents of Egypt's total area of about 1000,000 km^2.

More or less half of the arable land is situated in the Nile Valley, which, being nowhere broader than 20 km, stretches from Aswan to Cairo, a distance of almost 1000 km.

The Delta, North of Cairo, encloses most of the rest of Egypt's agricultural area. Both in the Valley and in the Delta the agricultural acreage decreases because of urban developments, new roads etc. The same is true for the Faiyum, a more or less separate area situated beside the Valley, about 100 km South-West of Cairo.

A consirable acreage, more than 40.000 feddan, (a feddan consists of 24 carats; a carat = 175 m^2, so a feddan is 24 x 175 m^2 = 4200 m^2) of good arable land, is situated in 5 oases in the Western Desert: Kharga, Dakhla, Farafra, Biharya and Siwa.

Large areas of reclaimed land have been added to the agricultural acreage recently. Most of this land has been reclaimed west of the Delta (Tahrir Province) and between Cairo and the Suez Canal. On a smaller scale land reclamation is going on in areas bordering the Valley and (some) oases.

The soils used for agriculture vary between heavy clay and sand. Only a rather limited percentage of the soils is loamy and (consequently) pre-eminently suitable for vegetable growing.

Egypt has an extremely dry climate. Only the Mediterranean area receives a remarkable quantity of rain (during winter). The yearly rainfall in Alexandria, Cairo and Asyut is respectively about: 133,6 and 0 mm. Only in the Mediterranean area can some agriculture be done without irrigation, e.g. the growing of date palms and watermelons in the North-Western Sinai.

By far the most important water supply comes from the Nile. Since the realisation of the High Dam (1966) water has been used more economically, resulting in e.g. the above mentioned large areas of reclaimed land. Besides the Nile and the, limited, rainfall in the North, a third source of water is a huge subsoil water supply feeding, in an artesian way, the wells of the oases. The expected quantities (reserves) seem almost inexhaustible, but the flowing capacity of the wells is the limiting factor.

The most common provisions in irrigated field are sunken beds and ridges + ditches. Most irrigation is done directly by flooding via canals and

ditches. The water supply is realized in different ways varying between the very ancient khaduf and modern electric pumps and pumping stations. More modern water supply systems do not require special provisions in the field, so they can be used for flat land, without dikes or ditches. The pivot system sprinkles units of 150 acres. Drip irrigation seems to be the most modern and economic water supply system up to now.

The natural vegetation in most of the desert area is almost nil, however from Cairo to the North the natural vegetation increases considerably. Here e.g. several wild relatives of leeks can be found. Also wild watermelons and wild lettuce are growing in Egypt. The indigenous wild plants and their habitats have been described by Vivi Täckholm et al. in the 'Flora of Egypt' and by Vivi Täckholm in the 'Students' Flora of Egypt' (1974).

3. Vegetable growing in Egypt

Fairly recent data on vegetable growing are given in the Statistical Yearbook 1974 of the Arab Republic of Egypt (Table 1).

Table 1. Acreages (in feddan) and total production (in tons) of vegetable crops in 1972.

Crop	Acreage	Production
Garlic	9.000	120.000
Tomatoes	256.000	1665.000
Cabbage	30.000	278.000
Cauliflower	9.000	.
Okra	13.000	72.000
Taro	4.000	41.000
Radish	6.000	30.000
Turnip	6.000	42.000
Lettuce	7.000	58.000
Carrots	6.000	50.000
Rocket	2.000	22.000
Kurrat	2.000	21.000
Water-melon	95.000	1009.000
Melon	14.000	151.000
Onions (single crop)	47.000	376.000
Onions (interplanted)	74.000	111.000

The following crops have been the most common vegetables (sensu stricto) within living memory: okra (Abelmoschus esculentus), taro (Colocasia antiquorum) and jew's mallow (Corchorus olitorius).
Also the cucurbitaceous fruit vegetables are very old: cucumber (Cucumis sativus), melon (Cucumis melo), snake cucumber (Cucumis melo flexuosis), squash (Cucurbita pepo) and water-melon (Citrullus vulgaris).
Relatively new for Egypt are: cauliflower (Brassica oleracea botrytis), white cabbage (Brassica oleracea capitata alba), leeks (Allium porrum) and tomato (Lycopersicon lycopersicum).
The following flavourings are an integral component of Egyptian dishes: garlic (Allium sativum), kurrat (Allium kurrat), onion (Allium cepa), radish (Raphanus sativus) and rocket (Eruca sativa).
Vegetable growing is scattered all over Egypt, being rather strongly concentrated near large towns e.g. Alexandria, Asyut, Cairo, Sohag, Tanta, Qena. Some regions are extremely suitable for a particular crop, e.g. the margin of the Nile Valley in Minya where snake cucumbers are grown during winter because of relatively high night temperatures. Some places are known for a special crop e.g. El Fashn for kurrat, Edwa (Minya) for melons and Kirdasa (Giza) for onions (Beni Suef).
Some vegetables, like leeks and cauliflower, are more bound in the Northern part of the country, others, like taro, more in the south.
Some corps are grown almost right round the year, like radish (not in July) and kurrat, but most of them are season-bound, like okra and the cucurbitaceous crops. The onion crop is harvested in March-April (winter crop), in May-June (the summer crop) and December-January (the crop from sets), but because of a good keeping quality this product is, also, available all the year round.
The most urgent problems to be solved in the field of growing vegetables are some severe diseases, e.g. white rot (Sclerotium cepivorum) in onions and viruses in tomato and squash.

4. Seed supply and collection of balady strains

In former times by far the most seeds were grown by the farmers themselves. Accidental or planned oversupplies were sold to neighbours or merchants. The merchants took care of the distribution by selling the seeds of these local strain through local shops, markets etc. This situation has changed and is changing very radically because of the development of more or less national varieties and the importation of foreign ones.

Almost all seeds of the new national varieties are grown on a Governmental farm (Nuba Seed, Tahrir Province) or by farmers on the basis of contracts with the Government.
By now in most, if not all, local seed shops national and foreign varieties are dominating over balady races. Nevertheless most of these shops are still concentrationpoints of local strains. Therefore collection from local seed shops seems much more efficient than collection from farms. However in general the information (knowledge) on the origin of the seed samples is less certain when they are obtained from seed shops than when they are obtained from farms. So collection from both farms and seed shops is self evident and, because of the fast disappearance of a considerable number of balady races, even very urgent.

5. Breeding new varieties versus disappereance of balady strains

In Egypt breeding of vegetables is only done by governmental institutes, namely by the Vegetable Research Department of the Horticultural Research Institute, the Onion Section of the Field Crops Research Institute and some Universities, e.g., the Universities of Asyut, Alexandria, Cairo and Minya. So there are no private breeders at all.
Probably the earliest breeding work on the crops in question was started on the Southern onion type (Saidi) in the thirties resulting in the modern variety Giza 6. At present it is the only onion variety grown south of Cairo. Consequently most of the local Saidi strains disappeared very rapidly. Only some of them are left, e.g. near Asyut and south of Qena.
Comparable developments are going on in other crops, namely in cucumbers, water-melons, squash, turnip and melon, whereas they ar imminent for the northern onion type (Behairy), and cauliflower.

6. The collection tours

6.1 The itinerary

The collection tours were very well prepared by the Directors and the staff of the Vegetable Research Department of the Horticultural Research Institute and the Onion Section of the Field Crops Research Institute, both in Giza. Leaving, by train, Giza for Sohag was on April 23. Collection was started on April 24. Much help was received from the

Agricultural Administration of the following governments: Qena, Sohag, Asyut, Gharbia, Minufiya and Sinai. Collection under the guidance of helpful enthousiastic local horticultural specialists appeared to be of great value for tracing a satisfactory number of balady seed samples.
The itinerary of the different tours is given in Annex 1 (time tabel) and Annex 2 (map).

6.2 The crops involved

The crops of which seed samples were collected are mentioned in table 2, together with the periods in which the seeds are maturing.

Table 2. Crops of which seed samples were collected in April-May, 1985.

Common name	Latin name	Vernacular name	Seed harvesting period
Onions	Allium cepa	Basal	4,5,6 *
Leek	Allium porrum	Korraat abu shosha	6,7
Kurrat	Allium kurrat	Korraat	6,7
Garlic	Allium sativum	Thoam	
Cabbage	Brassica oleracea capitata alba	Kromb	4,5,6
Cauliflower	Brassica oleracea botrytis	Karnabeet	4,5,6
Turnip	Brassica campestris rapa	Left	4,5,6
Radish	Raphanus sativus	Figl	4,5,6
Okra	Abelmoschus esculentus	Bamya	8,9
Lettuce	Lactuca sativa	Khass	4,5
Cucumber	Cucumis sativus	Kheyar	7,8
Snake cucumber	Cucmis melo flexuosis	Katta	7,8
Melons	Cucumis melo	Shammam	6,7
Water-melons	Citrullus vulgaris	Batteekh	7,8
Squash	Cucurbita pepo	Kosa	6,7

* 1 = January; 2 = February, etc.

As appears from the last column of table 2 seed harvesting dates vary strongly (especially with the latitude). So it is very difficult to collect seeds of one crop during one collection tour of 1 or 2 weeks. Nevertheless collection from the farmers' fields is the ideal procedure and must be practised as much as possible, but restricting this to one or some crops means an unacceptable loss of efficiency.
Some relevant details of the above mentioned crops are given below:

- Onions are produced from three different crops. The winter crop is grown south of Cairo, the only variety being Giza 6. It is a rather uniform, globe shaped yellow exportable onion type. Harvesting is done in March-April. Giza 6 is also used for the growing of onions from sets. This crop is used for local consumption and dehydration; it is grown south of Cairo and harvested in December-January. The summer crop is grown in the Delta, north of Cairo, mostly interplanted with cotton. Many local strains (called Behairy-strains) are used for the growing of this crop. Some of them are completely yellow, some completely red, but most of them are a mixture of yellow, red and intermediate colours. Local strains from Kharga might show strong resistance to pink root.
- Leek is of very limited importance. It is a long and slender type, probably originating from Turkey or the Balkans. This crop is only grown in Northern Egypt, e.g. near Damietta.
- Kurrat is a leek-type without pseudostem. The green leaves are especially used to prepare tahamia, a special and very popular Egyptian dish. After sowing (in November) from the same plants about 7 cuttings are harvested starting in April. No special varieties are known.
- Garlic is grown all over Egypt and very probably all balady garlic is of the same clone. The cloves are of a relatively small size and therefore nowadays a Chinese garlic clone (being resistant to rust), is grown for export. Also an American variety is tried out in practice.
- Of white cabbage two types are grown, balady and a foreign variety (especially for winter growing) named Brunswick of which the seeds are imported. Cabbage is only used for stuffing (with rice).
- Most cauliflower is of the Snowball type. This is a foreign variety of which local strains have been developed. The size and quality of Egyptian cauliflower are both excellent. Kibu Giant is a well known imported strain from Denmark. The following balady types, although becoming rare, are still grown as well: Sultaney, Mehayer, Tobi and Amsherey. These strains are later in the given order of succession.

- Of turnip two types are grown, namely the real balady and the Iraqucee type, which is flatter than balady. Imported varieties are Purple Top from the Netherlands and White Globe from Arco Seeds (USA).
- By far most of the Egyptian radish is balady with white, thin and elongated tubers. Both leaves and tubers are eaten. Nowadays the European type of radish (red-round) of which only the tubers are consumed is also grown. The most modern radish type, being red-round and of a very big size, is also appearing on the Egyptian markets.
- Of Okra two balady types are grown having pronounced spines. They differ in fruit size. New spineless foreign varieties are appearing and becoming popular, namely: White Velvet, Goldcoast and Climson Spineless.
- Different types of lettuce are grown in Egypt. Seed of Iceberg lettuce is imported. Dark Green is an imported Roman type-variety. In the South cow-lettuce is grown. This is not very popular as a vegetable and is predominantly grown for seeds from which oil is extracted containing a high level of vitamine E. Other balady types are more suitable for human consumption.
- Beth Alpha is by far the most important cucumber variety. It is of foreign origin (e.g. Vilmorin). The balady strains are disappearing very rapidly because of the much more heterogenous shape and size. Madina is a new variety of Asgrow, showing resistance to powdery mildew under Egyptian conditions. Pepinex (Bruinsma) is very suitable for growing under plastic.
- Snake cucumbers have not yet been subjected to any breeding activity. Several strains have a special name (e.g. Shamy and Izmirly). The crop shows much variation in skin colour, length, shape, colour of the fruit flesh, etc. The climate of Mynia is very suitable for the growing of snake cucumbers, but the crop is very common in the south as well.
- Several new varieties of melons have been developed, namely: Edfina, Ananas and Kahera 6. Kahera, originating from the University of Cairo, has a very good taste. Many balady strains showing much variation in e.g. size, shape, colour and taste, are still grown in practice.
- Giza 1 and Giza 21 are new varieties of water-melons showing strong and very strong resistance to Fusarium respectively. The acreage of these, and imported varieties (Congo, Charleston Grey and Chilian Black) is increasing very rapidly and consequently balady strains are becoming rare. Wild water-melon (Citrullus colocynthis) is quite common in Egypt, e.g. in the Oases of Kharga and Dakhla. It is crossible with

the cultivated form and is a source of resistance to water-melon mosaic virus 2, powdery mildew and drought. It is used as pollinator of the common water-melon.
- Also balady strains of squash are disappearing rapidly because of the introduction of a new variety (bush type with better fruit quality). It's name is Eskandarani.

6.3 Collected seed samples

If possible, samples of 200 grams were collected, but mostly that quantity was not available, or not bought, especially when collecting from farmers. When collecting from seed shops mostly large sample were available but in that case the drawback was that no special item in the budget was devoted to the buying of seed samples. Moreover the money from the IBPGR was not yet available when the collection tour started. So there was some hesitation in buying (paying for) a large number of large samples from local seed shops.

A special point is the quality of the collected seeds. Several samples, especially from farm stores, could show very low germination percentages. Such samples deserve special attention with respect to multiplication.

In some regions balady strains appeared to become rare, namely in the Ismailia region, the Sinai and the Dakhla Oasis. This seems to be symptomatic of the near future and is stressing the urgency of collecting balady strains.

The collected seed samples are mentioned in Annex 3.

For each sample an IBPGR collection form has been filled. Copies will be sent to the gene banks together with the seed samples.

The samples will have the following destinations:

Egypt, Giza	: Field Crops Research Institute: Onion Horticultural Research Institute: All other crops
USA, Ford Collins (NSSL)	: Cucumbers Snake cucumber Melons Water-melons Squash

Ivory Coast, Abidjan (ORSTOM)	: Okra
Israel, Rehoboth (Univers. of Jeruzalem)	: Garlic
U.K., Wellesbourne (NVRS) and The Netherlands, Wageningen, (IVT)	: Onions Leeks Kurrat Cabbage Cauliflower Turnip Radish Lettuce

7. Some suggestions

After having made the collection tours and having written the report it seemed worthwhile to think of possible perfections of the collection procedure. The following suggestions emerged:

- Appointing, within the scope of the project, a tidial regional vegetable genetic resources officer for each governerate having an important acreage of vegetables. Such vegetable specialists will know where to find balady strains how to approach the farmers and when to harvest the seeds.
- Making periodical tours from Giza, e.g. at intervals of about three weeks, for collection of samples from the regional officers, from local seed shops and, if possible, from farmers' fields.
- Paying as much attention as possible to the discovering of seed plots of local strains during travelling. In this way travelling tours can be very efficient, even during driving.
- Buying seed samples of about 200 gram from seed shops seems to be very economical because in that case one (first) multiplication can be saved.
- When collecting from farmers or seed shops consequent enumeration of all vegetables in question from a list is a mean to obtain all available balady strains.
- Regional collection tours for special crops could be made for important crops having many local strains. This is true e.g. for the Behairy onion strains in the Delta.

IVT, Wageningen
The Netherlands,
June, 1985

Itinerary

April 22:	Giza. Discussion, on technical and financial aspects and details of the collection trips, with Dr. M. Wafik El Shafie, Director of the Onion Section of the Field Crops Research Institute, Dr. Mohammed El Gammal, onion consultant and Dr. Salah Baha Eldin, Director of the Horticultural Research Institute and of the Vegetable Research Department of this Institute. Also met with Mr. Mohamed Sami Tawfik, head of the cucurbitacea department, Dr. Salah Youssef, variety specialist and Dr. M. Refaat El. Shami, garlic specialist. Dr. El Amin Abusineina, FAO representative in Egypt.
April 23:	Leaving Cairo by train for Sohag in company with Dr. M. El Gammal and Dr. S. Youssef.
April 24:	Collection near Qena and Qus with Dr. El Gammal, Dr. Youssef and Mr. Mohammed Hosein Ahmed of the Agricultural Administration of Qena.
April 25:	Collection near Isna and in Qena town with Dr. El Gammal, Dr. S. Youssef, Mr. Hosein Ahmed and Mr. El Haseiny M. El Samman of the Isna Agricultural Center.
April 26:	Friday, Luxor
April 27:	Collection between Luxor and Sohag with Dr. El Gammal and Dr. Youssef.
April 28:	Collection north and south of Akhmim with Dr. Fathi Abdelgaber Ahmed (Onion Section), Dr. Youssef and Mr. Farag Abd El Mageed Ali of the Agricultural Administration of Sohag.
April 29:	Collection in Gezeira Shandaweel and El Manshah with the same people as on April 28.
April 30:	Collection in Abnub (near Sohag town) and driving to Asyut with Dr. Fathi and Dr. Youssef.
May 1:	Labour day.
May 2:	Collection in Dronka and Masra with Dr. El Gammal, Dr. Youssef and Mr. Mourad Garas of the Agricultural Administration of Asyut. Collection in Asyut town with Dr. Mostafa K. Imam of th University of Asyut.
May 3:	To Kharga Oases with Dr. El Gammal and Dr. Youssef. Friday.
May 4:	Collection in Kharga Oases with Dr. El Gammal, Dr. Youssef and two person of the Agricultural Administration of Kharga: Mr. Saad Yousif Maiaz and Mr. Mohamed Abd Raboh.

May 5: Collection in Dakhla Oases with Dr. El Gammal, Dr. Youssef, Mr. Maiaz and Mr. Hamdy Aly Ibrahim of the Agricultural Center in Mut. Also collection in local seed shop at Kharga.

May 6: To Asyut and Mallawi with Dr. Fathy (see April 28) and Mr. Abd El Monsif Kamooh, water-melon specialist of the Horticultural Research Institute.

May 7: Collection in Mallawi and Minya with Dr. Fathy, Mr. Abd El Monsif and Mr. Salah Korayem of the Mallawi Agricultural Research Station.

May 8: Collection in Dairut, El Edwa (west of Maghagha) and Beni Mazar with Dr. Fathy, Mr. Abd El Monsif and Mr. Hamdy Mohamed Abdelaziz Elbehairy of the Agricultural Center in Edwa.

May 9: Collection in El Fashn, Beni Suef, Elwasta and Giza with Dr. Fathy and Mr. Abd El Monsif.

May 10: Giza, Friday.

May 11: Giza. Taking care of the collected seed samples: one third is kept in Giza two thirds will be distributed to gene banks.

May 12: Collection near Tanta in the Gharbia Governerate with Mr. Abdel Hakim El Shami of the Horticultural Research Institute, Mr. Ahmed El Kafouri of the Field Crops Research Institute and two persons of the Agricultural Administration of Gharbia: Mr. Hassan Mona and Mr. Mohamed Badran.

May 13: Collection in the Minufiya Governerate with Dr. M. Wafik El Shafie, Director of the Onion Section of the Field Crops Research Institute, Mr. Kafouri, Mr. Abd El Hakim and Mr. Fawzi Fonous Dimmian of the Agricultural Administration of Minufiya.

May 14: Giza. Collection of seed samples from the Field Crops Research Institute; discussion with Mr. Abd el Hakim and Mr. Mohamed Sami Tawfik of the Hort. Res. Inst. on dividing of the seed samples. Meeting with Mr. Ahmed Ehsan, field officer of the FAO in Egypt.

May 15; Collection in the Dakahlia Governerate, near El Mansura and in a local seed shop in Tanta (Gharbia Gov.) with Dr. Wafik El Shafie, Mr. El Kafouri and Mr. Mohammed Sayied Nasr Hanafy of the Hort. Res. Inst.

May 16: Visiting Nuba Seed in Tahrir Province with Dr. El Gammal, Dr. Wafik el Shafie and Mr. El Kafouri. Discussion with Mr. Hag Ismad, manager of the first region. Field excursion with respect to seed growing of modern vegetable varieties.

May 17: Friday.

May 18: To the Sinai. Collection around and in El Arish with Dr. El Gammal, Dr. Salah A. Mohamedien of the Hort. Res. Inst. and Mr. Rahmi Ahmad Shaker of the Agricultural Center in El Arish.

May 19: Collection between El Arish and Rafah with the same company as on May 18.

May 20: Back to Giza. Asking for balady samples in Ismaelia.

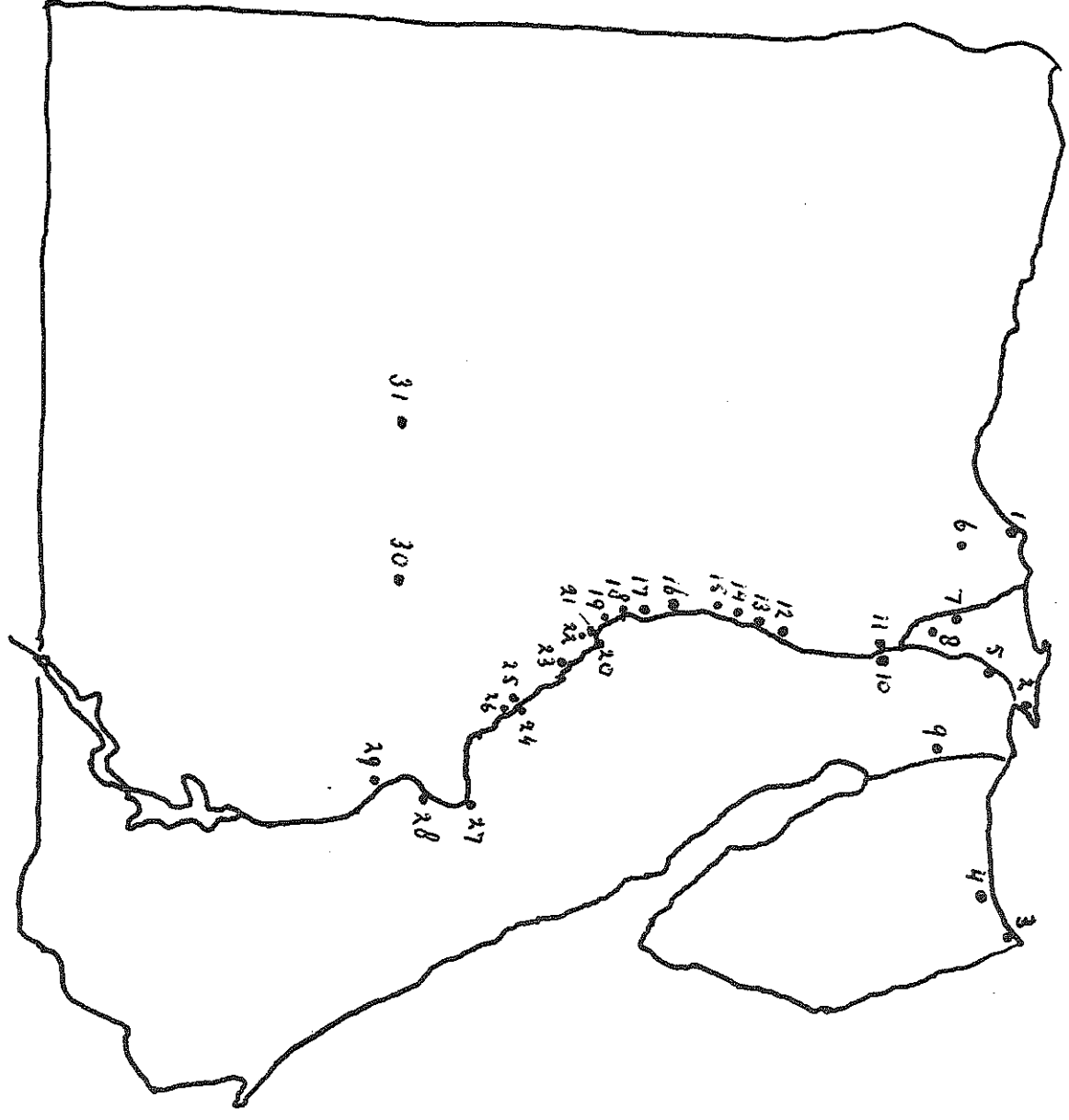
May 21: Preparing seed samples for transportation to Wageningen. Collection from local seed shop in Cairo with Dr. El Gammal.

May 22: Collection south and west of Giza with Mr. El Kafouri and Mr. Hanafy (see May 15).

May 23: Collection from the Horticultural Research Institute with Mr. Hanafy.

May 24: Back to the Netherlands.

Annex 2



1 Alexandria
2 Damietta
3 Rafah
4 El Arish
5 El Mansura
6 Nuba Seed
7 Tanta
8 Shibin El Ko
9 Ismaelia
10 Cairo
11 Giza
12 Beni Suef
13 El Fashn
14 Maghagha
15 Beni Mazar
16 Minya
17 Mallawi
18 Dairut
19 Manf'alut
20 Abnub
21 Asyut
22 Dronka
23 Tima
24 Akhmim
25 Sohag
26 El Manshah
27 Qena
28 Luxor
29 Isna
30 Kharga
31 Mut (Dakhla

List of collected samples

Annex 3

Collection number	Date	Crop	Status	Collection source	Location	Nearest town	Distance (km)	Direction
4	24.4	onions	balady	farm	Gragose	Qus	3	south
17	25.4	"	"	seed shop	Isna			
20	25.4	"	"	" "	Qena			
24	25.4	"	"	" "	"			
39	28.4	"	"	farm	Al Salamoni	Akhmim	10	north
41	28.4	"	"	"	Awlad Elsheikh	Awlad Toak	25	north
78	2.5	"	"	"	Dronka			
79	2.5	"	"	"	Dear Dronka	Dronka	3	south
80	2.5	"	"	"	Asyut			
92	4.5	"	"	"	Kharga	Kharga	3	south
98	4.5	"	"	"	Bir Ganah 12	Kharga	12	"
104	5.5	"	"	seed shop	Mut (Dakhla Oases)			
113	6.5	"	"	farm	Nazlet Remeih	Manfalut	5	"
114	6.5	"	"	village market	Dairut			
124	8.5	"	"	farm	Banub Dahr El Gamal	Dairut	2	west
125	8.5	"	"	"	"	"	2	"
127	8.5	"	"	"	Kafr Elmaghrabi	El Edwa	12	"
146	12.5	"	"	"	Tanta			
148	12.5	"	"	"	Manschat ganzur	Tanta	10	south
167	13.5	"	"	seed shop	Shebin el Koum			
175	14.5	"	variety	Institute	Giza			
176	14.5	"	"	"	"			
177	14.5	"	"	"	"			

List of collected samples

Collection number	Date	Crop	Status	Collection source	Location	Nearest town	Distance (km)	Direction
180	15.4	onions	balady	seed shop	El Mansura			
214	21.5	"	"	"	Cairo			
128	8.5	kurrat	"	"	Beni Mazar			
137	9.5	"	"	"	El Fashn			
168		"	"	"	Shebin el Koum			
187		"	"	"	Tanta			
215		"	"	"	Cairo			
2	24.4	garlic	"	farm	Hemidat	Qena	suburb	west
5	24.4	"	"	"	Gragose	Qus	3	south
12	25.4	"	"	"	Nagaa Abo Hemeed	Isna	2	north
13	25.4	"	"	"	Hella	Isna	3	south
38	28.4	"	"	"	Al Salamoni	Akhmim	10	north
40	28.4	"	"	"	Awlad Elsheikh	Awlad Toak	25	north
62	29.4	"	"	"	El Manshah			
83	2.5	"	"	"	Masra	Asyut	18	north
96	4.5	"	"	"	Baramud	Kharga	4	south
99	4.5	"	"	"	Bir Ganah 12	Kharga	12	south
103	5.5	"	"	"	Om El Sagher	Mut (Dakhla O.)	25	north
158	13.5	"	"	"	Gizar El Hagar	El Suhada	8	east
166	13.5	"	"	"	Zawyh El Noara	El suhada	11	north
186	15.5	"	"	market	Nikata	El Mansura	5	south
205	19.5	"	"	"	Rafah			

List of collected samples

Collection number	Date	Crop	Status	Collection source	Location	Nearest town	Distance (km)	Direction
25	25.4	white cabbage	balady	seed shop	Qena			
53	29.4	"	"	farm	Tima			
84	2.5	"	"	seed shop	Asyut			
112	6.5	"	"	farm	Nazlet Remeih	Manfalut	5	north
121	7.5	"	"	seed shop	Minya	Minya		
122	7.5	"	"	farm	Derwah	Mallawi	12	west
134	8.5	"	"	seed shop	Benimazar			
138	9.5	"	"	"	El Fashn			
142	9.5	"	"	farm	Beni Suef			
153	12.5	"	"	"	Manschat ganzur	Tanta	10	south
154	12.5	"	"	"	El Kobra Bolkena	Mehala	3	south-west
155	12.5	"	"	"	Bolkena	Mehala	3	south
159	13.5	"	"	"	Gizarh El Hagar	El Suhada	8	east
161	13.5	"	"	"	Kafr Hegazy	El Suhada	9	east
163	13.5	"	"	"	"	"	9	east
182	15.5	"	"	seed shop	El Mansura	El Mansura		
191	15.5	"	"	"	Tanta			
212	21.5	"	"	"	Cairo			
219	22.5	"	"	farm	Manile Sheba	Giza	7	south
224	22.5	"	"	seed shop	Nahia	Giza	8	west
228	22.5	"	"	"	Almohtamadeya	Giza	3	west
231	23.5	"	"	Institute	Giza			

List of collected samples

Collection number	Date	Crop	Status	Collection source	Location	Nearest town	Distance (km)	Direction
52	29.4	cauli-flower	balady	farm	Tima			
73	30.4	"	"	seed shop	Asyut			
143	9.5	"	"	farm	Beni Suef			
152	12.5	"	"	"	Manschat ganzur	Tanta	10	south
218	22.5	"	"	"	Manile Sheba	Giza	7	south
220	22.5	"	"	"	"	"	7	south
232	23.5	"	variety	Institute	Giza			
7	24.4	turnip	balady	farm	Gragose	Qus	3	south
31	28.4	"	"	"	Alsalamoni	Akhmim	10	north
64	29.4	"	"	"	El Manshah			
76	30.4	"	"	seed shop	Asyut			
118	7.5	"	"	"	Minya			
135	8.5	"	"	"	Beni Mazar			
151	12.5	"	"	farm	Manschat ganzur	Tanta	10	south
170	13.5	"	"	seed shop	Shebin El Koum			
181	15.5	"	"	"	El Mansura			
190	15.5	"	"	"	Tanta			
213	21.5	"	"	"	Cairo			
222	22.5	"	"	"	Nahia	Giza	8	west
230	22.5	"	"	"	Almohtamadeya	Giza	3	west
233	23.5	"	variety	Institute	Giza			

List of collected samples

Collection number	Date	Crop	Status	Collection source	Location	Nearest town	Distance (km)	Direction
6	24.4	radish	balady	farm	Gragose	Qus	3	south
18	25.4	"	"	seed shop	Isna			
21	25.4	"	"	"	Qena			
34	28.4	"	"	farm	Alsalamoni	Akhmim	10	north
44	28.4	"	"	seed shop	Akhmim			
51	29.4	"	"	farm	Tima			
68	29.4	"	"	"	El Manshâh			
74	30.4	"	"	seed shop	Asayut			
93	4.5	"	"	farm	Kharga		3	south
95	4.5	"	"	"	Baramudi	Kharga	4	south
106	5.5	"	"	seed shop	Mut (Dakhla Oasis)			
109	5.5	"	"	"	Kharga			
120	7.5	"	"	"	Minya			
133	8.5	"	"	"	Beni Mazâr			
150	12.5	"	"	farm	Manchat ganzur		10	south
169	13.5	"	"	seed shop	Shebin El Khoum			
179	15.5	"	"	"	El Mansura			
192	15.5	"	"	"	Tanta			
211	21.5	"	"	"	Cairo			
221	22.5	"	"	"	Nahia	Giza	8	west
226	22.5	"	"	"	Almohtamadeya	Giza	3	west
234	23.5	"	"	Institute	Giza			

List of collected samples

Collection number	Date	Crop	Status	Collection source	Location	Nearest town	Distance (km)	Direction
235	23.5	radish	variety	Institute	Giza			
1	24.4	okra	balady	farm	Hemidat	Qena	su burb.	west
10	24.4	"	"	"	Gragose	Qus	3	south
19	25.4	"	"	seed shop	Isna			
32	28.4	"	"	farm	Alsalamoni	Akhmim	10	north
56	29.4	"	"	"	Tima			
59	29.4	"	"	"	Gezeiret Shandaweel			
61	29.4	"	"	"	Gezeiret Awlad Hamza	El Manshâh	5	south-west
75	30.4	"	"	seed shop	Asyut			
91	4.5	"	"	farm	Kharga		3	south
94	4.5	"	"	"	Baramudi	Kharga	4	south
97	4.5	"	"	"	Bir Ganah 12	Kharga	12	south
105	5.5	"	"	seed shop	Dakhla			
110	5.5	"	"	"	Kharga			
117	7.5	"	"	"	Minya			
123	7.5	"	"	farm	Derwah	Mallawi	12	west
136	8.5	"	"	seed shop	Beni-Mazâr			
149	12.5	"	"	farm	Manschat-ganzur	Tanta	10	south
160	13.5	"	"	"	Gizarh El hagar	El Suhada	8	east
164	13.5	"	"	"	Kafr Hegazy	El Suhada	9	east
172	13.5	"	"	seed shop	Shebin El Khoum			
183	15.5	"	"	"	El Mansura			

List of collected samples

Collection number	Date	Crop	Status	Collection source	Location	Nearest town	Distance (km)	Direction
189	15.5	okra	balady	seed shop	Tanta			
198	18.5	"	"	farm	Wadi El Arish	El Arish	3	north
201	18.5	"	"	seed shop	El Arish			
216	21.5	"	"	"	Cairo			
223	22.5	"	"	"	Nahia	Giza	8	west
227	22.5	"	"	"	Almohtamadeya	Giza	3	west
236	23.5	"	"	Institute	Giza			
237	23.5	"	variety	"	"			
238	23.5	"	"	"	"			
16	25.4	lettuce	balady	farm	Hella	Isna	1	south
28	27.4	"	"	"	El Brahma	Qena	19	south
29	27.4	"	"	"	Deshna		2	south
85	2.5	"	"	seed shop	Asyut			
130	8.5	"	"	"	Beni-Mazâr			
156	12.5	"	"	farm	Bolkena	Mehala El Kobra	3	south
185	15.5	"	"	seed shop	El Mansura			
188	15.5	"	"	"	Tanta			
194	17.5	"	"	University	Asyut			
195	17.5	"	"	"	"			
196	17.5	"	"	"	"			
217	21.5	"	"	seed shop	Cairo			
239	23.5	"	"	Institute	Giza			

List of collected samples

Collection number	Date	Crop	Status	Collection source	Location	Nearest town	Distance (km)	Direction
8	24.4	cucumber	balady	farm	Gragose	Qus	3	south
23	25.4	"	"	seed shop	Qena			
30	28.4	"	"	farm	Al Salamoni	Akhmim	10	north
37	28.4	"	"	"	"	"	10	north
42	28.4	"	"	"	Elahaiwa Shark	"	16	south
55	29.4	"	"	"	Tima			
66	29.4	"	"	"	Manshâh			
86	2.5	"	"	seed shop	Asyut			
119	7.5	"	"	"	Minya			
147	12.5	"	"	"	Kafr El Shikh sleem	Tanta	5	south
162	13.5	"	"	farm	Kafr Hegazy	El Suhada	9	east
210	21.5	"	"	seed shop	Cairo			
45	28.4	snake cucumber	"	"	Akhmim			
46	28.4	"	"	"	"			
50	29.4	"	"	farm	Tima			
60	29.4	"	"	"	Geziret Shandaweel	Sohag	10	north
87	2.5	"	"	seed shop	Asyut			
88	2.5	"	"	"	"			
132	8.5	"	"	"	Beni Mazâr			
139	9.5	"	"	"	El Fashn			
174	13.5	"	"	"	Shebin el Koum			
184	15.5	"	"	"	El Mansura			

List of collected samples

Collection number	Date	Crop	Status	Collection source	Location	Nearest town	Distance (km)	Direction
193	15.5	snake cucumber	balady	seed shop	Tanta			
209	21.5	"	"	"	Cairo			
229	22.5	"	"	"	Almohtamadeya	Giza	3	west
14	25.4	melon	"	farm	Hella	Isna	3	south
15	25.4	"	"	"	"	"	3	south
22	25.4	"	"	seed shop	Qena			
33	28.4	"	"	farm	Alsalamoni	Akhmim	10	north
43	28.4	"	"	"	Elahaiwa Shark	Akhmim	16	south
47	28.4	"	"	seed shop	Akhmim			
57	29.4	"	"	farm	Tima			
63	29.4	"	"	"	El Manshâh			
70	30.4	"	"	"	Kadadeeh	Abnoub	5	north-east
77	30.4	"	"	seed shop	Asyut			
81	2.5	"	"	farm	Masra	Asyut	18	north
82	2.5	"	"	"	"	"	18	north
90	4.5	"	"	"	Kharga		3	south
100	4.5	"	"	"	Khartoum	Kharga	30	soutn
115	7.5	"	"	"	Taha Elaameda	Samalut	20	south-east
126	8.5	"	"	"	Banub Dahr El Gammal	Dairut	2	west
129	8.5	"	"	seed shop	Beni Mazâr			
140	9.5	"	"	"	El Fashn			
144	9.5	"	"	farm	Nasser	Beni Suef	9	north

List of collected samples

Collection number	Date	Crop	Status	Collection source	Location	Nearest town	Distance (km)	Direction
145	9.5	melon	balady	farm	Beni Solayman	El Wasta	20	south
171	13.5	"	"	seed shop	Shebin el Koum			
208	21.5	"	"	"	Cairo			
225	22.5	"	"	"	Almohtamadeya	Giza	3	west
3	24.4	water-melon	"	farm	Hemidat	Qena	suburb	west
26	25.4	"	"	seed shop	Dendara	Qena	3	south-west
48	28.4	"	"	"	Akhmim			
49	24.4	"	"	farm	Hemidat	Qena	suburb	west
58	29.4	"	"	"	Geziret Shandaweel	Sohag	10	north
67	29.4	"	"	"	Manshâh			
69	30.4	"	"	"	Kadadeeh	Abnoub	5	north-east
71	30.4	"	"	"	"	"	5	north-east
72	30.4	"	"	"	"	"	5	north-east
108	5.5	"	"	seed shop	Kharga			
199	18.5	"	"	farm	Wadi El Arish	El Arish	3	north
202	28.5	"	"	seed shop	El Arish			
203	19.5	"	"	farm	Abo Shennar	Rafah	6	west
206	19.5	"	"	"	Masura	Rafah	2	west
240	23.5	"	variety	Institute	Giza			
9	24.5	squash	balady	farm	Gragose	Qus	3	south
35	28.4	"	"	"	Al Salamoni	Akhmim	10	north
36	28.4	"	"	"	"	"	10	north

List of collected samples

Collection number	Date	Crop	Status	Collection source	Location	Nearest town	Distance (km)	Direction
54	29.4	squash	balady	farm	Tima			
65	29.4	"	"	"	El Manshâh			
107	5.5	"	"	seed shop	Mut (Dakhla Oases)			
111	5.5	"	"	"	Kharga			
116	7.5	"	"	"	Minya			
131	8.5	"	"	"	Beni Mazâr			
141	9.5	"	"	"	El Fashn			
157	12.5	"	"	farm	Bolkena	Mehala El Kobra	3	south
165	13.5	"	"	"	Zawy El Noara	El Suhada	11	north
173	13.5	"	"	seed shop	Shebin El Koum			
178	15.5	"	"	"	El Mansura			
200	18.5	"	"	"	El Arish			
241	23.5	"	variety	Institute	Giza			
204	19.5	Allium sp.	wild	wild		Rafah	3	west
207	19.5	"	"	"		El Arish	17	east
197	17.5	Lactuca serriola	"	University of Asyut				
11	24.4	Citrullus colocynthis	"	seed shop	Qus			
27	26.4	"	"	"	Luxor			
101	4.5	"	"	farm	Ganah 11	Kharga	20	south
102	5.5	"	"	"	Bed Khilo	Mut (Dakla O.)	20	north