EXPLANATION OF PLATE 11

Plate 11

Fruits and male buds; the scales are divided in inches.

Fig. 1. I.R. 100.
Fig. 2. I.R. 143.
Fig. 3. S.H. 62(1).
Figs. 4, 5. Type 20.
Fig. 6. Male buds of I.R. 143 (left) and I.R. 100 (right)
Fig. 7. Male buds of type 20 (left) and S.H. 62(1) (right).

ADDENDUM

On the Nomenclature of Edible Bananas

By E. E. Cheesman

This paper by Dodds & Simmonds has a special interest as a step toward the revision of the taxonomy and nomenclature of the edible bananas.

As the authors have implied, all the edible bananas from the Indo-Malayan region in the Imperial College *Musa* collection can be sorted by phenotype into three groups: (1) those that appear to derive from *M. acuminata* Colla, (2) those that appear to derive from *M. Balbisiana* Colla, (3) those that appear to have both species in their ancestry. We have recognized this division for some time, but before advancing it as a basis for classification wished for proof, first, that an edible banana variety could be bred from a cross between the two species mentioned, and secondly, that the variety would resemble some member or members of the third group sufficiently closely to support the hypothesis of their ancestry. With these proofs now in hand, it is time to discuss the correspondence between our three groups and the 'species' of current nomenclature.

Linnaeus, as is well known, used two specific names for edible bananas, *paradisiaca* and *sapientum*, and the subsequent application of the Linnaean epithets has varied widely with different authorities on *Musa*. In the most general usage at present, three 'species' are recognized: *M. paradisiaca* standing for 'plantains' (commonly understood as certain bananas of a starchy consistency, not palatable unless cooked), *M. sapientum* for all 'dessert bananas' except one variety distinguished by dwarf habit, and *M. Cavendishii* Lamb. for the said dwarf variety, otherwise known as the Canary or Chinese banana.

M. Cavendishii Lamb. can be very shortly dismissed. Dwarfness of habit by itself is clearly no ground for the recognition of a species, and it was shown several years ago (Cheesman, Wardlaw & Spencer, 1933) that the Cavendish banana can be connected, through a series of its own mutant forms, with a tall variety only distinguishable with difficulty from the well-known Gros Michel. Thus this name, though widely used in the literature, has no botanical justification and must be rejected in favour of one of the Linnaean names.

The distinction between plantains and dessert bananas as 'species' is likewise unsound botanically. The fruit quality depends on differences in the proportions of starch and sugars in the ripe fruit, and has undoubtedly a genetical basis, but differences of this kind are frequently varietal rather than specific, and in *Musa* certainly do not run parallel with specific characters. We have, therefore, to inquire into the original significance of the two Linnaean names.

M. paradisiaca L. is the older, and dates back to the first edition of *Species Plantarum* (1753) where the type was described simply as '*Musa* with a nodding spadix'. In *Systema Naturae*, 10th ed. (1759), where Linnaeus wished to distinguish a second kind of banana

which had come to his notice, and which also had a nodding spadix, he noted persistence of the male flowers, thus:

Musa with male flowers persistent.	*paradisiaca*
Musa with male flowers deciduous.	*sapientum*

This by itself is no better as a specific distinction in *Musa* than the starchiness of the fruit, but the mention of the persistent male flowers (an uncommon character) coupled with a reference in *Species Plantarum* to *Musa Cliffortiana* (a particular plant described from living material by Linnaeus in 1736) enables us to fix the type of *M. paradisiaca* with some confidence. The name was originally applied to a variety of cooking banana with persistent bracts, which is perhaps the commonest type of 'plantain', and the variety to which the name *M. paradisiaca* is still most commonly applied to-day.

So far, everything is straightforward. *M. paradisiaca* is the oldest name in the genus and unquestionably valid when applied to the plantain with persistent bracts and male flowers. But there are other plantains which do not have persistent bracts and male flowers, yet do not differ from *M. paradisiaca* in any more important character; the name must be extended to cover those. Then we find dessert bananas which, on the sum of their characters, must be regarded as belonging to the same species, and so the name must be extended again to cover some varieties of dessert bananas.

Now, the bananas (and plantains) covered by this extended use of the name *M. paradisiaca* L. are those which, in our opinion, are derived directly from the wild species *M. acumiñata* Colla. They form the first of the classes enumerated above. According to a very strict interpretation of the rules of nomenclature, the epithet *acuminata* should not be used at all, but the older epithet *paradisiaca* should be employed for the wild as well as the cultivated forms. But there is precedent in treatments of some other genera containing crop plants for the use of one name for a group of cultivated varieties (cultigen) and another for the wild species from which they are *supposed* to be derived. The practice is very convenient, and it helps very much to reduce confusion, since the connexion is only a *supposition*, which, in *Musa*, in the presence of parthenocarpy, polyploidy, sterility and accumulated mutations in the cultigen is going to be exceedingly difficult, if not impossible, to *prove*.

It is submitted, therefore, that primarily as a matter of convenience, but also as a precaution against implications not entirely justified by the state of knowledge, the name *M. paradisiaca* L. should be restricted for the present to *cultivated* bananas (including plantains) considered conspecific with the Linnaean type. It will then include many, but not all, of the varieties commonly referred at present to *M. sapientum* L., and botanically it will indicate a cultigen *believed* to be derived from *M. acuminata*.

The type of *M. sapientum* L. is much more difficult to fix. In *Systema Naturae* (1759) where the name first appears, Linnaeus cites 'Ehr. sel. t. 21, 22, 23'. This is a reference to a volume of drawings painted by Ehret and published by Trew in 1750. The three plates represent one plant, and show respectively the habit, the female flowers and the ripe fruit. They are not easy to interpret, and do not strongly suggest any banana variety known to us; they show some, but not all, of the characters of *M. Balbisiana*. There is a clue to the identity of the depicted plant in a reference to Sloane's *Catalogus plantarum quae in Insula Jamaica sponte proveniunt* of 1696. It was evidently a banana variety which was in Jamaica at that date, and the number of varieties in the New World before 1700 was not very large. Among what seem to be the older introductions is type 17 of the I.C.T.A. collection, known in Trinidad as silk fig, which has been compared with a variety from

Madras called Rastali and judged identical. This is known in some countries as the apple banana; it is widespread in the New World to-day, and it comes nearer to Ehret's tab. 22 than any other West Indian variety. The identification is not entirely satisfactory, because tab. 23 shows fruits about 4 in. long by 3 in. in diameter, several of which are split. The fruit of the silk fig is not nearly so thick in proportion to its length; but for that matter, no West Indian banana at the present time has a fruit of the shape indicated, and unless the variety has been lost we must conclude that Ehret's fruit drawing is bad.

One thing certain about the plant depicted by Ehret is that it was not a form of *M. paradisiaca* as we have defined that cultigen. The name *M. sapientum* therefore cannot properly be regarded as a synonym of *M. paradisiaca* L., nor can it properly be used as the name of a subspecies. The combination *M. paradisiaca* subsp. *sapientum* used by K. Schumann and some other authorities is taxonomically unsound. *M. sapientum* subsp. *paradisiaca* used by J. G. Baker and others is even worse, violating a rule of nomenclature as well as the findings of taxonomy.

Another thing to be accepted about the original *M. sapientum* is that it had some of the characters of *M. Balbisiana* but lacked some others which we regard as diagnostic of that species. We should, therefore, almost certainly classify it in our third group of phenotypes if we had it in our collection to-day, and it would there be near to type 17 even if it proved distinct from that clone. Balancing all the probabilities, it seems more likely that Ehret drew his fruit a little out of proportion than that he selected an uncommon variety which has since disappeared, and identification of *M. sapientum* L. with our type 17, the apple banana or silk fig seems to be the most reasonable conclusion to be reached.

Now, type 17 is very close in phenotype to type 20, the differences being mainly such as we should expect from the greater vigour of the former. Evidence about the origin of type 20 may therefore be taken as relevant to the origin of type 17 likewise. The significance, in this connexion, of the facts established by Dodds & Simmonds lies in the strong support they afford to the view that the original *M. sapientum* of Linnaeus was an interspecific hybrid.

We are now confronted with a nice problem in the wider application of the name. Strictly, there are objections to its application to anything except the one banana of doubtful identity depicted by Ehret, and those who prefer to use Latin binomials only when a tolerably precise meaning can be attached to them will dislike the combination altogether. On the other hand, if we reject it entirely we have two classes of banana varieties for which no established 'cultigen' names are available, these being the class supposedly derived directly from *M. Balbisiana* and that believed to have originated in a cross, or crosses, between that species and *M. acuminata*. The two classes have certain characters in common which serve to mark them off quite definitely from *M. paradisiaca*, and it seems desirable that they should be distinguished from that fairly well-marked cultigen, and from each other. Yet to introduce two entirely new names would probably cause more confusion than it would clear, apart from being open to other objections.

As it seems impossible to combine accuracy, convenience and logical arrangement in the solution of this problem, and the first two considerations are the more important, I suggest that our three groups of banana varieties may be designated as follows:

Group	Putative origin	Cultigen name
1	*M. acuminata* Colla	*M. paradisiaca* L.
2	*M. Balbisiana* Colla	*M. Balbisiana* (*sensu lato*)
3	Hybrids of *M. acuminata* × *Balbisiana*	*M. sapientum* L. (*sensu lato*)

The illogical feature of this arrangement is the extension of *M. Balbisiana* to cover edible forms, coupled with the refusal to extend *M. paradisiaca* to cover wild and fully seeded forms. But it may serve its purpose until further research suggests a better.

A note may be added on the confusion between *M. Balbisiana* and *M. sapientum* in the older literature. The species which we call *M. Balbisiana* has been recognized by several authorities as a parent of some cultivated bananas, but failure on their part to realize the bispecific ancestry of the group led them to transfer back the name *sapientum* from the cultivated to the wild form without enquiring further into the relationship. Roxburgh, in particular, dealing with the forms of *Musa* in India in his *Flora Indica* (1824) gave an excellent description of *M. Balbisiana* but called it '*Musa sapientum* (the wild sort)', and concluded that this was 'the original wild *Musa* from which . . . all the cultivated varieties of both plantain and banana proceed'.

Sulpiz Kurz (1865) came nearer to the truth with these words: 'The continent of India is usually designated as the native country of the cultivated kinds of plantains, a view that I can entertain only partially. After long enquiries into this question on the Malayan islands I have come to the conclusion that the cultivated Plantains belong to several botanically different species and also, that the original species, from which most of the numerous varieties now in cultivation in the Archipelago descend, is a Malayan species. . . . *Musa sapientum*—a second kind of plantain remarkable for its numerous varieties, is a true continental species, occurring in the forests from Behar up to the Himalaya.'

If we read '*M. Balbisiana*' for '*M. sapientum*' in this quotation, it appears that our present views on banana classification are very similar to those held by Kurz. The ranges, both of his Malayan species (*M. acuminata*) and of his '*M. sapientum*', have been found to be wider than he knew, and the possibility of their crossing is perhaps new since his day; but he noticed the essential fact of bispecific origins which many missed. It is a pleasure to pay tribute to Kurz, whose field observations were strangely underestimated or neglected by later systematists working on *Musa*, but have been highly valuable in our more recent studies.

The wild species that he and Roxburgh had in mind, however, does not agree sufficiently with the type of *M. sapientum* to bear the same name. This wild species, although described and figured by Rumphius in the *Herbarium Amboinense* (1750), was not given a name valid by modern rules until Colla (1820) named it *M. Balbisiana*. Colla's name has likewise been neglected by later systematists, although it applies to the commonest and most widespread of all species of *Eumusa*. One probable reason is that it was not until a central collection of living *Musa* species was formed that anybody was in a position to know that the species was widespread, or to realize its importance. Another is the obsession of so many authorities with the idea that any *Musa* related to a banana must be referred to *M. sapientum*. Acceptance of the fact that there can be no true 'wild form' of *M. sapientum* should go far in clearing up the nomenclature of the genus.

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