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A Photographic Description of the Fruit of Certain Apple Rootstocks

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Abstract

Correct identification of apple rootstocks is essential for research and industry. Fruit characteristics, being very distinctive and widely variable, can often be used to identify or confirm a rootstock's identity. Fruit from 48 apple rootstocks illustrated with black and white photography provide a working reference for most of the Malling rootstocks and a number of recent introductions.

Introduction

The characterization of apple rootstocks by Hatton (3) in 1917 led to the classification and eventual introduction of the size-controlling apple rootstocks. Garner (1, 2), Shaw (8) and Tydeman (10) carefully describe the vegetative characteristics for these and later introductions from East Malling. It was intended that these descriptions would assist inspectors, consultants, researchers, nursery operators and orchardists to identify apple rootstock, usually at the one-year liner stage. When a relatively small number of clones is involved these descriptors are adequate. Tydeman (10) points out however, that when the number increased and there was an absence of sharply contrasted characters there could be considerable confusion. Both Hatton (4) and Maurer (5) completely describe certain Malling rootstocks. In addition to the vegetative traits they include photos of the fruit. Little documentation has been reported since that time, yet many new stocks have been introduced.

Apple rootstocks have a great influence on tree size, fruit yield and quality (11). Quantifying these effects under field conditions is the chief objective for many pomologists (6). Fewer studies have focused on the rootstocks' influence on other traits such as anchorage, soil adaptability and hardiness. For most traits however it has been proposed that the best method of assessing the rootstock influence is actual field evaluation (7). Rootstock field studies, because of their long term nature are expensive to prepare, maintain and document. Plot layout errors and misidentification of plant material which renders trials partially or completely unusable, are therefore very costly. In some cases trials may have been salvageable if the questions concerning rootstock identity had been resolved.

Tukey (9) highlights the need for a certification scheme to guarantee that trees are true to name for both cultivar and rootstock. He also noted that piece-root cuttings could be propagated from established orchard trees to verify characteristics. In many cases the vegetative traits are adequate for identification. A complete phenotypic assessment however, can only be conducted when the specimen is grown past the juvenile stage and allowed to fruit. For most of the new rootstocks the fruit is very distinctive, and easily compared. The purpose of this work is to provide a photographic record of many of the traditional and new apple rootstocks.

Materials and Methods

The Malling, KSC and CG rootstock cultivars were established in a specimen collection at the Agriculture and Agri-Food Canada Research Center, Kentville, Nova Scotia in rows at 2m x 6m. There were 5 trees of each clone in the collection and each was separ-

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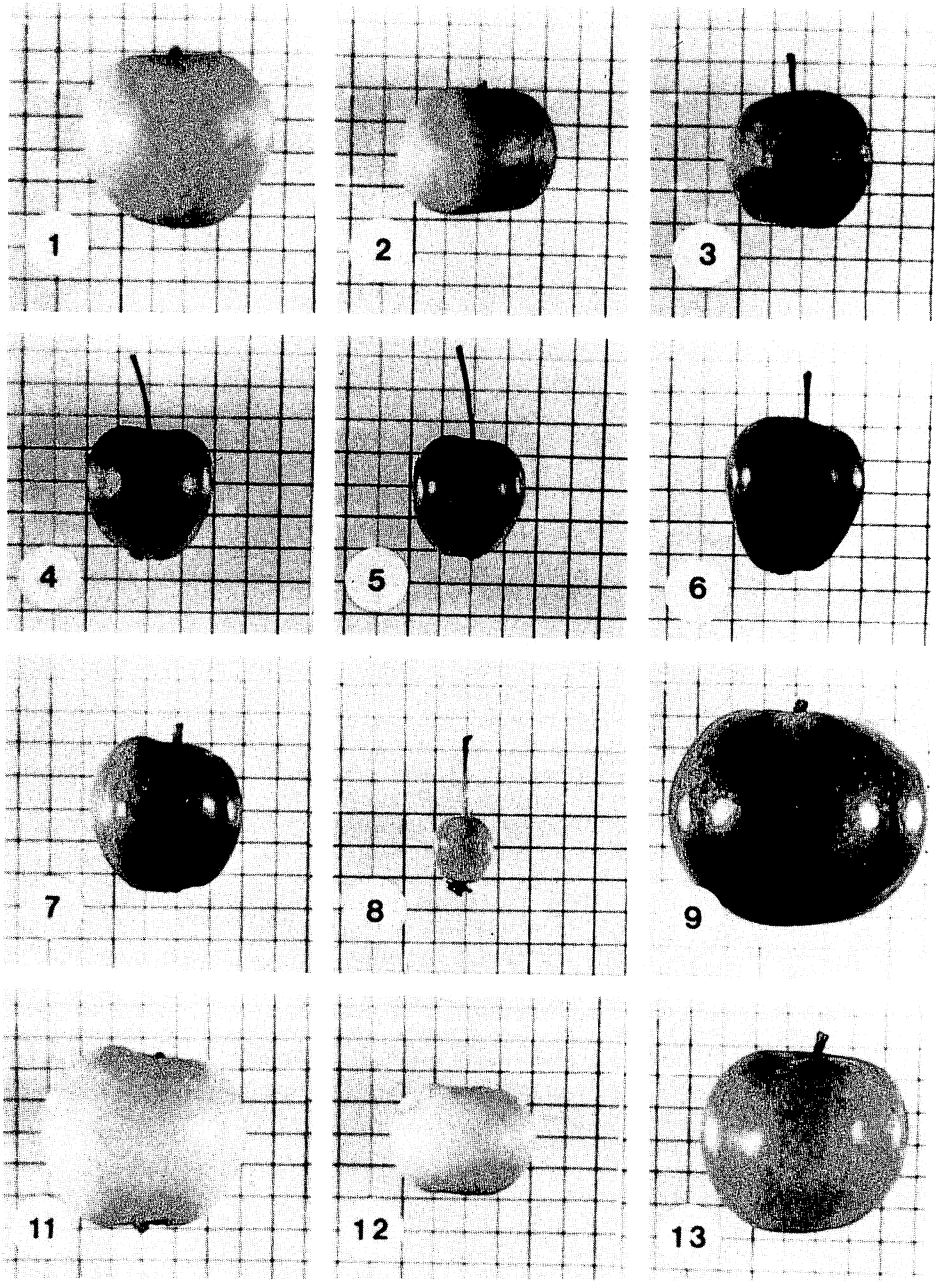

Figure 1. Fruit of (1) Alnarp 2, (2) YP, (3) Bud. 57-491, (4) Bud. 57-490. (5) Bud. 54-146, (6) Bud. 54-118, (7) 'Mark,' (8) MAC-24, (9) 'McIntosh,' (11) P.13, (12) P.16, and (13) P.1 apple rootstocks. The abbreviations indicate the following; Bud. = Budagovsky, MAC = Michigan apple clone, and P = Polish.

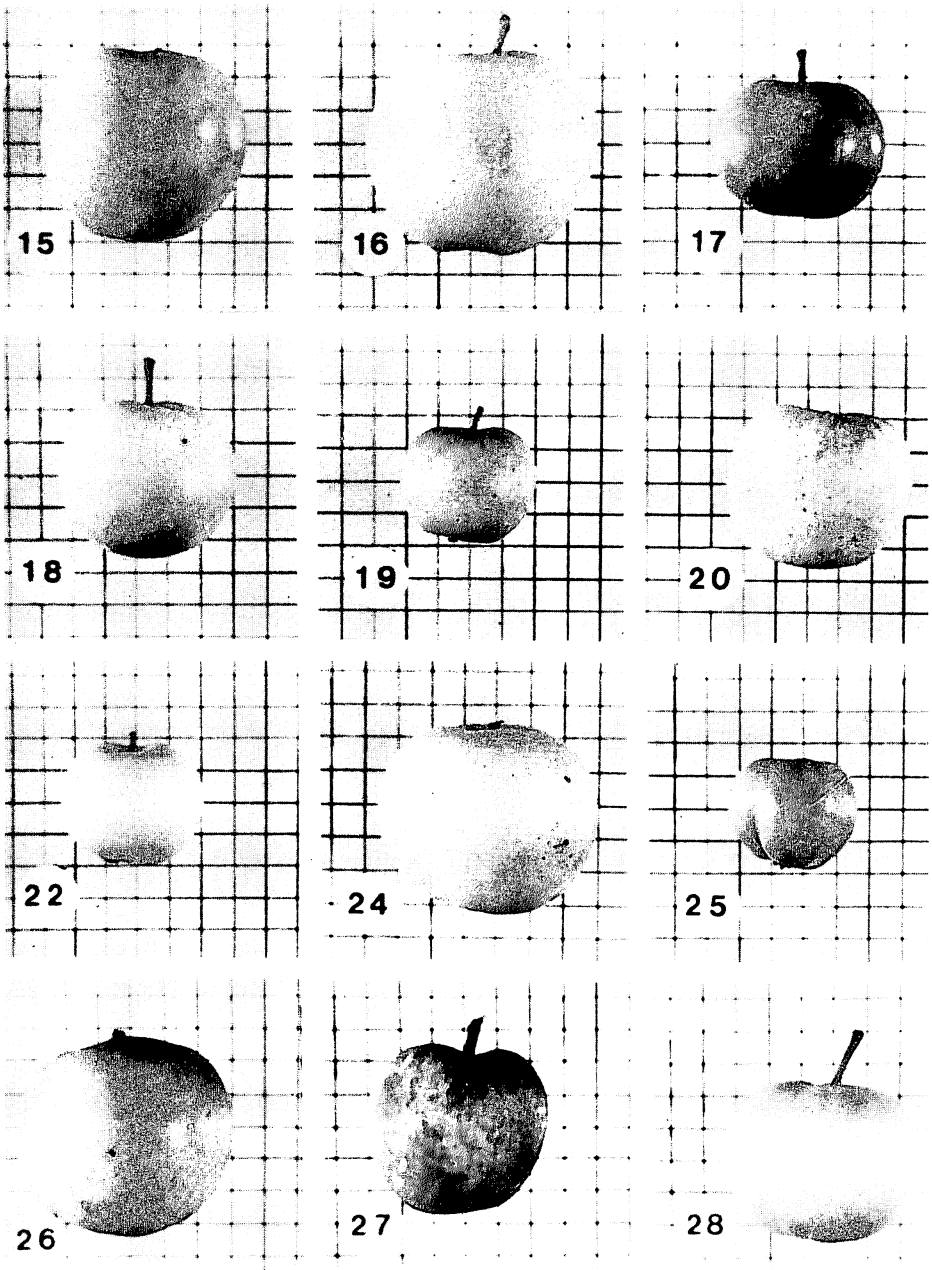

Figure 2. Fruit of (15) P.18, (16) M.1, (17) M.2, (18) M.3, (19) M.4, (20) M.7, (22) M.9, (24) M.26, (25) M.27, (26) MM.101, (27) MM.102, and (28) MM.104 apple rootstocks. The abbreviations indicate the following; P = Polish, M. = Malling, and MM. = Malling-Merton.

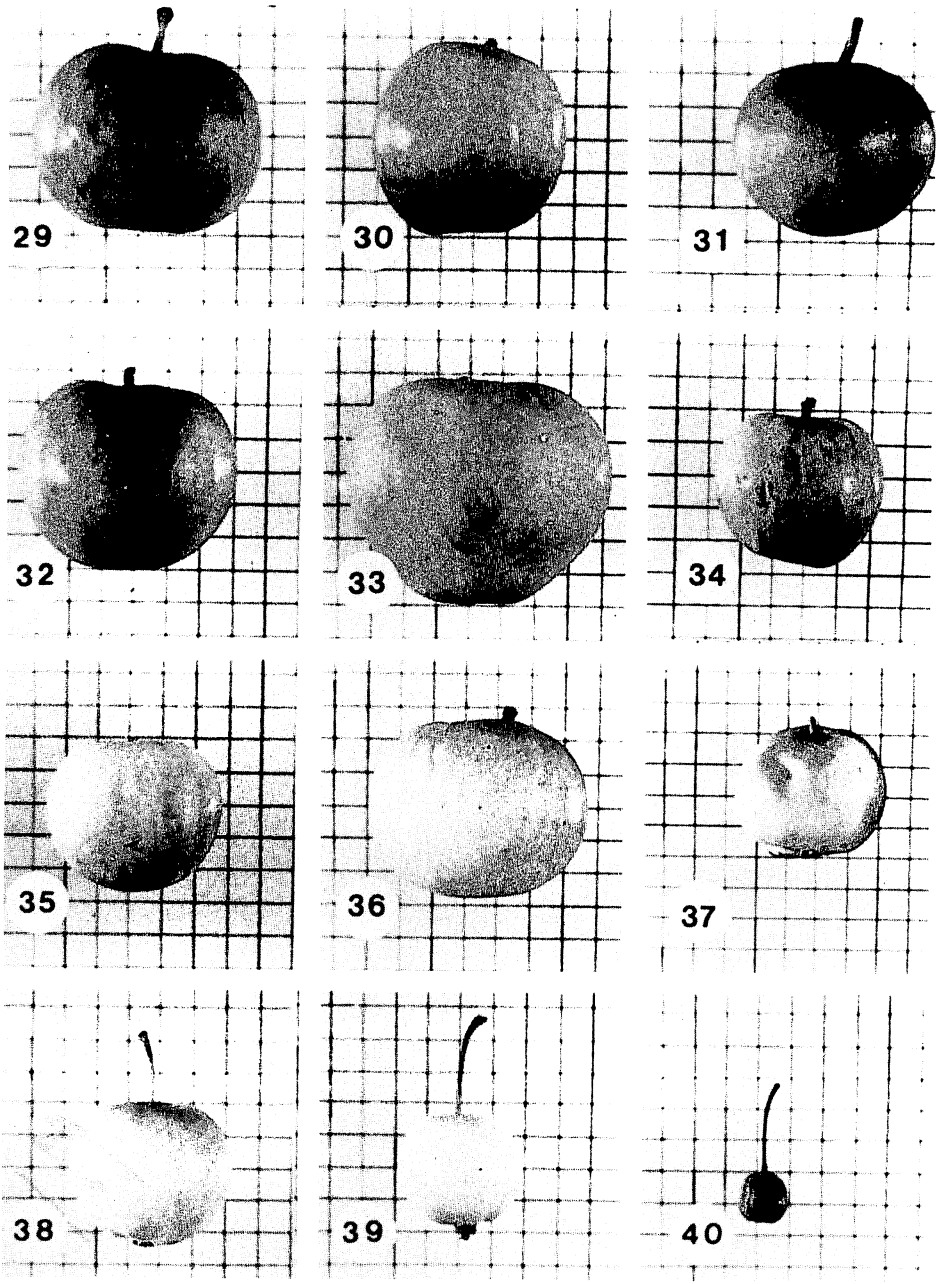

Figure 3. Fruit of (29) MM.105, (30) MM.106, (31) MM.110, (32) MM.111, (33) MM.112, (34) MM.113, (35) MM.114, (36) MM.115, (37) O.3, (38) O.4, (39) O.5 and (40) O.7 apple rootstocks. The abbreviations indicate the following; MM = Malling-Merton, and O = Ottawa.

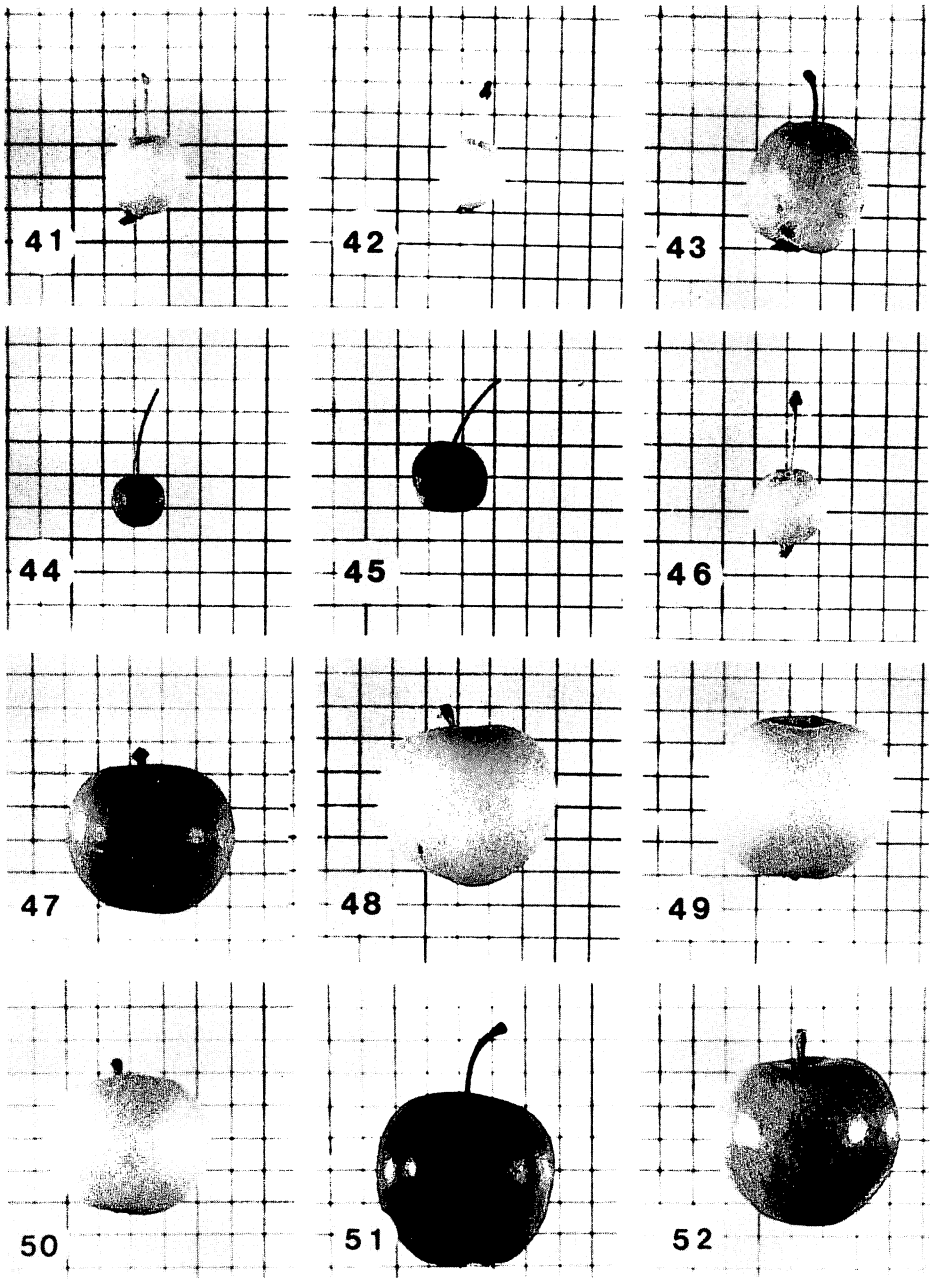

Figure 4. Fruit of (41) O.8, (42) O.11, (43) O.12, (44) Robusta #5, (45) KSC 3, (46) KSC 7, (47) KSC 28, (48) CG.10, (49) CG.55, (50) CG.80, (51) Kansas K-14, and (52) Russian K 14 apple rootstock. The abbreviations indicate the following; O = Ottawa, KSC = Kentville Stock Clone, and CG = Cornell Geneva (old series).

ated by a 2m space. The remainder of the cultivars fruited in the nursery row where they had been established as liners. They had never been grafted and were allowed to grow and fruit. The fruit was harvested soon after a few fruit fell or if they appeared to mature on the tree. Fruit samples were photographed against a 1 cm grid pattern (Figs. 1-4).

Discussion

Our photographic record was compared (personal communications, K. R. Tobutt, 1991) with fruit from rootstocks that were available at the Horticulture Research International, arboretum East Malling, England. Our photographic descriptions for M.2, M.3, M.26, M.27, MM.104, MM.111 and MM.112 agree well with fruit from their collection. Their M.1 is large but not as large as the specimen from Kentville. It should be noted that since fruit size is influenced by crop load the light crop on M.1 may account for its large size. Most cultivars carried a good to heavy crop. At East Malling the fruit of M.9 tends to be more irregular, M.7 somewhat conical and MAC-24 lacks a calyx. In a subsequent crop of MAC-24 at Kentville the calyx was very easily removed from the fruit and may well fall off when grown at sites with a longer season.

Researchers, extension agents and growers who suspect the identity of a rootstock can now graft a root sucker from the suspected plots or orchards onto a dwarfing rootstock and in a few years produce fruit. Characteristics of this fruit can then be compared with these photos to help varify or correct its identity.

Acknowledgements

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References

1. Garner, R. J. 1946. Tree fruit raising. Min. Agr. Bul. 135.
2. Garner, R. J. 1946. The recognition of some apple and plum rootstocks in the nursery. Rpt. E. Malling Res. Sta. for 1945:130.
3. Hatton, R. G. 1919. Paradise apple stocks. J. Royal. Hort. Soc. 42:361-99.
4. Hatton, R. G. 1919. Paradise apple stocks: Their fruit and blossom described. J. Royal Hort.Soc. 44:89-44.
5. Maurer, E. 1939. Die Unterlagen des Obstgeholze. Paul Parey, Berlin.
6. NC-140, 1990. Early performance of Starkspur Supreme Delicious on 16 rootstocks in the NC-140 cooperative planting. Fruit Var. J. 44(4):225-235.
7. Preston, A. R. 1953. Some new apple rootstocks. Proc. 13th Intern. Hort. Congr., London, 1952.
8. Shaw, J. K. 1944. The propagation and identification of clonal rootstocks for the apple. Mass. Agric. Exp. Sta. Bul. 418.
9. Tukey, H. B. 1964. Dwarfed fruit trees. Macmillan, New York.
10. Tydeman, H. M. 1953. A description and classification of the Malling-Merton and Mailing XXV apple rootstocks. Rpt. E. Malling Res. Sta. for 1952:55.
11. Westwood, M. N. 1988. Temperate-zone pomology. Timber Press.

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I certify that the statements made by me above are correct and complete. R. M. Crassweller, Business Manager. September 30, 1994.