TRADITIONAL PLUM VARIETIES IN THE NORTHERN NETHERLANDS: MODERN OCCURRENCES AND ARCHAEOLOGICAL EVIDENCE

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ABSTRACT: Since the cultivation of plums (*Prunus domestica* s.l.) in the Neolithic, a multitude of varieties have arisen in Europe. For the greater part these are small-fruited plums cultivated in limited areas and of little economic importance. This paper discusses the traditional plum varieties recorded in the Netherlands. Only some of them have been described in detail in the literature. Overall, the number of these varieties has significantly decreased in recent decades. The characteristics of the stones and fruits are of major importance in the identification of varieties. Besides photographs of the stones and fruits, additional detailed information is presented to facilitate the identification of individual varieties. Plum stones have been secured in substantial numbers from (post-)medieval occupation deposits. The various types of stone indicate that a range of varieties were cultivated in the Netherlands, several of which are still present today. All the evidence suggests that part of these varieties were developed locally. The archeological record shows that the cultivation of different varieties significantly predates their first mention in the literature. This applies in particular to some renowned English varieties, which actually originate from the Continent.

KEYWORDS: the (northern) Netherlands, late/post-Middle Ages, *Prunus domestica*, traditional plum varieties, plum-stones.

1. INTRODUCTION

Several millennia of plum cultivation have produced an almost immeasurable number of varieties in *Prunus domestica* s.l. Until recently, these varieties were common in gardens and farmyards, along roads, in hedgerows and waste places. Most of these so-called traditional varieties produce small fruits of moderate quality. In the last five decades especially, their numbers have dramatically decreased, as economic reasons to preserve these trees no longer apply. Moreover, a great number of new varieties were raised and chance seedlings were found in the 19th and 20th centuries with excellent dessert, cooking and preserving qualities. Varieties like Czar, Opal, Reine Victoria, Stanley and gages (*e.g.* Reine Claude d'Althan) are now the principal plums in commercial orchards and private gardens. Japanese plums (*P. salicina*) grown in regions with a Mediterranean climate such as South Africa, Chile and Spain, contribute considerably to the markets of western Europe. Some traditional plums with special fruit qualities such as Prune d' Agen, Reine Claude Verte and Mirabelles are current varieties in commercial plantations in France.

Archaeological evidence from the Netherlands shows that a range of varieties have been in cultivation at least since the Middle Ages (see below). That several of them are still present today is due to some useful properties. First, almost all the traditional varieties grow and crop well on their own roots, which makes sophisticated propagation techniques like grafting and budding unnecessary**.** Moreover, the roots of these trees usually send up abundant shoots, which themselves in time become rooted. These so-called suckers are in fact clones and can be taken off and raised up to trees which in all characteristics are similar to the parent.

In contrast to this method, modern varieties have to be grafted, as propagation from seedlings or cuttings does not produce trees with adequate yields. Several old plum varieties have proved to be a suitable stock for grafting more prized plums. When for some reason the graft decays, the rootstock itself will often grow into a tree. Their use as rootstock and the abundant production of suckers is probably the main reason why varieties producing small and poorly flavoured plums are still common today.

This paper deals with a selection of traditional plum varieties growing in farmyards and gardens in the (northern) Netherlands. Only a few varieties of commercial and culinary interest, such as 'Dubbele Boerenwitte', have been described in more detail in the literature (Dahl, 1943). The descriptions and illustrations of the living material aim to facilitate the study and identification of plum varieties. The descriptions and illustrations of the stones should also be a useful reference for the identification of archeological plum-stone material.

The numbers of trees of traditional varieties have significantly declined over the past 50 years or so; for instance, over 40% of the trees documented in the Netherlands for the present study have disappeared. As some of them are apparently restricted to the Netherlands, they have to be regarded as an endangered heritage whose disappearance should be prevented.

2. THE ARCHAEOLOGICAL EVIDENCE

In practice, the endocarps (commonly called stones) are the only part of the plum tree to become preserved in waterlogged conditions, such as cesspits, latrines and lake sediments. Apart from lake deposits, such conditions were rare until the Roman period. As plum stones are not easily carbonized, records predating Roman times are not common. The earliest evidence of *Prunus domestica* ssp. *insititia* in Europe comes from late-Neolithic Ehrenstein near Ulm in southern Germany (Hopf, 1968). The few carbonized stones are said to compare well with the Krieche, a fairly common variety in Germany and eastern France at present. *Insititia*-type stones were recovered at Hauterive-Champréveyre, a late-Bronze Age site on the shores of the Lac de Neuchâtel in Switzerland (Jaquat, 1988).

The stone record shows a significant increase in Roman times. Appreciable numbers of stones of peach (*P. persica*), cherry plum (*P. cerasifera*), sloe (*P. spinosa*) and different varieties of *P. domestica* were secured from locations along the Roman *Limes* in Germany (*e.g.* Baas, 1974; Frank & Stika, 1988; Maier, 1988). Although fruit growing expanded enormously in this period, it must be assumed that this increase is above all due to the construction of specific features with good preservation conditions, such as wells and latrines. There is a distinct drop in the number of recorded stones in the centuries following the Roman period until Carolingian times. Apparently, plum cultivation (or preservation conditions) increased again from Carolingian times onward (9th century AD). Hundreds of stones were recovered in the excavations at the Viking site of Hedeby (German: Haithabu) in Schleswig-Holstein (Behre, 1978). The predominant stone type of Haithabu, Behre 's *Formenkreis* A, was also found in several medieval and post-medieval assemblages in the Netherlands (local code: GRO-2). This stone type, among others, was present also in the botanical remains of early-medieval Douai (Van Zeist *et al*., 1994). This type will be discussed in greater detail, as there is evidence that its modern equivalent is currently grown in commercial orchards.

In the expanding late-medieval town centres in Europe, many structures were built that provided excellent (*i.e.* waterlogged) conditions for preservation. Stones of different varieties were recovered from late- and post-medieval archeological assemblages in Alt-Schleswig and Lübeck (Behre, 1978; Kroll, 1980). At least thirteen different types of plum stone, representing as many varieties, could be identified in the town of Groningen from cesspits dating from the 14th to the 18th century (Van Zeist & Woldring, 2000).

It is evident from the literature that the number of varieties greatly increased in post-medieval times (*e.g.* Roach, 1985). By breeding and selection, nurserymen like Rivers and Laxton in 19th-century England produced a great number of new varieties, several of which are still of economic importance.

3. METHODS AND TAXONOMY

The stones of *Prunus domestica* varieties show characteristic differences in size, shape and sculpture, features which greatly facilitate the identification of varieties. In a study of eighty modern plum varieties, Röder (1940) demonstrated that each of them could be identified by means of the dimensions and morphological features of the stones. This is of importance not only for the identification of living plums, but even more for the plum-stone material in archeological deposits, since the stones usually are the only part to become fossilized. It is self-evident that identification by stones alone requires the availability of a comprehensive reference collection. Primarily for the purpose of identifying archeological plum-stone material, a reference collection was compiled of stones of *Prunus domestica* varieties and the closely related cherry plums (*P.cerasifera*) and sloe (*P. spinosa*). This collection now comprises about 1500 samples mainly from the Netherlands, Germany, Britain, France, Italy, Greece and Turkey. An outcome of this investigation is the finding that there are hundreds of traditional varieties in Europe, most of them with a regional distribution. Because of their negligible economic value, these varieties have only in some instances been documented in any detail (Werneck, 1958; 1961; Körber-Grohne, 1996).

The following chapter describes the traditional varieties recorded in the northern Netherlands. Of each variety, the characteristics of the trees are outlined, such as growth habit, the leaves and pubescence of the summer shoots and particulars of the fruits and stones. In addition to these details, the area of distribution is outlined and examples of archeological evidence are presented.

As already emphasized, the dimensions and shape of the stones are of particular importance in distinguishing the different varieties. Therefore, from each sample the length, breadth and thickness of 15-25 stones was measured. The shape of the stones is expressed in the so-called index values, the mathematical ratio between the measurements. The dimensions and index values are indicated in table 1. In addition to these figures, other features may be perceived in distinguishing the different types of stone. The relatively broad lateral sides of the stones are more or less domed. The sides show differences in the surface pattern, and longitudinal creases may be present. The lateral sides are bordered by a narrow furrow on the dorsal side, and a ridge and two parallel grooves on the ventral side. The position of the measurements and the recorded parameters of the stones are indicated in figure 1. Photographs of stones collected from trees and some examples of stones from archeological contexts are presented in Plates I to VI.

Table 1. Mean, minimum and maximum dimensions in mm and index values of stones of traditional *Prunus domestica* varieties from the Netherlands. L length, B breadth, T thickness, N number of stones measured.

	L	B	T	100B:L	100T:L	100T:B	N
1. Bonte Kroospruim							
Groningen 1997	13,34	6,61	9,74	50	73	148	18
	(12.2-14.5)	(5.6-7.4)	(8.6-10.6)	(42-56)	(70-78)	(130-176)	
Groningen 2003	15,00	6,31	10,92	42	73	173	22
	(13.6-16.2)	(5.4-7.8)	(9.5-15.8)	(39-49)	(64-99)	(141-203)	
2. Varkenspruim							
Warffum 2010	18,47	6,79	13,60	37	74	202	18
	(16.8-19.9)	(5.3-8.3)	(12.2-14.9)	(28-42)	(64-81)	(173-230)	
Vlieland 1997	14,44	6,65	11,64	46	81	175	22
	(13.4-15.4)	(6-7.8)	(10.2-12.8)	(41-55)	(71-90)	(154-197)	
3. Oefkes							
Agelo 2003	12,02	7,10	9,37	59	78	132	19
	(10.6-13)	(6.5-7.7)	(8.4-10)	(55-62)	(74-81)	(128-138)	
Nietap 1992	10,63	6,71	8,74	63	82	130	22
	(9.3-11.8)	(5.9-7.5)	(7.9-9.4)	(55-72)	(76-88)	(118-145)	
Coevorden 1650-1675	10,63	6,47	8,52	0	80	132	18
	(9.4-11.7)	(5.7-7.8)	(7.8-9.3)	(54-72)	(73-87)	(115-144)	
4. Smal Boerenblauwtje							
Sandebuur 1998	16,11	6,57	10,34	41	64	158	18
	(14.2-18.3)	(5.7-7.4)	(9.3-11.8)	(38-43)	(60-69)	(140-170)	
Spier 2002	15,43	6,36	9,65	41	63	152	20
	(13.1-17.3)	(5.8-7.3)	(8.8-10.5)	(38-45)	(56-67)	(136-161)	
5. Gewoon Boerenblauwtje							
Nietap 1990	17,61	7,98	12,95	45	74	163	22
	(15.3-18.7)	(6.8-8.7)	(11.9-13.7)	(39-51)	(68-80)	(150-177)	
Leutingewolde 1997	17,89	7,44	12,75	40	71	172	16
	(14.9-19.2)	(6.5-8)	(11.3-13.8)	(7-48)	(67-76)	(157-180)	
6a. Dubbele Boerenwitte							
Haarveenschedijk 2011	17,16	7,92	12,16	46	71	154	22
	(14.6-18.9)	(7.2-8.5)	(11.4-13.5)	(43-55)	(66-82)	(144-168)	
Nietap 1990	16,74	7,89	11,91	47	71	151	22
	(14.4-17.7)	(7-8.3)	(11.1-12.5)	(44-49)	(68-79)	(140-167)	
6b. Dubbele Boerenwitte (red-skinned form)							
Haren 2005	15,78	7,30	10,96	46	70	150	17
	(13.5-17.1)	(6.2-7.9)	(9.8-12.6)	(44-52)	(66-74)	(140-160)	
6c. Enkele Boerenwitte							
Niebert 2002	15,23	7,24	10,87	48	71	150	22
	(13.7-16.8)	(6.5-7.7)	(9.8-11.8)	(43-54)	(66-76)	(142-158)	
7. Wichters							
Nietap 1990	12,33	7,66	11,02	62	89	144	22
	(11-14.3)	(6.7-9)	(9.8-12.5)	(57-70)	(84-97)	(127-162)	
Foxwolde 2010	12,22	7,25	10,54	59	86	146	22
	(11.2-13.4)	(6.4-7.9)	(9.6-11.3)	(56-63)	(81-91)	(137-156)	

Table 1 continued

	L	B	T	100B:L	100T:L	100T:B	N
8. Bonne de Bry							
Hoogkerk 2000	15,08	9,40	13,36	62	89	142	22
	(12.8-17.6)	(8.3-10.9)	(11.6-14.7)	(56-71)	(79-99)	(130-156)	
Norfolk 2011	13,35	8,08	11,85	61	89	147	4
	(12.9-14.4)	(7.5-8.4)	(11.4-12.3)	(58-63)	(85-93)	(142-152)	
Groningen Kattendiep 1550-1575	14,59	9,08	11,79	62	81	130	22
	(13.1-16.2)	(8.4-10.7)	(10.4-13.4)	(52-71)	(72-91)	(115-145)	
9. Tonneboer							
Eelderwolde 2003	20,38	8,99	12,22	44	60	136	18
	(18.4-21.8)	(8.2-10.3)	(11.3-12.9)	(41-48)	(56-66)	(124-151)	
Niebert 2000	19,31	8,95	11,13	46	58	125	20
	(17.2-21.1)	(7.9-10.7)	(10.4-12)	(39-53)	(54-63)	(110-137)	
10. Purple Pershore							
Spier 2002	21,29	7,71	12,51	36	59	163	19
	(19.2-23.2)	(6.9-8.6)	(10.8-13.5)	(32-45)	(55-67)	(148-175)	
Groningen 2004	19,48	7,63	11,09	39	57	146	18
	(17.2-21)	(6.8-8.7)	(9.7-12.3)	(35-43)	(50-65)	(132-165)	
Peizermade 1997	21,98	8,12	12,64	37	57	156	16
	(20-23.7)	(6.9-9.1)	(11.3-14.4)	(32-43)	(52-62)	(130-175)	
De Haar 16th and 17th century	19,74	7,86	12,23	40	62	156	18
	(17.5-20.7)	(7.2-8.6)	(10.8-12.9)	(37-45)	*(56-67)*	(138-172)	

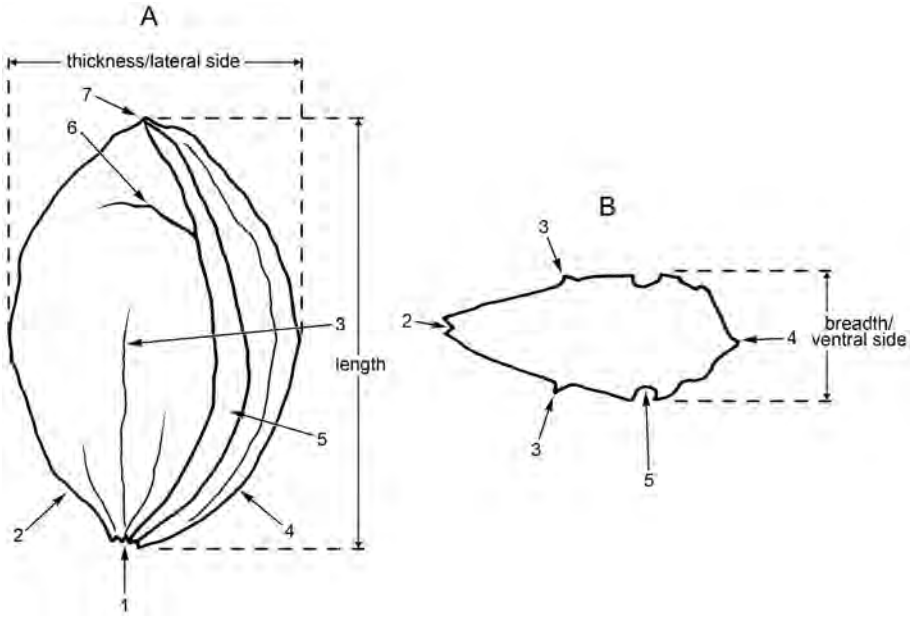

Fig. 1. Schematic drawing of the plum stone. A lateral view, B cross-section. 1: base; 2: dorsal side/ groove; 3: crease; 4: ventral ridge; 5: lateral groove; 6: branch of lateral groove; 7: apex (After: Dahl, 1943).

The subfossil plum-stones from the Netherlands have only in part been identified to the variety level. References are limited to reports specifically dealing with the different plum-stone types. In addition, stone types identified by the present author from unpublished plum material are depicted and described.

The characteristics of the fruits are secondary to those of the stones for their limited use in the identification of the living plum varieties, since only the endocarps are recovered from excavations. So far, no whole fruits have been found in an archeobotanical context**.** Besides the various basic colours of the skin, scattered red, golden or

Table 2. Mean, minimum and maximum dimensions and index values of fruits of traditional *Prunus domestica* varieties from the Netherlands.

	L	B	T	100B:L	100T:L	100T:B	N
1. Bonte Kroos-pruim							
Groningen 1997	25,11	25,13	23,78	100	95	95	17
	(22.8-27.9)	(21.3-27.8)	(21.1-26)	(93-104)	(87-100)	(91-99)	
Groningen 2003	26,22	24,72	23,78	94	91	96	13
	(23.7-28.1)	(22-26.8)	(20.9-25.3)	(86-99)	(84-95)	(94-100)	
2. Varkenspruim							
Warffum 2010	31,47	29,26	27,28	93	87	93	14
	(27.6-35.4)	(26.2-32.4)	(24.2-30.4)	(86-97)	(81-93)	(85-98)	
Vlieland 1997	26,49	26,91	23,54	101	89	88	20
	(24.3-29.7)	(23.5-30.8)	(20.9-26.8)	(94-108)	(83-94)	(81-92)	
3. Oefkes							
Agelo 2003	22,23	22,56	22,09	101	99	98	14
	(20.1-24.8)	(19.8-25.3)	(19.8-24.2)	(96-106)	(95-102)	(95-100)	
Nietap 1992	18,73	18,81	18,42	101	98	98	22
	(15.2-21)	(15.3-20.8)	(14.1-20.4)	(93-117)	(93-113)	(92-103)	
4. Smal Boeren-blauwtje							
Sandebuur 1998	28,52	24,81	24,39	87	86	98	10
	(24.9-31.8)	(21.8-26.4)	(21.6-27.1)	(82-90)	(79-91)	(93-103)	
Spier 2002	29,84	27,45	26,46	92	89	96	16
	(26.8-32.2)	(24.6-29.3)	(24.2-28.5)	(86-95)	(85-91)	(92-100)	
5. Gewoon Boeren-blauwtje							
Nietap 1990	26,56	23,75	24,27	89	91	102	10
	(25.3-28.2)	(21.4-25.7)	(22.4-25.6)	(84-97)	(88-96)	(99-108)	
Leutingewolde 1997	30,18	27,93	26,86	92	89	96	16
	(27.4-32)	(24.3-30.8)	(24.5-29.1)	(85-99)	(85-92)	(93-103)	
6a. Dubbele Boerenwitte							
Haarveenschedijk 2011	35,20	35,42	32,76	101	93	93	22
	(32.1-37.4)	(33.4-38.6)	(31.1-34.7)	(96-104)	(89-98)	(90-95)	
Nietap 1990	32,33	30,90	29,57	96	91	96	10
	(30.2-33.8)	(29.5-33)	(26.6-31.3)	(91-99)	(88-94)	(90-101)	

Table 2 continued

	L	B	T	100B:L	100T:L	100T:B	N
6b. Dubbele Boerenwitte (red-skinned form)							
Haren 2005	30,90	30,36	29,60	98	96	98	5
	(28.4-32.7)	(27.6-32.5)	(27.6-31.4)	(94-102)	(92-99)	(95-100)	
6c. Enkele Boerenwitte							
Niebert 2002	30,78	29,78	27,50	97	89	92	5
	(29.6-32.8)	(27.8-32.8)	(25.2-29.6)	(94-100)	(85-93)	(90-96)	
7. Wichters							
Nietap 1990	21,55	23,31	21,43	108	100	92	10
	(19.4-24.1)	(21.2-26.6)	(19.9-23.4)	(101-114)	(97-104)	(88-96)	
Foxwolde 2010	22,15	23,87	22,35	108	101	94	11
	(20.5-23.3)	(22.1-25.5)	(20.2-24.2)	(100-113)	(92-105)	(91-97)	
8. Bonne de Bry							
Hoogkerk 2000	30,71	34,74	32,29	113	105	93	17
	(27.7-33.7)	(31.7-38.4)	(29.1-35.6)	(107-121)	(97-116)	(90-97)	
9. Tonneboer							
Eelderwolde 2003	35,11	31,83	30,87	91	88	97	15
	(31.5-40.5)	(26.4-37.3)	(26.5-34.6)	(81-102)	(82-95)	(93-102)	
Niebert 2000	32,53	28,49	27,77	88	85	97	15
	(27.9-35.6)	(24.8-31)	(24.1-29.9)	(82-90)	(79-90)	(94-102)	
10. Purple Pershore							
Spier 2002	37,69	28,75	29,00	76	77	101	10
	(34.9-39.9)	(25.5-30.8)	(26.7-30)	(71-83)	(73-81)	(94-106)	
Groningen 2004	34,21	29,20	27,05	85	79	93	12
	(31.5-38.2)	(25.6-33.6)	(24.2-29.9)	(73-93)	(75-84)	(87-103)	

russet spots and streaks of different sizes may be present, especially in yellow-fruited varieties. In many varieties the skin is covered with a fine, 'waxy', pale-coloured bloom. A feature present in all plums is a shallow or deeper line (suture line) running from the base to the apex of the fruit**.** Some features of the fruit-stalks, such as their length and pubescence, can also be helpful in the identification of varieties. The dimensions and index values of the fruits are indicated in table 2**.** Photographs of the fresh fruits are presented in Plates VI to XVI.

Researchers have made different taxonomical subdivisions of *Prunus domestica* L. In accordance with the *Flora Europaea* (Tutin *et al*., 1968, Vol. 2), the subdivision into two subspecies is adopted here: *P. domestica* ssp. *domestica* L. and *P. domestica* ssp. *insititia* (L.) C.K. Schneider. As a rule, *insititia* varieties are smaller in all parts (leaves, whole fruits and stones) and, in contrast to most *domestica* varieties, the summer shoots and fruit-stalks are usually pubescent. The subdivision is to some degree arbitrary, as several varieties display intermediate characteristics, which prevents a sharp distinction between the subspecies. The various forms in *P. domestica* are mostly indicated by the term 'variety' (Taylor, 1949; Roach, 1985). Lawrence (1989) defines a variety as a taxonomic group below the species level and used in different senses by different specialists.

In this paper, a distinction is made between traditional and modern varieties. Documented chiefly on the basis of

archeological records, traditional varieties evolved before AD 1800; whereas modern varieties, documented in written records, originated in the 19th and 20th centuries.

Modern varieties have authorized names (*e.g.* 'Early Rivers'), in written records often preceded by the prefix 'cv' (an abbreviation of 'cultivar' or 'cultivated variety'). By contrast, most traditional varieties are known only by popular names. This can be confusing, as different names may refer to the same variety or different varieties may bear the same name. This is the case with, for instance, the so-called 'Boerenblauwtjes', which comprise two different varieties with similar fruits. Number 1 in the following list of varieties even remained without a name. The suggested name 'Bonte Kroospruim' ('variegated plum') is derived from the characteristics of the fruits.

4. DESCRIPTION OF VARIETIES

The descriptive list comprises 10 varieties recorded from the (northern) Netherlands. To facilitate comparison, the varieties with similar characteristics are placed together as much as possible and therefore no priority is given to the debatable subdivision into ssp. *domestica* and ssp. *insititia*. The taxonomical classification of the individual plum varieties in the subspecies of *Prunus domestica* is indicated next, followed by the descriptive list:

– *Prunus domestica* ssp. *domestica*
– Bonne de Bry
– Pershore
– Tonneboer
– Varkenspruim
– *Prunus domestica* ssp. *insititia*
– Bonte Kroospruim
– Dubbele/ Enkele Boerenwitte
– Gewoon Boerenblauwtje
– Oefkes
– Smal Boerenblauwtje
– Wichters

1. **Bonte Kroospruim** (*P. domestica* ssp. *insititia*). **Plates I and VII; tables 1 and 2.**
General characteristics: A large bush or small tree, producing abundant suckers. Summer shoots smooth with large, oval leaves up to 8 cm, and petioles up to 3 cm.
Fruit: round to oval, about 2.5 cm, in colour variegated, red, orange, brownish and yellow, of reasonable flavour. Suture line inconspicuous, shallow. Fruit-stalks smooth, up to 23 mm. Ripening season end of July, early August.
Stone: The stones are slightly asymmetric in outline. The lateral sides are (weakly) domed only in the central part. The surface pattern is mostly weakly developed. The distinct grooves of the ventral side have one or more short side-grooves or indentations encroaching on the lateral side of the stones. In some samples, the edges of the grooves are joined in the middle.
Location: Bonte Kroospruim is found scattered across the provinces of Groningen and Drenthe. Remarkably, several trees were identified in the town of Groningen. Bonte Kroospruim has also been recorded in the north of Germany, where it is locally known as 'Kreete' (Schlottmann, 2011).
Archaeology: Bonte Kroospruim is the modern equivalent of the GRO-1 type plum-stones. The stones have been identified from several archeological assemblages in the Netherlands (*e.g.* Van Zeist & Woldring, 2000; Van der Meer *et al*., 2009; Van Haaster, 2010; Van der Meer, 2011b), which indicates that this variety was cultivated since late medieval times.
Remarks: despite the demonstrated long tradition of cultivation, no Dutch name was found for this plum. Knoop (1763) describes the plum varieties grown in the 18th century in fairly broad terms. The list includes some varieties with orange and reddish fruits, but these seem to differ in detail from Bonte Kroospruim.

2. **Varkenspruim** (*P. domestica* ssp. *domestica*). **Plates I and VIII; tables 1 and 2.**
General characteristics: tall shrub or tree, often surrounded by suckers. Summer shoots pubescent, the leaves oval, up to 10 by 6 cm.
Fruit: c. 3 cm, round or slightly ovate, in colour black-purple, bloom present. Suture line distinct, shallow or deep. Flesh firm, fairly dry and acid, of poor flavour. Fruit-stalk 16-20(23) mm, pubescent. A regular cropper. Season late August.
Stone: ovate in outline, blunt at the apex and rounded at the base. The ventral ridge is strongly developed and a prominent crest is frequently present. The grooves on both sides vary in depth and width, and occasionally there is no groove at all. A short line is often present almost perpendicularly running inward from the upper part of the groove. The lateral sides are flat or moderately domed below the middle of the stone. The surface of the sides often shows features of corrosion.
Location: this variety is very common in the northern Netherlands.
Archaeology: the Varkenspruim ('pig plum') is the modern equivalent of the GRO-10 type stones (Van Zeist & Woldring, 2000: 570: in this paper the authors erroneously referred to a St. Julien type as the modern equivalent of GRO-10). So far, this type of stone has been recovered only from assemblages in the town centre of Groningen, dating to the early 19th century.
Remarks: the Varkenspruim is considered an old Dutch variety (Kemp *et al*., 1999). According to Booy (1947: 63), the English selection 'Brussel' is identical with the Varkenspruim. Indeed, the reference material from the Netherlands exactly matches the descriptions and illustrations of the fruits and stones of the Brussel in Maurer

(1939). The Brussel was long used as a rootstock for grafting other plum varieties. This practice will be the main cause of the present widespread distribution of the Varkenspruim in the Netherlands. Nevertheless, the alleged Dutch origin must be questioned. The relatively short period of its cultivation and the absence of the Varkenspruim in Knoop (1763) does not support such a claim.

3. **Oefkes** (*Prunus domestica* ssp. *insititia*). **Plates I, II and IX; tables 1 and 2.**
General characteristics: tree up to 5 m, or shrub. Summer shoots shortly pubescent, the leaves elliptic to oval, up to 6 by 4 cm.
Fruit: round or slightly tapering at apex, 20-25 mm, purple to almost black, usually covered with (heavy) bloom. Suture line inconspicuous, shallow. Fruit of reasonable flavour, slightly acid. Fruit-stalk (thinly) pubescent, 9-20 mm. A regular cropper. Season late August - early September.
Stone: about 12 mm, symmetrical (rarely slightly oblique), the ventral ridge is broad in the middle and narrow at the ends. The strongly domed sides have a slightly pitted surface.
Location: the 'Oefkes' is fairly common in Twente, otherwise scattered around the northern Netherlands. This variety has also been recorded in the north of Germany, especially in the region south of Lübeck, where it is locally known by the name of 'Kricke' (Schlottmann, 2011).
Archaeology: the Oefkes ('egg-shaped plums') is an old plum variety, cultivated for several centuries in the Netherlands and Belgium. Several dozen stones were secured from occupation deposits dating to the 17th century in the castle of Coevorden (unpublished). The stones of Oefkes were also identified from archeological assemblages in the town centre of Louvain, Belgium, dating to the 14th century (Van der Meer, 2011a) and from occupation deposits in the town centre of Groningen dating to the 17th and 18th centuries (unpublished).
Remarks: the fruits and stones of the Oefkes are similar to those of the Brompton (Maurer, 1939: 344–6), an English selection which has been widely used as a rootstock in western Europe. The first mention of the Brompton was made in 1826 (Roach, 1985: 158). This was certainly not the first year of its cultivation, but rather the year that this rootstock type was described and registered under the name of Brompton, in the way that many fruit varieties were documented for the first time in 19th-century England. Most probably, plant material of the Oefkes was imported from the Continent before this time. Esteemed for its rootstock qualities, the Brompton also became dispersed in countries like Germany and the Netherlands. The Oefkes in these countries may in part come from Brompton stock grown into trees. Considering the fruit and stone characteristics, most of the St. Julien rootstock types developed at the East Malling Research Station in England in the early 20th century are also selections of the Oefkes (see Maurer, 1939: 344–6).

4. **Smal Boerenblauwtje** (*P.domestica* ssp. *insititia*). **Plates II, X and XI; tables 1 and 2.**
General characteristics: large shrub or tree up to 5 m. Summer shoots shortly pubescent. Leaves oval, up to 6 by 4 cm.
Fruit: oval, each end broad and nearly flat, about 3 cm, in colour violet-red to purple, pale blue bloom present. Suture line distinct, shallow. Fruit-stalk 10-15 mm, pubescent. Sweet flavour. Usually a heavy cropper. Season early to mid-August.
Stone: elliptic in outline, blunt or weakly pointed at both ends. The surface is pitted, but almost smooth in the middle. Some weakly developed longitudinal lines are often present. The ventral ridge is well-developed. The grooves on both sides are not very conspicuous, often consisting of a narrow line only, or partly absent.
Location: Smal Boerenblauwtje is one of the most widespread plums in the (northern) Netherlands, which nevertheless has not been recorded elsewhere. The stones were recorded in various late- and post-medieval deposits, which shows that this plum was also common in the past (*e.g.* Van Zeist & Woldring, 2000; Van Haaster, 2003; 2006; 2008; 2010; Van der Meer *et al*., 2009; 2011a; 2011b).
Remarks: the name Effies used in the province of Drenthe for Boerenblauwtjes probably applies to this plum, but this name has also been given to the variety described below. See below for further comment.

5. **Gewoon Boerenblauwtje** (*P. domestica* ssp. *insititia*). **Plates II, III and XII; tables 1 and 2.**
General characteristics: tree up to 6 m, upright, stem with a regular setting of lateral branches. Summer shoots shortly pubescent or smooth, the leaves broadly oval, up to (10) 6 by 4 cm. The trees usually produce prolific crops and develop abundant suckers.
Fruit: round or slightly oval, in size 2.5-3 cm. Colour deep violet to purple, the skin carrying a whitish bloom, suture line quite shallow. Fruit juicy or rather dry, mostly of moderate flavour. Fruit-stalk 10-16 mm, thinly pubescent or smooth. Season mid-August.
Stone: almost symmetrical and oval in outline. The ventral ridge is well-developed, in width equal or somewhat broader than the adjacent zone of the lateral sides. Short creases running from the base are often present. Some samples show more or less corrosion of the lateral sides. The dimensions of the stones vary to some extent in individual samples (table 1).
Location: Gewoon Boerenblauwtje was recorded mainly in the northern part of the province of Drenthe and adjacent areas (fig. 2).
Archaeology: most probably this variety is the modern equivalent of the GRO-11 type stones, a late-comer in the

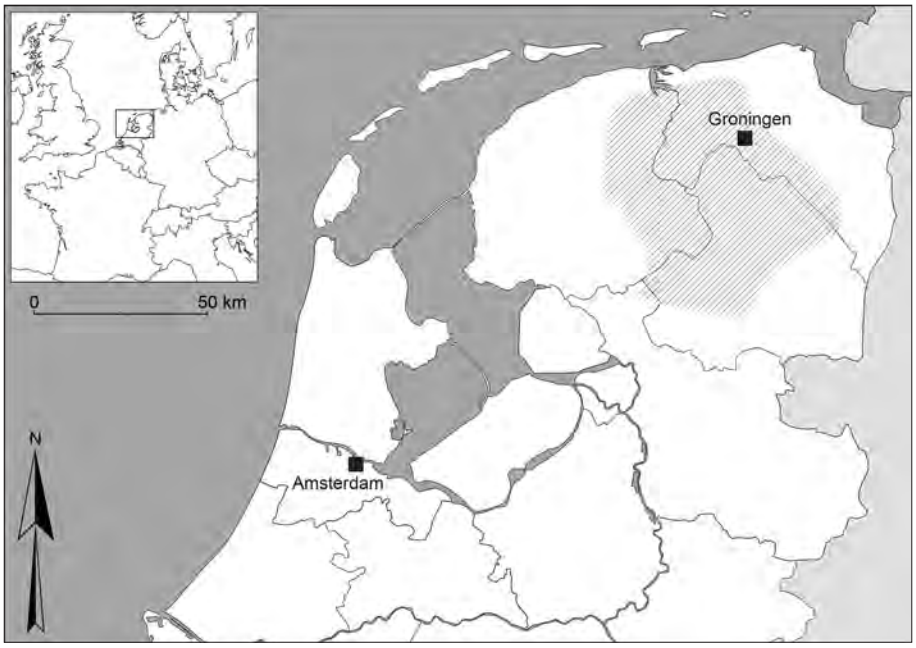

Fig. 2. Main distribution area of Gewoon Boerenblauwtje in the northern Netherlands (H. Woldring, RUG/GIA).

Groningen plum-stone types that does not appear before AD 1800. This stone type is not common. Besides their presence in post-medieval assemblages of Groningen, the stones were also identified in the botanical material from a 17th-century dump at the castle of Coevorden (unpublished) and sporadically at other archeological sites (Van der Meer, 2011b). Its relative scarcity in (post)medieval contexts suggests that this plum was only cultivated on a limited scale.
Remarks: this variety is apparently much more restricted in its distribution than the widespread Smal Boerenblauwtje, and this seems to have been the same in the past. The two varieties have similar fruits, though the fruits of Smal Boerenblauwtje are slightly larger. The varieties can be reliably distinguished by the index values and other features of the stones (table 1)**.** The apparent restriction to the Netherlands of fossil stones and living occurrences suggests that both types of Boerenblauwtje evolved locally.

6a. **Dubbele Boerenwitte** (*Prunus domestica* ssp. *insititia*). **Plates III and XIII; tables 1 and 2.**
General characteristics: tree up to 6 m, often lower and more bushy when growing on its own roots. Branches topped with dense bunches of branchlets. Summer shoots thickly pubescent, the leaves elliptic-oval, up to 7 by 4 cm.
Fruit: round, about 3-3.5 cm, dull yellow or greenish, tending to white, occasionally with faint streaks. Suture line prominent, fairly deep. Skin with light bloom. Fruit juicy, sugary, of dessert quality. Fruit-stalk 12-16 mm, pubescent. A good cropper in most years. Season early August.
Stone: oval in outline, with a rather broad base. The sides are domed and the surface is (sometimes weakly) pitted. One (to three) longitudinal lines may be present, often on one side only. The ventral ridge is well-developed. A conspicuous feature is the extension of the ventral ridge to below the base of the stone. This feature is less prominent or absent in the smaller stones and is also absent in the major part of the fossil stones from Groningen (GRO-5a and 5b in Van Zeist & Woldring, 2000).
Location: Dubbele Boerenwitte is a widespread variety in the Netherlands and has repeatedly been recorded in the north of Germany.
Archaeology: the stones have been identified in various archeological assemblages in the Netherlands (*e.g.* Van Zeist & Woldring, 2000; Van Haaster, 2006; 2010; Van der Meer, 2011b), which suggests that this plum was widely cultivated in the past.
Remarks: the Dubbele Boerenwitte was, and still is, one of the principal plums in farmyards and gardens. Flavour and colour of the fruit are reminiscent of the gages (Reine Claudes). The Dubbele Boerenwitte has repeatedly been referred to as an 'old' plum of Dutch origin. The apparent restriction of the stones to occupation deposits in the Netherlands indeed indicates such an origin. As a plum of commercial importance the Dubbele Boerenwitte is frequently offered for sale by specialized nurserymen. Cultivation beyond the Netherlands has given rise to names like 'White Virginal' in Britain, 'Jungfernpflaume' in Germany and 'Hvitt Jungfruplommon' in Sweden.

6b. **Dubbele Boerenwitte (**with pink fruits). **Plates III and XIII; tables 1 and 2.**
This variety differs from the former only in the reddish colour of the fruit. It should perhaps be regarded as a

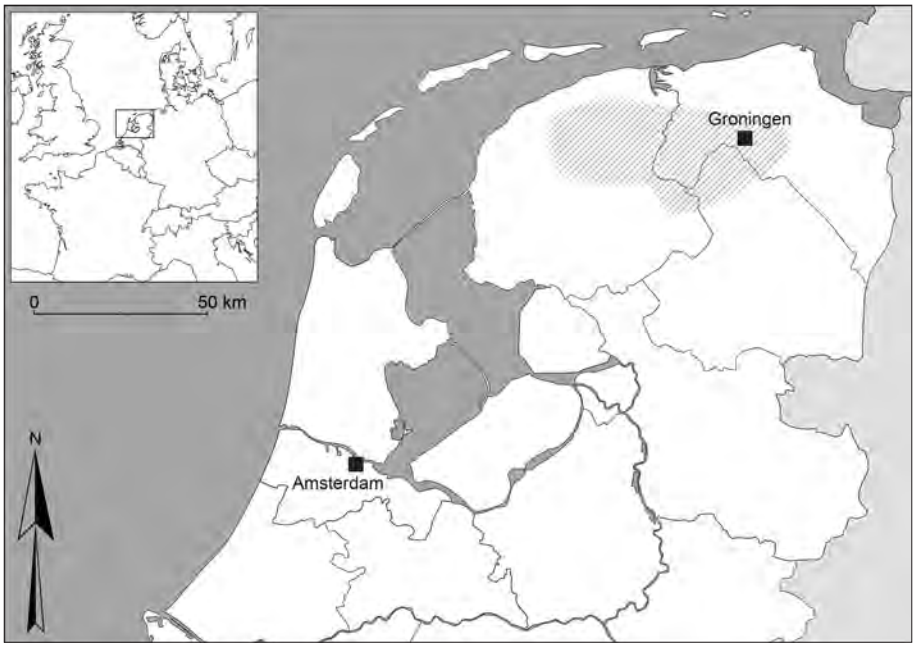

Fig. 3. Main distribution area of the Wichters in the northern Netherlands (H. Woldring, RUG/GIA).

form of the yellow-fruited variety. This type was recorded from only two locations in the vicinity of Groningen.

6c. **Enkele Boerenwitte**. **Plates III; tables 1 and 2.**
According to Knoop (1763), the Enkele Boerenwitte was widely cultivated in the Netherlands. This plum is said to differ from the Dubbele Boerenwitte only in the slightly smaller, and bright yellow fruits. These allegedly surpassed the fruits of the Dubbele Boerenwitte in flavour. The only specimen with features of this kind was recorded in Niebert (Gr.). The owner, a well-known pomologist, indeed claims that the fruits are of superb quality. As a possible example of the Enkele Boerenwitte, the dimensions and index values of these fruits and stones are presented and the stones depicted (unfortunately the pictures of the fruits were of poor quality). If this example indeed represents the Enkele Boerenwitte, any identification of its stones from archeological contexts will be out of the question, as they are identical to those of the Dubbele Boerenwitte.

7. **Wichters** (or 'kroosjes': *P. domestica* ssp. *insititia*). **Plates IV and XIV; tables 1 and 2.**
General characteristics: a shrub or sturdy tree up to 4 m with dense foliage. Summer shoots (densely) pubescent, leaves oval, up to 8 by 5 cm. Propagated from suckers.
Fruit: small, almost round, the base and apex somewhat flattened, skin greenish to yellow with red and russet brown spots (in sunny places) and thin bloom. Suture line shallow. Taste fairly sweet and juicy. Fruit-stalk pubescent, 12-20 mm. Season about mid-August. A prolific cropper.
Stone: characteristic, symmetrical, almost circular to suboval, the domed lateral sides with a very pitted surface, resembling the stones of sloe. In most samples the base of the stone has two distinct, closely placed points. Ventral ridge with a crest (absent in small stones). The grooves are weakly developed and often the edges are joined in the middle. Just below the apex, a short groove runs from the main groove towards the lateral side.
Location: the Wichters has mainly been recorded in the eastern part of Friesland (especially the Friese Wouden district) and the adjacent areas in the provinces of Groningen and Drenthe (fig. 3). Beyond this area it is quite rare. This is the only discussed variety which lacks any archaeological evidence. Wichters plums were not mentioned as such in the early literature, but may have been included in the group of small-fruited plums often indicated by the general term 'kroosjes' (*e.g.* Knoop, 1763). The name 'kroosjes' and 'krozen' is also given to cherry plums.
Archaeology: so far, there is no record of subfossil stones of this variety. See below for further comment.
Remarks: on account of the limited area of distribution and the small-sized fruits, this variety is assumed to have a certain tradition in the northern Netherlands. Actually nothing is known about how and when the Wichters became dispersed in the northern Netherlands and whether this variety indeed originates in this region. Even though acceptable for culinary use, the small and tender fruit is not of any commercial importance and there is no mention of its suitability for grafting. Fruit experts have suggested that seasonal workers from Rheinland-Westfalen (the so-called '*hannekensmaaiers*') brought this variety to the Netherlands in the 17th and 18th century. This does raise the question why the stones are absent (so far) in archeological deposits and why these plums are present only in a relatively small part of the northern Netherlands. It is still a custom among Frisians leaving their native region to take to their new home a sapling as a souvenir.

In two cases the owners of a Wichters tree in the north of the province of Drenthe explained that they had brought these trees as young saplings from their native village in the northeast of Friesland.

Archeological plum-stone material is needed if we want to prove a long tradition of Wichters plums**.** To this end, especially cesspits and other occupation deposits in the (post)medieval town centres in the province of Friesland should be potential findspots, as these are close to the present main distribution area of Wichters trees. However, it should be noted here that the study of botanical samples from the *terpen* in the northern coastal area has so far failed to yield a single plum stone. The descriptions and illustrations of the Wichters will facilitate the identification of any fossil stones and the living material of this variety.

8. **Bonne de Bry** (*Prunus domestica* ssp. *domestica*); **Plates IV and XV; tables 1 and 2.**

General characteristics: the only sample from the Netherlands identified as Bonne de Bry is a specimen from Hoogkerk, near Groningen. This bushy specimen consists of three or four stems about 10 cm in diameter and with a greyish bark. The summer shoots are glabrous or thinly pubescent. Its leaves are oval to almost round. This specimen grows from its own roots and makes abundant suckers.

Fruit: medium-sized, round with a somewhat flattened base and depressed apex. Skin violet(-blue) covered with a fairly heavy bloom. Suture line wide and deep. The fruit-stalks measure 12-20 mm, pubescent. Dessert plum of a superb flavour. A regular, good cropper. Season end of July, early August.

Stone: the stones of this tree show some variation in dimensions and shape: the larger ones are oblique-oval in outline, slightly pointed or rounded at the base and with a blunt to flattened apex, without or with an inconspicuous point. The smaller stones are almost symmetrical in outline, more or less rounded at the base and with a blunt apex (conforming to the Norfolk sample: Plates IV). The sides are strongly domed with one main crease, and often one or two shorter creases on one or both lateral sides. The ventral ridge is robust with partial incisions along the mid-line. The lateral grooves on both sides of the ridge are narrow, but distinct.

Location: apart from its sporadic presence in the Netherlands, Bonne de Bry is still of commercial importance in countries like France, Britain and Sweden (*e.g.* Dahl, 1943: 199–201).

Archaeology: Bonne de Bry is the modern equivalent of *Formenkreis* A from Haithabu and Alt-Schleswig (Behre, 1978) and Type A from Douai (Van Zeist *et al*., 1994). The stones (with local code GRO-2) have also been identified from various late- and post-medieval archeological assemblages in the Netherlands (*e.g.* Van Zeist & Woldring, 2000; Van Haaster, 2006; 2010; Van der Meer, 2011b). Despite its present infrequency, Bonne de Bry must have been one of the more commonly grown plums in the Netherlands.

Remarks: since its first documentation (in 2000), the Hoogkerk specimen has been classified as the modern equivalent of the GRO-2 type stones, as the stones perfectly correspond in their dimensions and other features. Until recently, however, the Hoogkerk specimen could not be attributed to any specific variety. This question has now been clarified since a small reference sample from a labeled Bonne de Bry tree was placed at our disposal by Ms N. Plumbe, the owner of a large commercial plum orchard at Burnham Market, Norfolk.[1]

These stones, though slightly smaller, are similar in all features to those of the Hoogkerk specimen. Also illustrative is the comprehensive record of Bonne de Bry in Dahl (1943: 199–201). Besides other features, the dimensions of the stones (14 by 9 by 12 mm) and fruits (32 by 32 by 32 mm) exactly match those of the Hoogkerk specimen. This all means that Bonne de Bry is the modern equivalent of the GRO-2 type stones and the *Formenkreis* A from Haithabu and Alt-Schleswig, as was assumed by Behre (1978). Therefore Bonne de Bry is the only plum of dessert quality proven to have been cultivated for at least 1200 years.

9. **Tonneboer** (*Prunus domestica* ssp. *domestica*) **Plates V and XVI; tables 1 and 2.**

General characteristics: small tree or shrub, readily producing new plants from suckers. Summer shoots pubescent, leaves oblanceolate (largest width above the middle) or elliptic, up to 8 by 5 cm.

Fruit: oval, medium-sized, 30-35(40) mm, skin yellow (on occasion orange-flushed), bearing deep-red and russet spots of different shapes and sizes (in sunny places). Thin bloom present. Suture line near the surface, distinct. Fruit of poor flavour, but good for culinary use. Fruit-stalk (7)10-17 mm, pubescent. The crops can be so heavy that branches break off. Season late August–early September. *Stone*: the fairly large, almost symmetrical stones are elliptic in shape, (sharply) pointed at the top and slightly extended at the base. The lateral sides are strongly domed, mostly with one longer and some shorter creases running from the base. The surface is minutely pitted (or almost smooth). The grooves on both sides of the ventral ridge are narrow. Often one of the grooves has some short grooves branching off towards the lateral side.

Location: Tonneboer is quite uncommon in the northern Netherlands. Most examples of this variety were recorded in the vicinity of the city of Groningen. Specialized nurseries offer this plum for sale.

Archaeology: Tonneboer is extremely rare in archeological contexts. A single stone was identified in the rich plum-stone material from a 17th-century dump in the castle of Coevorden, Drenthe (unpublished). A possible stone of this variety was secured from a cesspit dating to the 16th and 17th centuries in the castle ‘De Haar’ at Haarzuilens, Utrecht (Van der Meer, 2011b).

Remarks: this variety produces large crops of moderate quality and is occasionally mentioned as a suitable rootstock. Tonneboer is considered an old variety of Dutch origin, although it is not mentioned as such by Knoop (1763). Anyhow, the available data suggest that this variety has never been common in the Netherlands.

10. **Pershore** (*Prunus domestica* ssp. *domestica*). **Plates V and VI; tables 1 and 2.**
General characteristics: tree growth vigorous, up to 6 m. Summer shoots shortly pubescent, leaves oval, 6 by 4.5 cm.
Fruit: 3.5 to 4 cm, oval, (violet) purple, tapering at the base, the halves frequently of different length. Suture line shallow, distinct. Bloom present. Fruit-stalk 10-17 mm, shortly and thinly pubescent. Fruit of moderate quality. A fertile tree propagated from suckers. Season (early) mid-August.
Stone: asymmetrical, oval, with slightly extended and pointed base and fairly pointed apex. The lateral sides are moderately to clearly domed, the surface is fairly smooth or vaguely pitted. In some samples the surface of the lateral sides has in part disappeared by corrosion. Weakly developed short creases of different lengths are often present, especially in the part just below the apex. The ventral ridge has a low crest. The grooves are narrow and mostly shallow.
Location: Purple Pershore is fairly common in the central part of the province of Drenthe and occurs more scantily in adjacent areas.
Archaeology: a large number of these stones were recorded from a 16th- and 17th-century cesspit of the castle 'De Haar' in the province of Utrecht (Van der Meer, 2011b). The present author identified four stones from 15th- to 18th-century cesspits belonging to the manor house of Werkeren, Zwolle (unpublished), and two stones from a 17th-century cesspit in the castle of Coevorden (unpublished). Apart from the slightly smaller size, the fossil stones in every detail mirror the reference samples of Purple Pershore from the northern Netherlands.
Remarks: the identification of Pershore-type stones in the (post)medieval contexts from the Netherlands is not easily understood in the light of the history of the Pershore plum. There are two Pershore varieties or forms which according to the literature both originated in England in the 19th century. The Pershore (often called Yellow Egg) is a variety with yellow, medium-sized fruits, which is thought to have been a chance seedling found near Pershore in 1827 (Roach, 1985: 156). Opinions differ on the origin of Purple Pershore. According to Taylor (1949: 139), this was a bud sport from the Pershore. Roach (1985: 156) indicates (probably in error) that this variety originated from a cross between Early Rivers and Diamond at Pershore, c. 1877. Since there are no differences other than the colour of the fruits, both forms must be closely related, which makes Taylor's bud-sport theory very likely. Besides the value of the plums for cooking (in England), the (Yellow) Pershore has been widely used as a stock (*e.g.* Maurer, 1939; Booy, 1947; Taylor, 1949: 16). It was always assumed that the occurrences of the Purple Pershore in the northern Netherlands also resulted from this practice. But with the archeological testimony from at least three Dutch sites of Pershore-type stones predating the English Pershores, this hypothesis no longer stands.

The Belgian Van Cauwenberghe is probably right when he notes: "The origin (of Pershore) is uncertain and not properly defined" (Van Cauwenberghe, 1941: 77). Given the archeological evidence, the English Pershore strains most probably descend from genetically identical plums developed on the Continent well before the 19th century. The occurrences in the northern Netherlands (and maybe elsewhere) may be remnants of this culture.

5. FINAL REMARKS

The examination of archeobotanical material indicates that, besides other kinds of fruit, a great diversity of plums used to be cultivated in the Netherlands. Bonte Kroospruim, Bonne de Bry, Smal Boerenblauwtje, and Enkele/Dubbele Boerenwitte especially were widely cultivated since late-medieval times. All the recorded varieties have in common that they are simply propagated from suckers and make acceptable crops without requiring grafting, a property which will certainly have favoured the spread of these varieties. Considering the archeological evidence and the currently limited areas of cultivation, almost half of these varieties must have been locally developed and cultivated. The Wichters is the only variety of which we have no archeological evidence.

An unexpected outcome of this study is that some renowned English varieties appear to have originated much earlier than is recorded in the literature. The archeological evidence shows that the Brompton, which is a seedling selection of the Oefkes, and the Pershore were cultivated on the Continent long before they were registered in England in the 19th century.

Most interesting is the variety Bonne de Bry, because it combines some unique qualities. This variety was clearly cultivated over a large area since early medieval times and, despite this early origin, it has sizeable fruits which exceed most modern varieties in quality. Bonne de Bry is claimed to have been first grown at Bry-sur-Marne, near Paris, in 1824 (the fruits are depicted in the coat of arms of Bry). It is evident that this claim is erroneous and from an archeological point of view it would be more appropriate to give this credit to Douai in northern France or Haithabu in northern Germany, where this plum was cultivated a thousand years earlier.

There is no evidence of plum cultivation in the Netherlands during the Early Middle Ages, but since the 14th century Bonne de Bry was one of the more widespread varieties. The archeological evidence suggests

that the scale of its cultivation began to decrease from the 18th century. Despite its excellent properties this variety is now extremely rare in the Netherlands. In other countries it is still of economic importance.

The foregoing examples demonstrate that the origin and provenance of varieties as mentioned in the literature is not always correct. With regard to the English varieties, this inconsistency can be attributed to the fact that in the early decades of the 19th century a start was made with compiling inventories and descriptions of plant material. This work was necessary to achieve certain standards in horticulture and therefore also included the material already available on the market. In the absence of a known origin, obviously the year of registration was taken as a starting point. In the case of Bonne de Bry, some commercially-minded townsfolk must have simply declared Bry-sur-Marne to be its place of origin.

Several types of stone in the Dutch archeological material, whose modern counterparts have been identified, will be briefly discussed here. The modern equivalents of the stone types Gro-3, Gro-4, Gro-7, Gro-8, Gro-9 seem to be absent today in the Netherlands and until now had only been recorded from France and Germany (Van Zeist & Woldring, 2000). The modern equivalent of the Gro-3 stones is an *insititia*-variety (French: St. Julien) which is common in the north and east of France. This variety closely resembles the *Krieche*, but the latter has more rounded, almost symmetrical stones and the lateral sides are pitted. The Gro-3 type stones have been identified from various archeological deposits in the Netherlands (*e.g.* Van Zeist & Woldring, 2000; Van Haaster, 2003; 2010; Van der Meer *et al*., 2009; Van der Meer, 2011a; 2011b). We believe that Behre's *Formenkreis* B (and probably also *Formenkreis* D) from Alt-Schleswig (Behre, 1978) are identical to the Gro-3 stone type. The modern equivalent of Gro-4, which shows mainly the characteristics of the ssp. *domestica*, has so far only been recorded in some villages in the Dordogne in central France. Stones of this type were recovered from several cesspits in the Netherlands (*e.g.* Van Zeist & Woldring, 2000; Van Haaster, 2003; 2008; 2010; Van Smeerdijk, 2006; Van der Meer, 2011b).

The modern equivalent of the Gro-7 type stones is the European plum or German prune. This *domestica* variety produces fruit with excellent curing qualities, which is why it is widely cultivated commercially, not only in Europe but also in other continents (Hedrick, 1911: 220). Its wide distribution, the use of various stock for grafting and its propagation by sowing has given rise to a certain variation in the dimensions of the stones (Röder, 1940: 76). Even in the United States several new strains have emerged, although the European plum has been grown here for less than two centuries (Hedrick, 1911: 219–222). The numbers of stones recovered from (post)medieval deposits are quite small (Behre, 1978; Van Zeist & Woldring, 2000; Van Haaster, 2003; 2010).

The modern equivalent of the Gro-8 stone type is also a *domestica*-variety, the 'Gelbroter Spilling', which resembles the European plum in both size and shape of the fruit. The Gelbroter Spilling seems to have a fairly limited distribution and currently is mainly cultivated in the eastern part of Germany. Only a few such stones have been identified from archeological sites (Van Zeist & Woldring, 2000; Van Haaster, 2003; 2006).

The modern equivalent of the Gro-9 stone type is the Prune d' Agen, a *domestica* plum, which was named after Agen, a town near Bordeaux. Prune d' Agen is said to have been taken from Turkey or Persia to France by Benedictine monks in the 13th century (Hedrick, 1911: 138–140). This variety is largely cultivated in the warmer regions of Europe, *e.g.* France and Italy, and the United States, *e.g*. California. The main success of Prune d' Agen is that it makes prunes (dried plums; French: pruneaux) of high quality and hence can be easily transported over large distances and stored for considerable periods. The alternative name Prune d' Ente, much used in trade, was corrupted to *pruimedanten* in the Dutch language. The archeological evidence of these prunes is quite rare (Van Zeist & Woldring, 2000; Van Haaster, 2006; 2008). On the whole, the reference samples that the present author collected from trees in France differ considerably in the dimensions of the stones from those of dried plums sold in shops. This is in accordance with Hedrick who mentions that many strains of Agen are grown in the United States, due to the importation of grafts from various parts of France, where the plum orchards are frequently grown from seedlings or from shoots (Hedrick, 1911: 139).

The stones of the aforementioned varieties became preserved in greater or smaller numbers in the archeological deposits. Apparently these varieties were locally cultivated in the Netherlands but disappeared in the course of time. An alternative interpretation of the presence of these stones in the occupation deposits could be that dried plums (prunes) were imported from more southerly parts. At least three of these varieties have in common that the fruits can be preserved by drying (in contrast to many other plums). According to Roach (1985: 148), the majority of the plums were preserved by this method, which allowed storage for about a year. This property indeed facilitated their trade and transport over larger distances. For instance, Parkinson (in the 17th century) mentions that great quantities of dried 'Damson plums' were brought from France to England in large barrels and sold at groceries (see Roach, 1985: 149). In periods of relative prosperity a great many consumer goods were imported in the Netherlands (*e.g.* Van Haaster, 2010). Prunes and other fruits preserved by drying may have been imported from southern climes where this method was more practicable than in the moister conditions farther north.

The archeological assemblages also contain stone types of which no modern equivalent was found at all. Possibly these varieties have disappeared or are so rare now that they have been missed. On the other hand, some

living specimens with a seemingly traditional appearance have been recorded whose stone types have no match in the archeological assemblages. It is difficult to assess right now whether these are remnants of traditional varieties or maybe just chance seedlings by origin. In the absence of any further data or context, these examples have been left out of consideration here.

The number of traditional fruit varieties has dramatically decreased in the last decades. In general, the traditional varieties are more hardy and disease-resistant than the more recently developed varieties. For example, in Austria only a number of 'old' plum varieties survived the widespread devastation of plums in the severe winter of 1929. Nevertheless, the survival of the traditional varieties is endangered, especially of those with a local distribution. It would not only mean the disappearance of a part of the natural heritage, but also the loss of genetic diversity that may be of value in the development of new varieties. Already Werneck (1958) and Körber-Grohne (1984) have pointed out that a certain stock should be maintained of the economically insignificant fruit varieties. Fruit-tree collections have now been established in various countries, for instance at Ratzeburg in Germany.[2] In the pomological collections of the Netherlands, plums are generally underrepresented; indeed, with some exceptions, traditional plum varieties are virtually absent. It would be worthwhile to furnish these collections with plants of the varieties which according to this study are restricted to the Netherlands.

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7. NOTES

1. The stones were collected from a labeled Bonne de Bry tree by Ms N. Plumbe, owner of the Leith House Orchards, Burnham Market, Norfolk, England.
2. A large number of fruit varieties, including several traditional plum varieties, have been collected in the so-called '*Obstbaumredder*', a fruit-tree reserve near Ratzeburg in Germany (curator Mr. P. Schlottmann, Stiftung Herzogtum Lauenburg).

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Plate I. 1.1.1 Bonte Kroospruim Groningen 1997. 1.1.2 Bonte Kroospruim Groningen 2003. 1.2.1 Varkenspruim Warffum 2010. 1.2.2 Vlieland 1997. 1.3.1 Oefkes Agelo 2003.

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Plate VI. 6.10.3 Purple Pershore Peizermade 1997. 6.10.4 Pershore-type stones from castle De Haar (16th and 17th centuries). Below: fruits Purple Pershore Spier 2002.

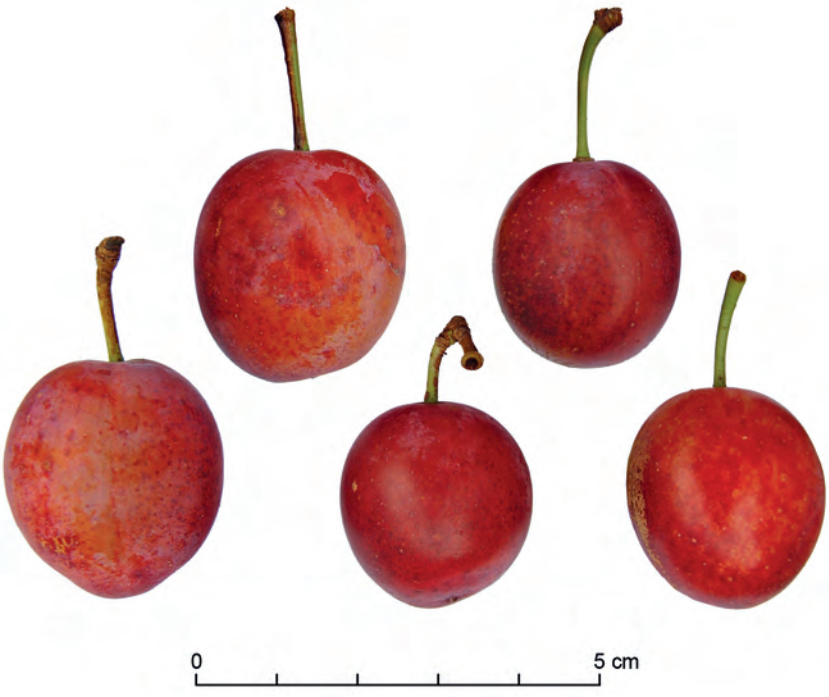

Plate VII. Bonte Kroospruim 7.1 Nietap 2011. 7.2 Groningen 2003.

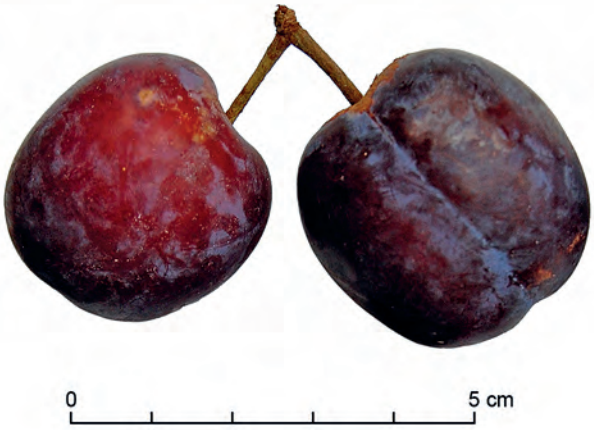

Plate VIII. Varkenspruim Warffum 2010.

Plate IX. Oefkes 9.1 Ratzeburg 2011. 9.2 Nietap 1992.

Plate X. Smal Boerenblauwtje. 10.1 Trees at the Hoogelandmuseum, Warffum 2010. 10.2. Warffum 2010.

Plate XI. Smal Boerenblauwtje. 11.1 Sandebuur 1998. 11.2 Noordpolderzijl 2010.

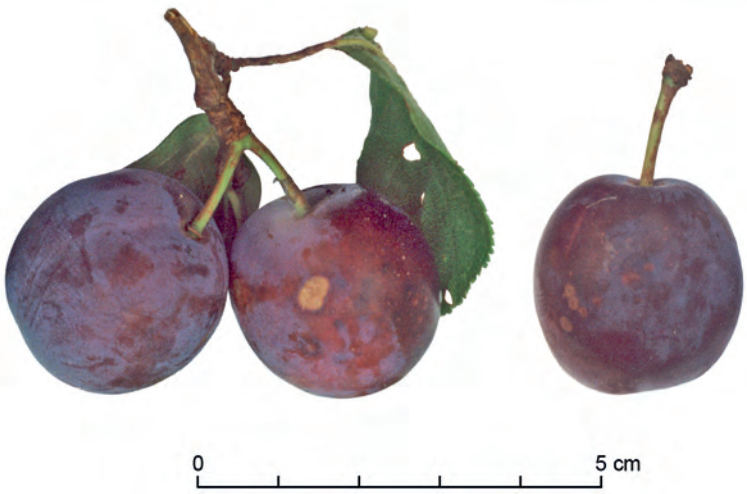

Plate XII. Gewoon Boerenblauwtje. 12.1 Haarveenschedijk 2011. 12.2 Peize 1998.

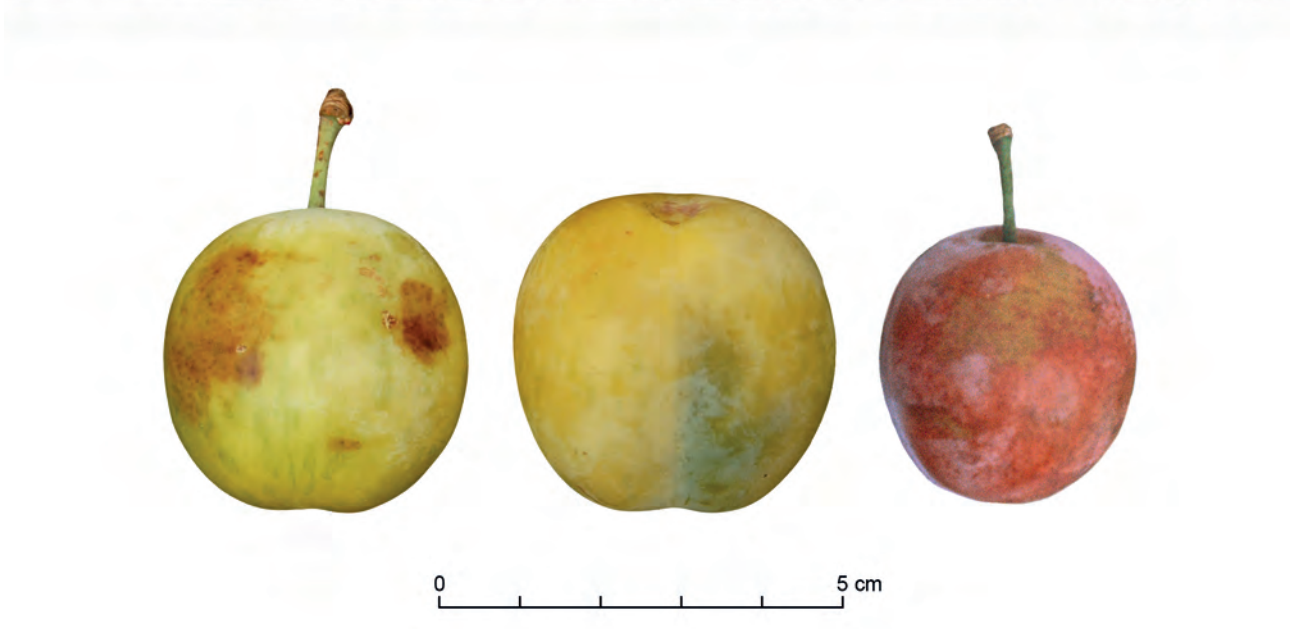

Plate XIII. Dubbele Boerenwitte. 13.1 Haarveenschedijk 2011. 13.2 left: Haarveenschedijk 2011, right: Haren 2005 (red-skinned form).

Plate XIV. Wichters. 7.1 Foxwolde 2011. 7.2 Reahel 2010.

Plate XV. Bonne de Bry Hoogkerk 2000.

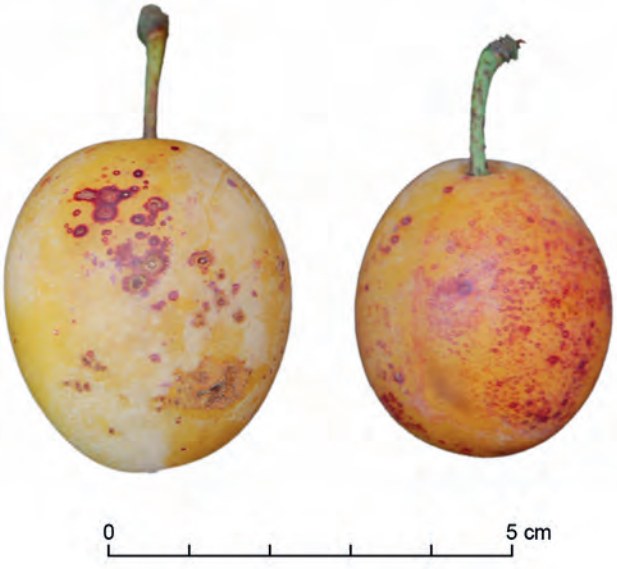

Plate XVI. Tonneboer Eelderwolde 2003.