DOA 1916 T, 20 heller part I, Coin production per die combination (2nd revision August 2018)

Untill the end of 2009 I collected all pictures of 20 Heller coins that I could find on internet. Some pictures were really to small or to bad to say anything but that they were 20 Heller 1916, so I had to throw them out. Together with the coins, in the lot I once bought, this resulted in 1077 coins for which, for almost all, the die combinations could be determined.
Then I stopped collecting each and every picture untill November 2013. As I had read somewhere that, if 5 coins are known for every die known, it may be assumed all dies are known, I kept only count of coins of die combinations of which I had not yet seen 5 coins.
Then Oktober 2013 I realised that, as I was determining the die combinations anyhow, I could, by keeping record of the amount of coins from each die combination, be able to calculate the amount of coins struck by each die combination. So I started collecting pictures again from all the coins appearing on internet.

To be really able to calculate the amount of coins struck by a die combination from the coins observed, the latter would have to be a random selection of the coins released from the mint.
The circumstances at the time they were produced and the way they reached the market today make this improbable.
The coins were legal tender only for a few month. Coins from different die combinations may have been released at places a thousand kilometer apart in a country where walking was often the only way to get from one place to the other and that was almost instantly occupied and devided by two different colonial powers.
In Holland 77% of all coins were still Dutch one year after the introduction of the euro
http://www.basvanleeuwen.net/Data.htm . By looking at the coins in your wallet today you can still tell in which euro-country you are.

This said there are some sparks of hope. A hundred years is a long time and some precautions can be taken.
First of all, larger lots of coins, which may have been gathered in a specific region of the country, could with some luck be recognized and be treated separately. My own lot may be considered as such and these coins have not been used in the calculations. A group of coins, which I call the Iringi lot, as it was gathered in that region, contained 27 HB2c-DB2e coins out of 91 in total.
Then some dealers may be offering on internet only specific parts of much larger stocks they have accumulated. These coins have been not used in the calculations if they were recognized.
When I started collecting pictures from internet, I could search back in time only for coins that figured in auctions. As a result auctionable coins like those HA with complete LL and the rarer copper types were vastly overrepresented. This was compensated by recalculating their figures based on their appearance between October 2013 and the end of 2014. The calculations per 2018 are based on 4160 coins,

Although the calculated figures may not represent the actual mintage figures, they are representative for the availability of coins from certain combinations on the market today, which for a collector may be just as important. The figures presented here are rounded to the nearest multiple of 500. The complete data sheets can be found at
http://www.emuenzen.de/forum/threads/praegezahlen-deutsch-ost-afrika-doa-1916-t-tabora.79225/
The +/- figures are the (rounded) statistical 95% confidence interval. 95% confidence interval means that the chance is less then 5%, that you would have found as much items as you did, if the real total amount of items was more then this margin higher or lower then you calculated.

The larger the groups of die combinations, the smaller the chance that survival rates of single combinations have influence. For the main types actual mintage figures may be well within the confidence interval.
On the performance of the first die combinations (HB1-2-DB2) Schumacher remarked that only rarely they produced more then 10.000 coins. The calculated figures reflect this and show that later on the die quality was much improved.

Calculated mintage (2018)

Amounts rounded to nearest multiple of 500, .+/-. = 95% confidence interval

99** die combinations, 25 HA-DA, 7 HA-DB, 7 HB-DA and 60** HB-DB

152** dies, 26 HA dies, 24 DA dies, 54 HB** dies and 48 DB dies   ** HB2i and HB2i? counted as separate dies

HA3-DA ?	green ink: die combination could not be fully determined
	coloured fields relate to same die at some distance in the tables

Column 1

die combination		mintage	.+/-.
HA(C)1-DA LL complete		45.500	8.500
HA-DA brass		248.500	18.000
HA-DA copper – J724a		56.000	9.000
Total J724a & b		350.000	21.000
HA(C)1a-Da1a		24.500	6.000
HA(C)1b-	DA3a	10.000	4.000
HA(C)1c-		10.000	4.000
HA3h-	DA6a	2.500	2.000
HA(C)1d-		1.500	1.500
HA2b-	DA2a	15.500	5.000
HA2a-DA1b		12.500	4.500
HA2d-		10.500	4.000
HA3a-	DA4c	10.000	4.000
HA3b-DA5a		30.000	7.000
HA3c-DA6b		10.000	4.000
HA3d-DA6c		10.500	4.000
HA3k-		2.000	2.000
	DA5b	20.500	5.500
HA3e-	DA7a	15.000	5.000
HA3n-			
HA3f/n ? -			
	DA8c	14.000	4.500
HA3f-	DA8d	1.000	1.000
HA3g-DA9b		20.000	5.500
HA3i-DA9f		11.000	4.000
HA3j-DA8e		6.000	3.000
HA3m-DA6e		12.000	4.500
HA4a-DA8a		20.500	5.500
HA4b-DA10a		56.000	9.000
HA4b-DA10a ?		500	
HA4c-DA11a		23.500	6.000
HA2/3?-DA		500	
HA3-DA		1.000	
HA(C)1-DB LL complete		12.000	4.500
HA-DB		94.000	12.000
Total – J726 a & b		106.000	12.500
HA2b-		0	1.000
	DB3u	3.000	2.000
HA(C)1c-		9.000	4.000
HA3w	DB3v	29.500	6.500
HA2d-	DB3w	17.000	5.000
HA3x		2.000	2.000
HA4d	DB3b	45.500	8.500
HB-DA – J725a & b		120.000	13.000
HB3c-	DA3a	15.500	5.000
HB3d-		21.500	6.000
HB4d-	DA6a	6.000	3.000
	DA11b	4.000	2.500
HB4c	DA11c	3.000	2.000
HB5y-DA8b		39.500	8.000
HB5z-DA9c		31.000	7.000

Column 2

die combination		mintage	.+/-.
HB-DB – J727a & b		1.058.000	24.000
HB0-DB0		0	1.000
HB0a-DB0a		0	1.000
HB0b-DB0b		0	1.000
HB1-DB		183.000	16.000
HB1a-DB1a		8.000	3.500
HB1b-		29.000	6.500
HB1w-	DB1b	13.000	4.500
	DB1c	3.500	2.500
	DB1v	3.500	2.500
HB1c-	DB1y	27.000	6.500
HB1d-DB1d		1.000	1.000
	DB1x	10.000	4.000
HB1e-	DB2a	49.500	8.500
	DB2b	1.000	1.000
HB1f-		4.000	2.500
HB1g-	DB2c	21.000	5.500
HB1s-		1.000	1.000
HB1t-	DB2t	1.000	1.000
HB1z-DB1z		8.000	3.500
HB1?- DB1/2?		3.000	
HB2-DB2		225.000	17.500
HB2a-	DB2c	12.000	4.500
HB2b-DB2d		39.500	8.000
HB2c-DB2e		41.000	8.000
	DB2f	8.500	3.500
HB2d	DB2g	29.000	6.500
HB2e-DB2h		15.500	5.000
HB2f-		12.000	4.500
	DB2i	14.500	5.000
	DB2i/j/q?	1.500	
HB2g-		9.000	4.000
	DB2j	7.500	3.500
	DB2k	7.500	3.500
HB2h-		1.500	1.500
HB2j-	DB2p	12.000	4.500
HB2i-		4.000	2.500
HB2i?	DB2o	3.000	2.000
HB2?-DB2?		7.000	

Column 3

die combination		mintage	.+/-.
HB3-DB2		62.000	9.500
	DB2l	12.000	4.500
HB3a-	DB2n	3.000	2.000
HB3b-DB2m		25.000	6.000
HB3b-DB2m ?		500	
HB3y-DB2x		9.500	4.000
HB3z-DB2z		8.000	3.500
HB3z-DB2z ?		2.000	
HB3?-DB2?		1.500	
HB4-DB3		30.000	7.000
HB4a-DB3a		10.000	4.000
HB4c-	DB3b	20.000	5.500
HB5-DB3		554.500	24.000
	DB3c	19.000	5.500
HB5a-		6.500	3.000
	DB3d	13.000	4.500
HB5b-	DB3e	35.000	7.500
HB5c-DB3f		26.500	6.500
HB5d-		39.500	8.000
HB5d/e?		500	
HB5e-	DB3g	26.500	6.500
HB5f-	DB3h	18.000	5.500
HB5g-		29.000	6.500
HB5h-	DB3i	23.000	6.000
HB5i-		38.500	7.500
HB5i-j?		500	
HB5j-	DB3j	45.000	8.500
HB5k-DB3k		36.000	7.500
HB5l-DB3l		48.500	8.500
HB5m-DB3m		40.500	8.000
HB5n-	DB3h	16.000	5.000
HB5o-		14.000	4.500
HB5p-	DB3o	27.000	6.500
HB5q-DB3p		28.000	6.500
HB5r-		12.500	4.500
HB5s-	DB3q	7.500	3.500
HB5?-DB3?		3.000	

The second table shows if and when a fifth coin was found for a die combination. March 2017 only 6 die combinations are still waiting for their fith coin.

Untill December 2009 I did know HA3a-DA4c only from paper.
Unknown before December 2009 were:
HA3k, a newly found die, used in combination with DA5b
HA3x, idem, used in combination with DB3b.
HB1s, idem, used in combination with DB2t
HB1f-DB2c, a newly found combination of previously known dies. 1 HB1f-DB2c had been in store as unidentified before December 2009.
HB2h-DB2p, a newly found combination of previously known dies. Uncertain how many may have escaped detection before the first one was recognized, 2 were found archived among questionmarked coins..
HA(C)1c-DA6a – coin alignment
HB3-4?-DB2? – coin alignment
HA2b-DB3u, a newly found combination of previously known dies.

Less then 5 coins per last revision
5th coin found after December 2009
*** included in HA3f-DA8c, HA3n only later found to be a seperate die.
**** as yet it could not be established whether or not HB2i and HB2i? are two different dies. From 2014 coins from these dies all of a sudden started to appear much more frequently.

	Dec 2009		paper	Aug 10 new	Aug 11 new	Dec 12 new	Oct 13 new	Dec 14 new	Dec 15 new	Dec 16 new	Aug 18 new
HA(C)1a-DA1a	34	(5-29)	+3								
HA(C)1b-DA3a	9	(2-7)	+1								
HA(C)1c-DA6a – coin alignment	0	(0-0)					+1				
HA(C)1c-DA6a – medal alignment	11	(0-11)									
HA(C)1d-DA2a	1	(0-1)		+1		+1	+1	+1			
HA2a-DA1b	4	(1-3)		+1							
HA2b-DA2a	7	(2-5)									
HA2d-DA4c	5	(1-4)									
HA3a-DA4c	0	(0-0)	+1	+3	+1						
HA3b-DA5a	16	(1-15)	+1								
HA3c-DA6b	8	(1-7)									
HA3d-DA6c	4	(1-3)		+2							
HA3e-DA5b	13	(5-8)									
HA3e-DA7a	4	(1-3)	+1								
HA3f-DA8c	8	(1-7)									
HA3f-DA8d	1	(0-1)		+1				+1		+1	
HA3g-DA9b	14	(7-7)									
HA3h-DA6a	3	(0-3)		+1			+1				
HA3i-DA9f	3	(1-2)		+3							
HA3j-DA8e	3	(0-3)		+1	+1		+1	+1			
HA3k-DA5b	0	(0-0)			+1	+1	+1	+1	+4		
HA3m-DA6e	7	(4-3)									
HA3n-DA8c ***	***	***									
HA4a-Da8a	9	(1-8)									
HA4b-DA10a	50	(3-47)	+5								
HA4c-DA11a	18	(3-15									
HA(C)1c-DB3u	2	(0-2)		+2	+3						
HA(C)1c-DB3v	15	(0-15)	+3								
HA2b-DB3u	0	(0-0)									+1
HA2d-DB3w	16	(1-15)	+2								
HA3w-DB3v	19	(2-17)	+1								
HA3x-DB3b	0	(0-0)		+ 1		+2	+1	+2			
HA4d-DB3b	34	(1-33)	+7								
HB3c-DA3a	6	(1-5)	+2								
HB3d-DA6a	16	(1-15)									
HB4d-DA6a	2	(0-2)		+3							
HB4c-DA11b	2	(0-2)	+1	+2							
HB4c-DA11c	3	(0-3)		+2							
HB5y-DA8b	22	(2-20)	+1								
HB5z-DA9c	25	(3-22)	+3								
HB0a-DB0a	1	(1-0)	+1		+1				+1		
HB0b-DB0b	1	(1-0)									

Combination	Count	Range									
HB1a-DB1a	3	(1-2)		+1	+2						
HB1b-DB1b	9	(1-8)									
HB1c-DB1c	3	(1-2)			+2						
HB1c-DB1v	2	(0-2)			+1	+2					
HB1c-DB1y	14	(4-10)									
HB1d-DB1d	2	(2-0)		+1	+2						
HB1e-DB1x	3	(0-3)		+1	+2						
HB1e-DB2a	23	(12-11)									
HB1f-DB2b	1	(1-0)			+3				+1		
HB1f-DB2c	1	(0-1)			+1	+1		+2			
HB1g-DB2c	24	(11-13)									
HB1s-DB2t	0	(0-0)				+1		+2		+1	
HB1t-DB2t	1	(0-1)				+1			+1		+1
HB1w-DB1b	7	(5-2)									
HB1z-DB1z	3	(0-3)		+3							
unidentified	3	(1-2)									
HB2a-DB2c	13	(5-8)									
HB2b-DB2d	18	(5-13)									
HB2c-DB2e	21	(11-10)									
HB2d-DB2f	1	(1-0)		+1	+1	+4					
HB2d-DB2g	17	(9-8)	+1								
HB2e-DB2h	16	(7-9)									
HB2f-DB2i	10	(4-6)									
HB2g-DB2i	7	(3-4)									
HB2g-Db2j	3	(0-3)		+2							
HB2h-DB2j	3	(2-1)		+1	+1						
HB2h-DB2k	4	(1-3)		+1							
HB2h-DB2p	0	(0-0)							+1 (+2)	+2	+1
HB2i-DB2o	1	(0-1)				+1	+2	+3			
HB2i?-DB2o****	****	****						+1	+4		
HB2j-DB2p	4	(0-4)			+1						
unidentified	2	(0-2)									
HB3a-DB2l	10	(6-4)									
HB3a-DB2n	2	(0-2)					+3				
HB3b-DB2m	13	(5-8)									
HB3y-DB2x	6	(2-4)									
HB3z-DB3z	1	(0-1)		+3	+1						
unidentified	1	(0-1)									
HB3-4?-DB2? – coin alignment	0	(0-0)					+1				
HB4a-DB3a	7	(1-6)									
HB4c-DB3b	12	(7-5)									
HB5a-DB3c	13	(8-5)									
HB5a-DB3d	8	(7-1)									
HB5b-DB3d	9	(5-4)									
HB5b-DB3e	31	(18-13)									
HB5c-DB3f	27	(17-10)									
HB5d-DB3g	17	(6-11)									
HB5e-DB3g	24	(2-22)	+3								
HB5f-DBh	12	(3-9)	+2								
HB5g-DB3i	34	(21-13)	+2								
HB5h-DB3i	18	(9-7)									
HB5i-DB3j	11	(3-8)									
HB5j-DB3j	32	(22-10)	+1								
HB5k-DB3k	23	(11-12)									
HB5l-DB3l	14	(3-11)	+1								
HB5m-DB3m	20	(3-17)									
HB5n-DB3h	8	(1-7)	+1								
HB5o-DB3o	13	(9-4)									
HB5p-DB3o	26	(17-9)									
HB5q-DB3p	35	(22-13)									
HB5r-DB3q	8	(2-6)	+2								
HB5s-DB3q	5	(2-3)									
unidentified	2	(0-2)									

September 2017 it was recognized DA3b in combination with HA(C)1b and DA3a in combination with HB3c were one and the same die. So HA(C)1b-DA3b was renamed HA(C)1b-DA3a.
Beginning of 2018 it was recognized DB3n in combination with HB5n and DB3h in combination with HB5f were one and the same die. So HB5n-DB3n was renamed HB5n-DB3h