



Biology Data Book

Second Edition

VOLUME I

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BETHESDA, MARYLAND

Part IV. Chick

Data were adapted from Hamilton [2]. Age: Times at which stages occur are approximate and are based on an incubation temperature of 38°C.

Stage ^{1/}	Age	Identification of Stage	Stage ^{1/}	Age	Identification of Stage	
Before Laying			20	14	50-53 hr	22 somites; trunk flexure; 1st & 2nd branchial arches; 1st & 2nd branchial grooves
Cleavage			21	14+ to 15-	~50-54 hr	23 somites; premandibular head cavities
1	Early	3.5-4.5 hr ^{2/}	22	15	50-55 hr	24-27 somites; 3rd branchial arch; 3rd branchial groove
2	During	23	16	51-56 hr	26-28 somites; forelimb (wing) bud; posterior amniotic fold
3	Late	4.5-24.0 hr ^{2/}	24	17	52-64 hr	29-32 somites; hindlimb bud; pineal body
After Laying			25	18	3 da	30-36 somites, extending beyond level of hindlimb bud; allantois
4	1	26	19	3.0-3.5 da	37-40 somites, extending into tail; maxillary processes
5	2	6-7 hr	27	20	3.0-3.5 da	40-43 somites; rotation completed; eye pigment
6	3	12-13 hr	28	21	3.5 da	43-44 somites; 4th branchial arch; 4th branchial groove
7	4	18-19 hr	29	22	3.5-4.0 da	Somites extending to tip of tail
8	5	19-22 hr	30	23	4 da	Dorsal contour curved line from hindbrain to tail
9	6	23-25 hr	31	24	4.5 da	Toe plate
10	7	23-26 hr	32	25	4.5-5.0 da	Elbow & knee joints
11	7 to 8-	~23-26 hr	33	26	5 da	1st 3 toes
12	8	26-29 hr	34	27	5.0-5.5 da	Beak
13	9	29-33 hr	35	28	5.5-6.0 da	3 forelimb (wing) digits; 4 toes
14	9+ to 10-	~33 hr	36	29	6.0-6.5 da	Rudiment of 5th toe
15	10	33-38 hr	37	30	6.5-7.0 da	Feather germs; scleral papillae; egg tooth
16	11	40-45 hr	38	31	7.0-7.5 da	Web between 1st & 2nd forelimb (wing) digits
17	12	45-49 hr	39	32	7.5 da	Anterior tip of mandible has reached beak
18	13	48-52 hr				
19	13+ to 14-	~50-52 hr				
		20-21 somites; tail bud				

^{1/} As described in reference 1. ^{2/} After ovulation.

continued

28. CHARACTERIZATION OF DEVELOPMENTAL STAGES

Part IV. Chick

	Stage ^{L/}	Age	Identification of Stage		Stage ^{L/}	Age	Identification of Stage
40	33	7.5-8.0 da	Web on radial margin of forelimb (wing) & its 1st digit	47	40	14 da	Beak, 4.0 mm long; 3rd toe, 12.7 ± 0.5 mm long
41	34	8 da	Nictitating membrane	48	41	15 da	Beak, from anterior angle of nostril to tip of upper bill, 4.5 mm long; 3rd toe, 14.9 ± 0.8 mm long
42	35	8.5-9.0 da	Phalanges in toes	49	42	16 da	Beak, 4.8 mm long; 3rd toe, 16.7 ± 0.8 mm long
43	36	10 da	Beak, from anterior angle of nostril to tip of bill, 2.5 mm long; 3rd toe, from tip to middle of metatarsal, 5.4 ± 0.3 mm long; primordium of comb; labial groove; uropygial gland	50	43	17 da	Beak, 5.0 mm long; 3rd toe, 18.6 ± 0.8 mm long
44	37	11 da	Beak, 3.0 mm long; 3rd toe, 7.4 ± 0.3 mm long	51	44	18 da	Beak, 5.7 mm long; 3rd toe, 20.4 ± 0.8 mm long
45	38	12 da	Beak, 3.1 mm long; 3rd toe, 8.4 ± 0.3 mm long	52	45	19-20 da	Yolk sac half-enclosed in body cavity; less blood contained in chorioallantoic membrane (membrane "sticky" in living embryo)
46	39	13 da	Beak, 3.5 mm long; 3rd toe, 9.8 ± 0.3 mm long	53	46	20-21 da	Newly hatched chick

^{L/} As described in reference 1.

Contributor: Hamilton, Howard L.

References

[1] Hamburger, V., and H. L. Hamilton. 1951. *J. Morphol.* 88:49.

[2] Hamilton, H. L., ed. 1952. *Lillie's Development of the Chick*. Ed. 3. Holt, Rinehart and Winston, New York.