Table 1. Biological Abstracts authored by Barbara McClintock between 1927 and 1956.

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3) McClintock, B. 1928. [Abstract #] 106. SCHWEMMLE, J. The hybrid *Oenothera berteriana* X *Onagra* (*muricata*) and its cytology (Der Bastard *Oenothera berteriana* X *Onagra* (*muricata*) und seine Zytologie). Jahrb. Wiss. Bot. 66 (4):579-595, 1927. Biological Abstracts, vol. 2.

4) McClintock, B. 1928. [Abstract #] 8915. LAIBACH, F. Artificial abortions in plants with respect to their importance for hybrid and hereditary investigation (Kunstliche Fruhgeburten bei Pflanzen in ihrer Bedeutung fur die Bastard- und Vererbungsforschung). Naturwissenschaften 15(34):696-700, 1927. Biological Abstracts, vol. 2.

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9) McClintock, B. 1934. [Abstract #] 12787. McCLINTOCK, BARBARA. The order of the genes *C*, *Sh* and *Wx* in *Zea mays* with reference to a cytologically known point in the chromosome. Proc. Natl. Acad. Sci. U.S.A. 17(8):485-491. [2 fig], 1931. Biological Abstracts, vol. 8. [Biol. Ab. 8(6, June/July), p. 1376, Cytology, Plant, 1934].

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11) McClintock, B. 1941. [Abstract #] 14129. McCLINTOCK, BARBARA. The stability of broken ends of chromosomes in *Zea mays*. Genetics 26 (2):234-282, [1 fig], 1934. Biological Abstracts, vol. 15. [Vol. 15 (August-Dec), p. 1264, Cytology, Plant, 1941].

12) McClintock, Barbara. 1946. [Abstract #] 6165. McClintock, Barbara. (Carnegie Inst. Washington, Cold Spring Harbor, N.Y.) Neurospora. I. Preliminary observations of the chromosomes of *Neurospora crassa*. Am. J. Bot. 32(10):671-678, 1945. Biological Abstracts, vol. 20. [Vol. 20 (Jan-July), p. 675, Cytology, Plant, 1946].

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awarding winning investigations (Kass, Genetics 164:1251-1260, 2003; Kass, Bonneuil and Coe, Genetics 169:1787-1797; Coe and Kass, PNAS 102(19):6641-6656, 2005). While an instructor in Cornell's Department of Botany (1927-1931), a post-doctoral researcher at Missouri and Caltech (1931-1933) and a researcher in the Department of Plant Breeding (1934-1936) at Cornell University, McClintock was invited to submit summaries of current research in biology for their newly established journal, Biological Abstracts (Table 1). Jacob R. Schramm, Professor of Botany at Cornell University, was editor-in-chief of Botanical Abstracts from 1921-1925 and founder and first editor-in-chief of Biological Abstracts [now BIOSIS] (1924-1937). This is but one of many landmark contributions to American Plant Biology made by Cornellians over the last century (Kass and Cobb, Plant Sci. Bull. 53(3):90-101, 2007; Murphy and Kass, Department of Plant Breeding & Genetics, Cornell University, Ithaca, NY, 2007).

Scientists continue to rely on BIOSIS to gain access to current literature. As a beginning graduate student in the late 1960s, I had used hard copies of Biological Abstracts for my research, and later became familiar with the on-line value of BIOSIS. I used this database to find summaries of the work of McClintock and her contemporaries (e.g., Coe and Kass, 2005; Kass and Chomet, pp. 17-52, in Bennetzen and Hake, The Maize Handbook: Genetics & Genomics, Springer, 2009). Recently, I learned that one may also use this database to find historically recognized papers, summarized by contemporaneous leaders in the field. This was brought to my attention in a note published in Mannifest, the Newsletter of Albert R. Mann Library, Cornell University (Morris-Knower, Mannifest Spring 2007 14(2):3, 2007, http://www.mannlib.cornell.edu/about/news/upload/spring07.pdf). By typing McClintock's name into the "topic" area of BIOSIS Previews one can find a list of abstracts authored by McClintock. The information is not as complete as one would find by examining the original hardbound copies of the journal (i.e., the month of publication and the page on which the abstract appears are not included), yet it provides easy access to the names of authors who summarized research papers, and one can certainly get complete information by seeking out the original source in a library (for example, see Table 1, references 8-9 and 11-13 for the complete source in Biological Abstracts).

It was enlightening to learn of McClintock's contributions to Biological Abstracts and to gain an understanding of the importance of a foreign language requirement for students in the early 20th century. McClintock's comprehension of the German language is reflected by the many papers she read in their original language and summarized for Biological Abstracts. Although most of her publications were encapsulated by others (not listed here), McClintock reviewed five individual investigations for *Biological Abstracts*, the last of which appeared in 1957 (Table 1).

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Evaluation and identification of maize for *turcicum* leaf blight resistance under cold temperate conditions

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In temperate hilly regions, high infestations of *Exserohilum turcicum* (Pass) Leonard and Suggs are encountered, causing *turcicum* leaf blight disease that exceeds economically feasible limits. Disease development is favoured by high relative humidity (75-90%) and moderate temperatures (22-25°C) during the growing season. The valley of Kashmir, which is a hotbed for this disease, lacks varieties of maize resistant to this disease. In spite of the fact that maize is an important food and fodder crop for the region, chemical control for the disease is not practiced. This results in a need to screen for TLB disease resistance in order to develop high-yielding disease resistant varieties of maize. We

Table 1. *Turcicum* leaf blight disease intensity of maize genotypes under epiphytotic field and controlled pot grown conditions.

S. No.	Name of entry	Disease intensity % under field conditions	Disease intensity % under controlled pot conditions	Log transformed values under field conditions	Log transformed values under controlled conditions	Days to 50% silk emergence	Grain yield (t/ ha)
1	GROP-132	76.29	46.56	1.88	1.67	50.00	1.43
2	GROP-172	66.30	34.10	1.82	1.53	54.00	3.97
3	GROP-165	64.00	41.99	1.81	1.62	56.00	4.24
4	GROP-104	69.76	32.97	1.84	1.52	54.00	1.32
5	GROP-104 wh	68.13	32.26	1.83	1.51	54.00	0.80
6	GRIL-4048	68.12	35.91	1.83	1.56	61.50	2.40
7	GRIL-3714-2	45.31	30.50	1.66	1.48	68.50	3.26
8	GRIL-12-112-1	59.57	43.22	1.78	1.64	64.50	3.10
9	NDSAB(M)C7	49.21	40.88	1.69	1.61	58.00	5.67
10	NDSM(8)WN	52.45	39.95	1.72	1.60	59.00	5.89
11	TL99A 1101-1	34.41	44.44	1.54	1.65	83.00	4.50
12	TL1111 1X2	34.60	47.98	1.54	1.68	84.00	6.15
13	TL99A 1101-3	27.25	40.70	1.44	1.61	84.00	4.27
14	TL99A 1102-6	30.62	38.66	1.49	1.59	91.00	5.07
15	TL00B 6135	33.35	46.39	1.52	1.67	91.00	5.61
16	TL 2000 B 6313	18.18	34.18	1.26	1.53	95.00	4.82
17	TL99 6119 20X19	23.93	38.32	1.38	1.58	81.00	4.07
18	TL99B 6119 6X5	23.77	31.36	1.38	1.50	68.00	4.16
19	Pob-800	41.60	34.03	1.62	1.53	69.00	4.76
20	Pob-845	50.44	40.46	1.70	1.61	58.00	4.16
21	Pob-86 C5	44.30	40.98	1.65	1.61	70.00	4.99
22	Sint-1	41.50	40.40	1.62	1.61	77.00	3.92
23	Sint-2	36.11	35.81	1.56	1.55	73.00	2.77
24	Sint-3	38.73	41.43	1.59	1.62	73.00	2.75
25	Sint-4	46.29	53.87	1.67	1.73	74.00	2.44
26	RS-11	29.17	25.74	1.46	1.41	60.00	2.39
27	RS-12	31.40	15.49	1.50	1.19	60.00	2.67
28	RS-14	25.73	22.84	1.41	1.36	71.00	5.29
29	RS-15	31.88	22.48	1.50	1.35	70.00	4.58
30	Ht-1	12.66	14.91	1.10	1.17	74.00	0.63
31	Ht-2	10.23	12.60	1.01	1.10	75.00	1.76
32	Ht-3	13.23	18.34	1.12	1.26	73.00	0.78
33	Ht-N	28.09	17.61	1.45	1.25	79.00	0.88
34	NIAS-5	29.28	36.79	1.47	1.57	71.00	2.78
35	NIAS-13	42.16	34.28	1.62	1.54	73.00	0.87
36	NZ-3	58.61	57.68	1.77	1.76	63.00	1.26
38	NZ-7	56.83	50.22	1.75	1.70	58.00	2.59
39	NZ-8	45.82	38.38	1.66	1.58	61.00	2.63
40	Po-77	39.30	31.01	1.59	1.49	66.00	3.07
41	Po-89	42.21	33.34	1.63	1.52	63.00	2.66
42	NZ-84	53.75	57.61	1.73	1.76	59.00	2.71
43	MOSSC C15	42.87	51.97	1.63	1.72	70.00	2.75
44	NAC-6004	10.33	31.67	1.01	1.50	99.00	4.45
45	NAC-6002	18.78	29.89	1.27	1.48	80.00	3.75
46	NAI-104	24.84	20.61	1.40	1.31	83.00	1.61
47	NAI-112	7.01	14.99	0.85	1.18	94.00	2.37
48	NAI-147	8.28	12.29	0.92	1.09	95.00	4.44
49	NAI-151	18.07	44.29	1.26	1.65	75.50	4.79
50	NAI-155	15.88	19.73	1.20	1.30	81.50	1.75
51	VL-41	55.54	46.19	1.75	1.66	67.50	2.15
52	VL-16	44.90	45.38	1.65	1.66	64.50	3.68
53	VL-Sk-11	27.50	26.81	1.44	1.43	76.00	3.16
54	VL-88	45.95	35.58	1.66	1.55	58.00	3.12
55	VL-Amb-pop	50.26	55.56	1.70	1.74	77.00	1.49
56	FH-3079	32.28	26.36	1.51	1.42	74.00	6.36
57	FH-3186	28.08	21.93	1.45	1.34	73.00	4.09
58	Him-129	42.64	42.23	1.63	1.63	63.00	4.10
59	Vivek-9	17.65	17.56	1.25	1.24	71.00	6.63
60	Surya	48.52	42.60	1.69	1.63	72.50	3.46
61	Kanchan	46.02	43.15	1.66	1.63	68.50	3.26
62	Girija	2.99	4.26	0.48	0.63	79.00	5.61
63	P7xC6	37.50	30.00	1.57	1.48	72.00	3.13
64	P8xC6	33.94	35.30	1.53	1.55	72.50	3.99
65	QL-1	46.98	37.83	1.67	1.58	72.50	2.72
C	C6	30.06	33.50	1.48	1.52	74.00	5.38
C	C14	38.75	32.98	1.59	1.52	76.50	5.12
C	C15	34.59	36.77	1.54	1.57	71.50	4.79
C	Super-1	42.77	38.13	1.63	1.58	72.50	5.11
	Mean	37.75	34.80	1.52	1.51	71.46	3.47
	SD	16.64	11.63	0.26	0.19	10.82	1.51
	CV (%)	44.08	33.42	17.08	12.76	15.14	43.67

have screened for *turcicum* blight disease resistance in over 43 exotic and 19 indigenous genotypes along with 3 local collections for the consecutive years of 2003 and 2004 at SKUAST-K, Shalimar, Jammu and Kashmir. *Turcicum* blight reaction of genotypes

had no relation to their geographical origin. Ht-monogenic sources, inbred NAI-147 and composite Girija, were among the genoypes that expressed resistance to the disease.

The 65 entries were sown in Augmented Block Design along with 4 checks (viz., Super-1, C_6, C_{14}, and C_{15}) within 3-rowed plots having inter- and intra-row spacing of 70 and 25 cm, respectively. Moderate doses of nitrogen were applied. Nitrogen in too low or too high quantity leads to increased and decreased disease severity, respectively, as cited by Bimla (Ann. Biol. 18(2):137-141, 2002) and Sharma and Mishra (1989). Artificial inoculation in the field was performed at the 6-8 leaf stage per Ivanova (Ras. Nauki 20(6):119-123, 1983). Plantings during the 2 years were altered by one month so as to mitigate the influence of early maturation on disease severity. Similarly, inoculation under controlled plot conditions was done at the 2- and 4-leaf growth stages to rule out the effects of juvenile sensitivity. Disease intensity was calculated according to modified McKinney rapid technique as applied by Horsfall and Heuberger (Phytopathology 32:226-232, 1942). This technique is based on individually scoring the leaves of a plant into 10 grades depending upon the percentage of leaf area infected. The severity (%) was calculated as $\{\sum (nV) / (NG)\} \times 100$, where 'n' is the number of infected leaves in each grade (1-10, which corresponds to 10-100% diseased area); 'V' is the numerical value of each grade; 'N' is the total number of leaves examined; and 'G' is the maximum numerical value of infection grades (i.e., 10). Based on disease intensity, genotypes were categorized into 5 groups as follows (Jeffers, personal communication): 0.1-5% = resistant; 6-25% = moderately resistant; 26-50% = moderately susceptible; 51-75% = susceptible; >75% = highly susceptible.

The results of screening germplasm over the two years indicated that *turcicum* leaf blight (TLB) disease intensity at the field level exhibited very high correlations (0.81** and 0.72**) with those calculated under controlled pot grown conditions. Genotypes at serial numbers 47, 48 and 62 (Girija) showed disease intensity less than 10% at field level. The genotype Girija recorded absolute resistance to the disease under both the screening environments (Table 1) with disease intensity percentages of 2.99 (0.48) and 4.26 (0.63) under field and controlled conditions, respectively. This genotype ranked only 6th for grain yield per hectare with 5.61 tons. The variability ranged from 2.99 to 76.29 and 4.26 to 57.68 percent for disease intensity and from 50 to 99 days for 50% silk emergence. At least 22 genotypes were found superior to check composite C6 with respect to disease log score. The genotypes showing moderate resistance under both the environments included RS-14, Ht-1, Ht-2, Ht-3, NAI-104, NAI-112, NAI-147, NAI-155, and Vivek-9. Smith and Kinsey (Plant Dis. 64:779-781, 1980) suggested the conferring of resistance by Ht-gene backgrounds. These Ht-monogenic sources have expressed resistance under controlled conditions in demonstrations by Leath and Pedersen (Plant Dis. 70:529-531, 1986), and with the exception of Ht-N, are known to display the chlorotic type of resistance (Leonard et al., Plant Dis. 79:776, 1989) observed in the present study. Populations NAC-6002 and NAC-6004, procured from the National Turcicum Leaf blight Nursery, Mysore, were found to be moderately resistant to TLB under field conditions, which has also been reported by Prabhakar et al. (Current Res. 32:63-66, 2003). The land races and most of the exotic materials succumbed to the disease. Disease intensity at the field level was negatively correlated to yield, which corresponds to the findings of Satyanarayana (Madras Agric. J. 82(40):249-251, 1995), and Sharma and Misra (Indian Phytopathol. 36(2):255-256, 1983). As expected, early maturing varieties tend to be more susceptible to disease than full season ones. This is because late summer conditions coincide with the log growth phase of early varieties where 70% or more of the leaf area was infested by the disease. This agrees with the findings of Patil (Mysore J. Agric. Sci. 13(1):1-4, 1979) that indicate genetic linkage between TLB resistance and late maturity traits. Thus there remains a possibility of selecting for early-maturing resistant lines among the recombinant generations of late-maturing resistant and early-maturing susceptible crosses. The varieties Girija, NAI-147, NAI-155 and Vivek-9, showing resistant to moderately resistant reactions to TLB in the present study, are all late season varieties that could be used as parents in backcross breeding to adaptable, high-yielding (average 50 qha^{-1}), susceptible checks C_{15}, C_6, C_{14} and Super-1.

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Evaluation of salinity tolerance at the seedling stage in maize (*Zea mays* L.)

--Collado, MB; Aulicino, MB; Molina, MC; Arturi, MJ

Maize (*Zea mays* L.) is the third most important cereal in the world after wheat and rice, and it grows under a wide range of climatic conditions. It is moderately sensitive to salinity and considered the most salt-sensitive of the cereals (Maas and Hoffman, J. Irrig. Drain Div. ASCE 103:115-134, 1977). Maize contains enormous variability (Paterniani, Crit. Rev. Plant Sci. 9:125-154, 1990) in which salinity tolerance may exist. Based on reports for many crops (Ashraf and McNeally, J. Agron. Crop Sci. 159:269-277, 1987; Ashraf and McNeally, Plant Breed. 104(2):101-107, 1990; Maiti et al., J. Plant Physiol. 148:741-744, 1996), selection for tolerance to salinity at the seedling stage appears useful in selecting for tolerance in saline soils. Previous papers indicate the effects of salinity treatments on the development of the maize coleoptile and radicle were considerable (Cicek and Cakirlar, Bulgarian J. Plant Physiol. 28:66-74, 2002).

This paper examines the presence of genetic variability in salt treatment of maize seedlings in thirteen populations and eighteen inbred lines of maize. Seeds were surface sterilized in 1% sodium hypoclorite solution for 5 minutes, then rinsed with distilled water. Six caryopses of each genotype were germinated between absorbent paper in plastic trays. The paper was moistened with either distilled water (control) or 150 mM NaCl. Each treatment was replicated two times. A completely randomized block design was used. Experiments were carried out in a controlled environmental room at 25ºC, with 16 h day length and with a relative humidity of 60%. After 12 days of treatment, the seedlings were harvested. The length for shoot and radicle (LS and LR, respectively) and the number of leaves (LN) were recorded. Shoot and radicle were separated, and the samples were dried for two days until constant weight, for dry weight determinations (DS and DR, respectively).