

Sp. Coll

106097 ✓2

# Primary Production and Nutrients on the Labrador Shelf, in Hudson Strait and Hudson Bay in August and September 1982

B. Irwin, P. Dickie, M. Hodgson, and T. Platt

Biological Sciences Branch  
Scotia-Fundy Region  
Department of Fisheries and Oceans

Bedford Institute of Oceanography  
P.O. Box 1006  
Dartmouth, Nova Scotia  
B2Y 4A2

March 1988

LIBRARY  
BEDFORD INSTITUTE  
OF OCEANOGRAPHY  
MAY 25 1988  
BIBLIOTHÈQUE  
INSTITUT OCÉANOGRAPHIQUE  
DE BEDFORD

PLEASE DO NOT  
REMOVE FROM  
LIBRARY

## Canadian Data Report of Fisheries and Aquatic Sciences No. 692



Government of Canada  
Fisheries and Oceans

Gouvernement du Canada  
Pêches et Océans

## **Canadian Data Report of Fisheries and Aquatic Sciences**

These reports provide a medium for filing and archiving data compilations where little or no analysis is included. Such compilations commonly will have been prepared in support of other journal publications or reports. The subject matter of Data Reports reflects the broad interests and policies of the Department of Fisheries and Oceans, namely, fisheries management, technology and development, ocean sciences, and aquatic environments relevant to Canada.

Numbers 1-25 in this series were issued as Fisheries and Marine Service Data Records. Numbers 26-160 were issued as Department of Fisheries and the Environment, Fisheries and Marine Service Data Reports. The current series name was changed with report number 161.

Data Reports are not intended for general distribution and the contents must not be referred to in other publications without prior written clearance from the issuing establishment. The correct citation appears above the abstract of each report.

## **Rapport statistique canadien des sciences halieutiques et aquatiques**

Ces rapports servent de base à la compilation des données de classement et d'archives pour lesquelles il y a peu ou point d'analyse. Cette compilation aura d'ordinaire été préparée pour appuyer d'autres publications ou rapports. Les sujets des Rapports statistiques reflètent la vaste gamme des intérêts et politiques du Ministère des Pêches et des Océans, notamment gestion des pêches, techniques et développement, sciences océaniques et environnements aquatiques, au Canada.

Les numéros 1 à 25 de cette série ont été publiés à titre de Records statistiques, Service des pêches et de la mer. Les numéros 26-160 ont été publiés à titre de Rapports statistiques du Service des pêches et de la mer, Ministère des Pêches et de l'Environnement. Le nom de la série a été modifié à partir du numéro 161.

Les Rapports statistiques ne sont pas préparés pour une vaste distribution et leur contenu ne doit pas être mentionné dans une publication sans autorisation écrite préalable de l'établissement auteur. Le titre exact paraît au haut du résumé de chaque rapport.

Canadian Data Report of  
Fisheries and Aquatic Science No. 692

March 1988

PRIMARY PRODUCTION AND NUTRIENTS ON THE LABRADOR SHELF,  
IN HUDSON STRAIT AND HUDSON BAY IN AUGUST AND SEPTEMBER 1982

by

B. Irwin, P. Dickie, M. Hodgson and T. Platt

Biological Sciences Branch  
Department of Fisheries and Oceans

Bedford Institute of Oceanography  
P.O. Box 1006  
Dartmouth, Nova Scotia  
Canada B2Y 4A2

©Minister of Supply and Services Canada 1988  
Cat. No. FS 97-13/692E ISSN 0706-6465

Correct citation for this publication:

Irwin, B., Dickie, P., Hodgson, M. and Platt, T. 1988. Primary production and nutrients on the Labrador Shelf, in Hudson Strait and Hudson Bay in August and September 1982. Can. Data Rep. Fish. Aquat. Sci. No. 692: iv + 139 p.

### Abstract

Irwin, B., Dickie, P., Hodgson, M. and Platt, T. 1988. Primary production and nutrients on the Labrador Shelf, in Hudson Strait and Hudson Bay in August and September 1982. Can. Data Rep. Fish. Aquat. Sci. No. 692: iv + 139 p.

During the period 12 August to 6 September 1982, a series of primary production experiments was conducted on board CSS Hudson on the Labrador Shelf, in Hudson Strait and Hudson Bay. In this report we make available the raw data and also the fitted light saturation parameters.

### Résumé

Irwin, B., Dickie, P., Hodgson, M. and Platt, T. 1988. Primary production and nutrients on the Labrador Shelf, in Hudson Strait and Hudson Bay in August and September 1982. Can. Data Rep. Fish. Aquat. Sci. No. 692: iv + 139 p.

Pendant la période du 12 août au 6 septembre une série d'expériences de la production primaire a été effectuée au bord du CSS Hudson dans la mer Labrador, au détroit de Hudson et dans la baie de Hudson. Dans ce rapport nous présentons les données brutes ainsi que les paramètres qui furent calculés pour représenter les courbes de production en fonction de la lumière.

**CONTENTS**

Abstract/Résumé .....	iii
Introduction .....	1
Sampling .....	1
Methods .....	1
Productivity .....	1
Chlorophyll a .....	2
Nutrients .....	2
Incubation light intensity .....	2
Estimation of photosynthetic parameters .....	2
Acknowledgements .....	3
References .....	4

## Introduction

This is the thirteenth in a series of data reports giving the results of experiments on photosynthetic production versus light intensity for natural phytoplankton populations in the North Atlantic and adjacent waters north of 50°N. Samples were collected from CSS Hudson between August 12 and September 6, 1982. This was a joint cruise with the Chemical Oceanography Division of the Physical and Chemical Sciences Branch of the Department of Fisheries and Oceans.

## Sampling

Water samples for primary production measurements were collected with 30 l Niskin bottles. At most stations two depths were sampled - the upper mixed layer and the bottom of the mixed layer.

Additional samples were collected with a rosette sampler on the Labrador Shelf. Sampling depths were selected by physical features in the water column.

## Methods

### Productivity

Primary productivity was measured using the  $^{14}\text{C}$  method as described in Strickland and Parsons (1972). For each light saturation experiment 50 ml of sodium bicarbonate was mixed with 5 l of water to yield an approximate activity of 5  $\mu\text{ci}$  per 100 ml of sample. Each of 43 light and 2 dark bottles was filled with 100 ml aliquot of innoculated sample water and placed in a temperature controlled incubator. Illumination in the incubators was provided by a 2000 W tungsten-halogen lamp (New Haline OHS 2000) having a maximum intensity of approximately  $1000 \text{ W m}^{-2}$  PAR.

Temperature control in the incubators was achieved by pumping water from a temperature controlled bath and circulator (Forma Scientific Model 2160). Temperatures were matched to in situ temperatures. Incubations were terminated after 3 hours. All

samples were filtered into Whatman GF/F filters and dried in a dessicator. Filters were stored at -20°C for later counting in a liquid scintillation counter.

#### Chlorophyll a

Replicate 100 ml samples were filtered onto 25 mm GF/F or 25 mm 1.0 µm Nuclepore filters. Filters were placed in glass vials containing 10 ml of 85% acetone and extracted for 24 hours at 0°C in the dark. The fluorometric technique of Yentsch and Menzel (1963) as modified by Holm-Hansen et al. (1965) was used to estimate chlorophyll and phaeophytin concentrations.

#### Nutrients

Three inorganic nutrients were measured routinely from each sample. All analyses were carried out on board within a few hours of collection. Inorganic phosphate, silicate and nitrate were measured on a Technicon II autoanalyser using industrial methods 155-71W, 186-72W, and 158-71W respectively.

#### Incubation light intensity

Photosynthetically active radiation (PAR) was measured in each bottle position using a Licor Li 185A quantum meter fitted with a 19OS underwater quantum sensor.

#### Estimation of photosynthetic parameters

Measurements of specific production, PB, and irradiance, I, were used to estimate parameters in the equation of Platt et al. 1981,

$$PB = P_S (1 - e^{-\alpha I/P_S}) e^{-\beta I/P_S}$$

$P_S$  (mg C mg Chl $^{-1}$  h $^{-1}$ ) is the light saturated rate of specific production in the absence of photoinhibition,  $\alpha$  (mg C (mg Chl) $^{-1}$  h $^{-1}$  W $^{-1}$  m $^{-2}$ ) is the initial slope of the PI curve and  $\beta$  (same units as  $\alpha$ ) is a parameter that characterises photoinhibition. Complete details of the fitting routine are given in Irwin et al. (1982) and a discussion of the mathematical basis for this technique is in Irwin et al. (1980).

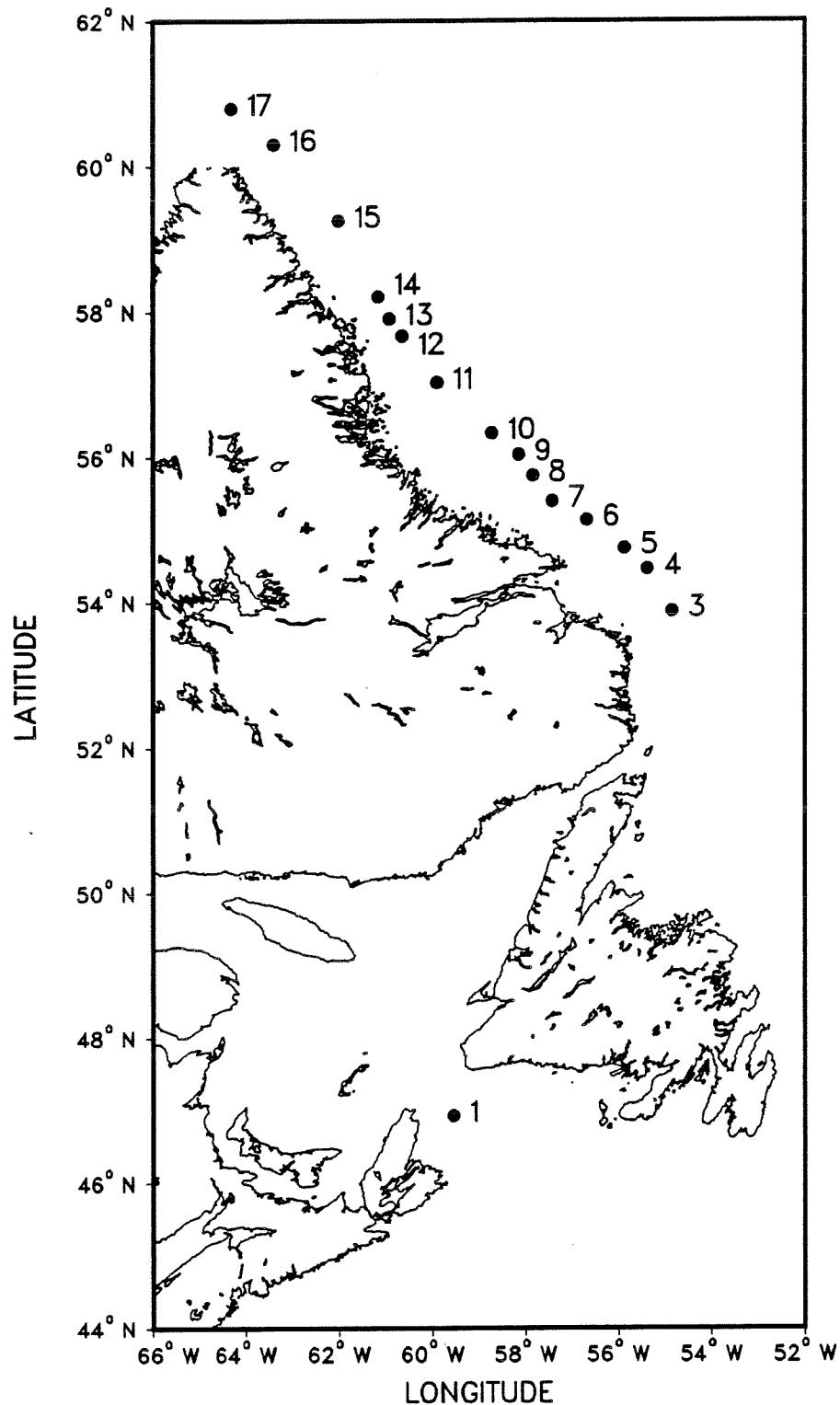
### **Acknowledgements**

We wish to thank Dave Rudderham and Alastair Macdonald for their assistance in the calculation of the light saturation parameters and the preparation of the data tables. A special thank you goes to Ray Hiltz who analyzed all the nutrient samples.

### References

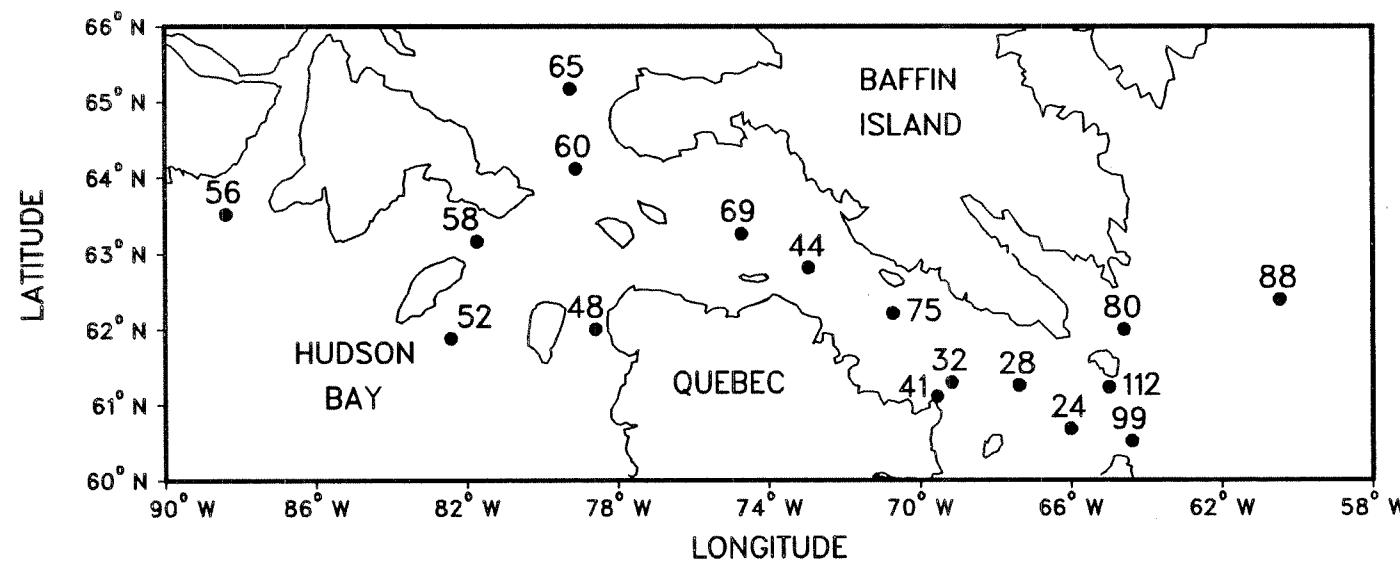
- Holm-Hansen, O., C.J. Lorenzen, R.W. Holmes and J.D.H. Strickland. 1965. Fluorometric determination of chlorophyll. *J. Cons. Int. Explor. Mer.* 30: 3-15.
- Irwin, B., T. Platt, W.G. Harrison, C.L. Gallegos and P. Lindley. 1982. Phytoplankton productivity experiments and nutrient measurements in Ungava Bay, NWT from August 1 to September 3, 1979. *Can. Data Rept. Fish. Aquat. Sci.* No. 287: 208 pp.
- Irwin, B., W.G. Harrison, C.L. Gallegos and T. Platt. 1980. Phytoplankton productivity experiments and nutrient measurements in the Labrador Sea, Davis Strait, Baffin Bay and Lancaster Sound from 26 August to 14 September, 1978. *Can. Data Rept. Fish Aquat. Sci.* No. 213: 103 pp.
- Platt, T., C.L. Gallegos, and W.G. Harrison. 1981. Photoinhibition of photosynthesis in natural assemblages of marine phytoplankton. *J. Mar. Res.* 38(4): 687-701.
- Strickland, J.D.H., and T.R. Parsons. 1972. A practical handbook of sea water analysis. *Bull. Fish. Res. Bd. Canada* No. 167: 311 pp.
- Yentsch, C.S. and D.W. Menzel. 1963. A method for the determination of phytoplankton chlorophyll and phaeophytin by fluorescence. *Deep-Sea Res.* 10: 221-231.

## HUDSON 1982 STATIONS



LOCATION OF SAMPLING STATIONS

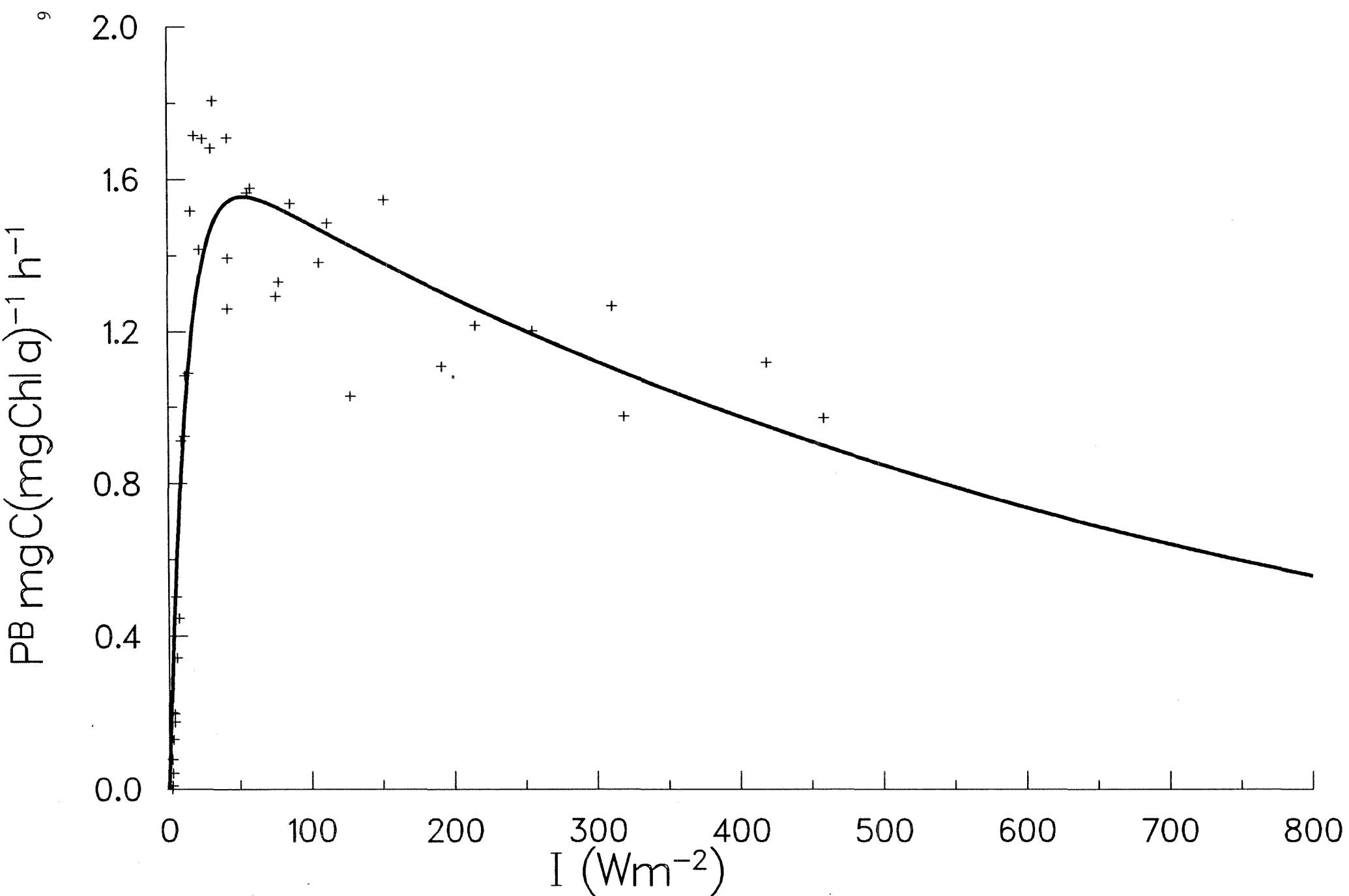
## HUDSON BAY 1982 PI STATIONS



## PI PLOTS



ID 8208796 STA. 1 13/08/1982 10 M

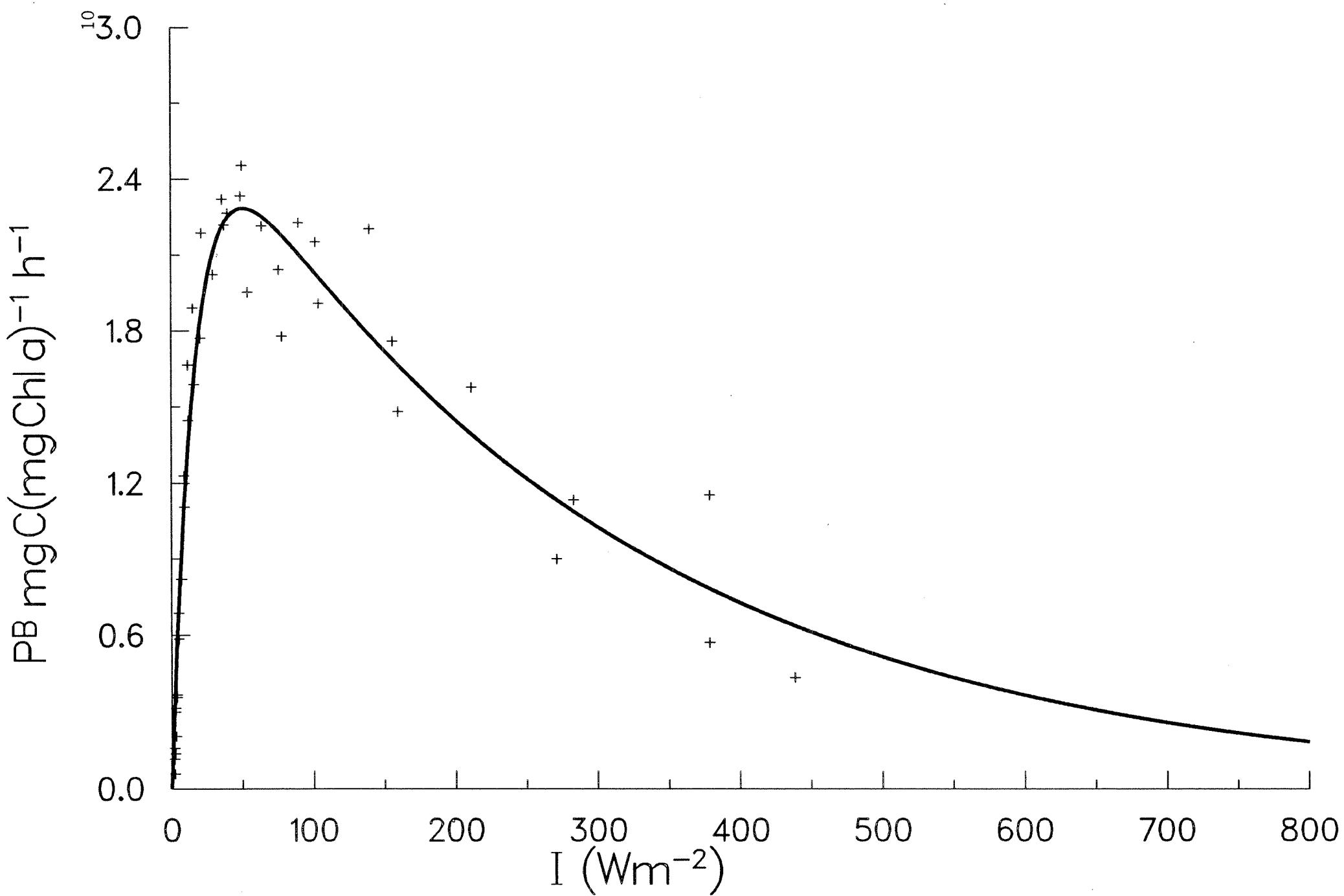


ID 8208795

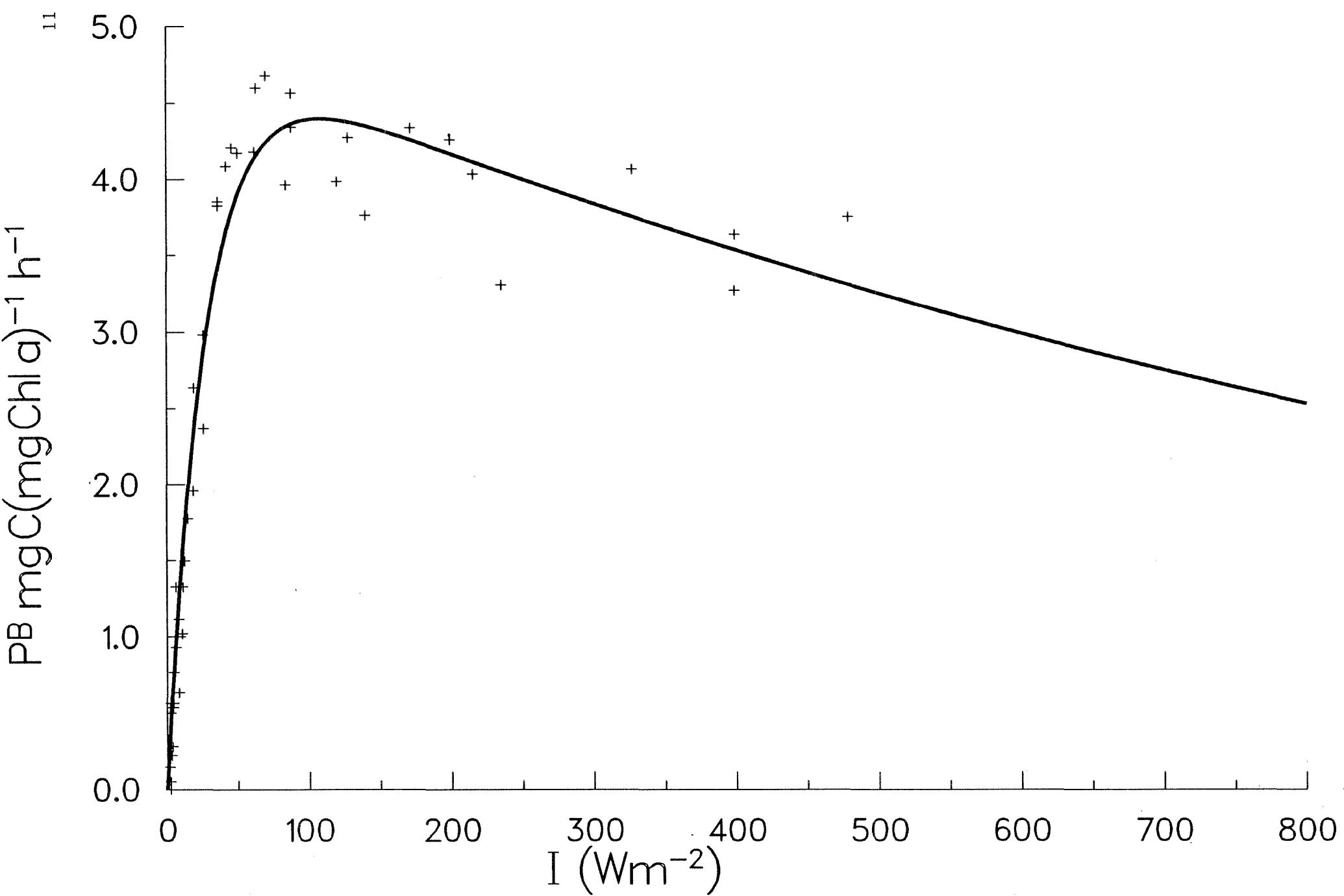
STA. 1

13/08/1982

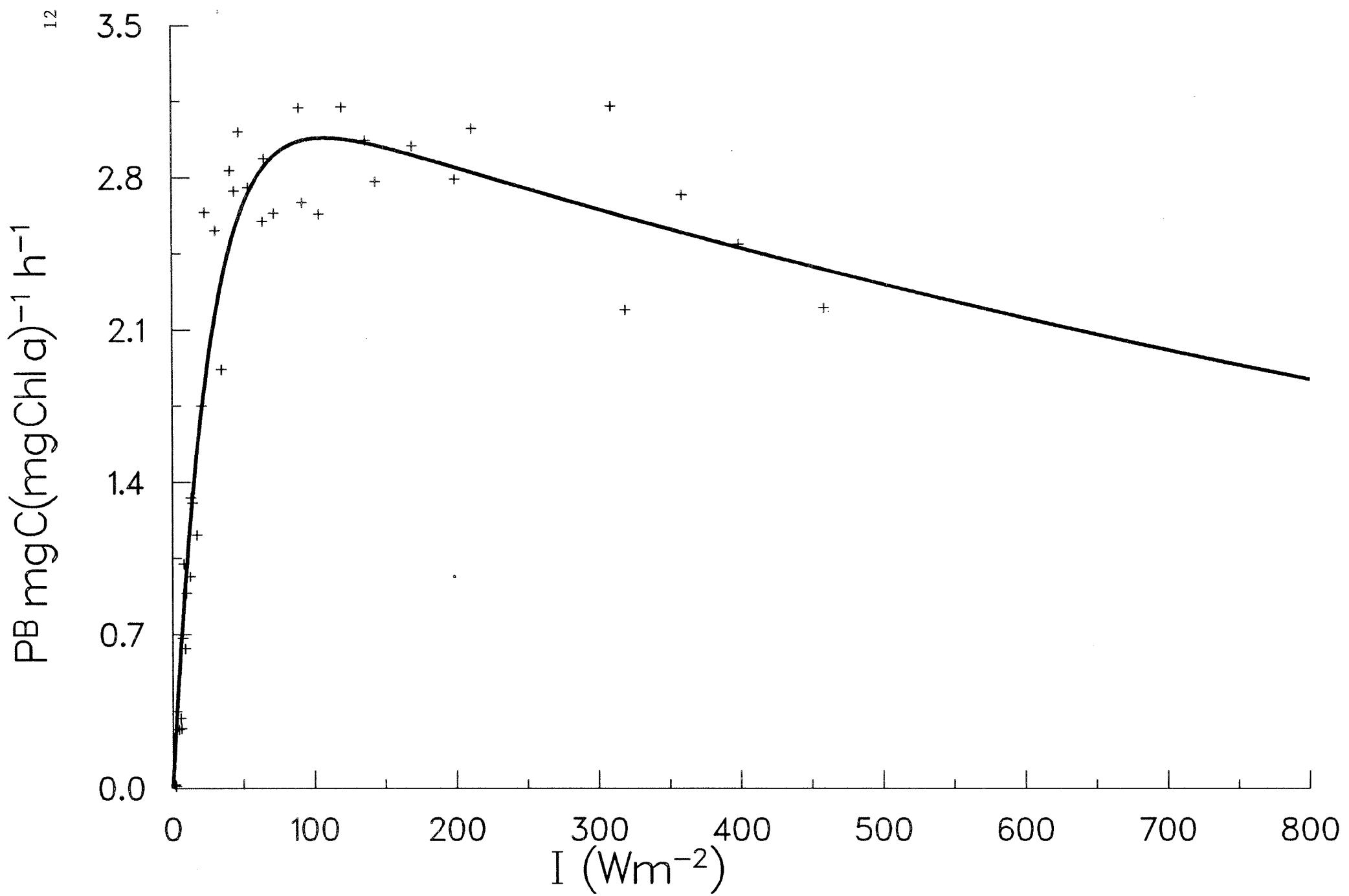
28 M



ID 8213421 STA. 3 16/08/1982 17 M



ID 8213422 STA. 3 16/08/1982 10 M

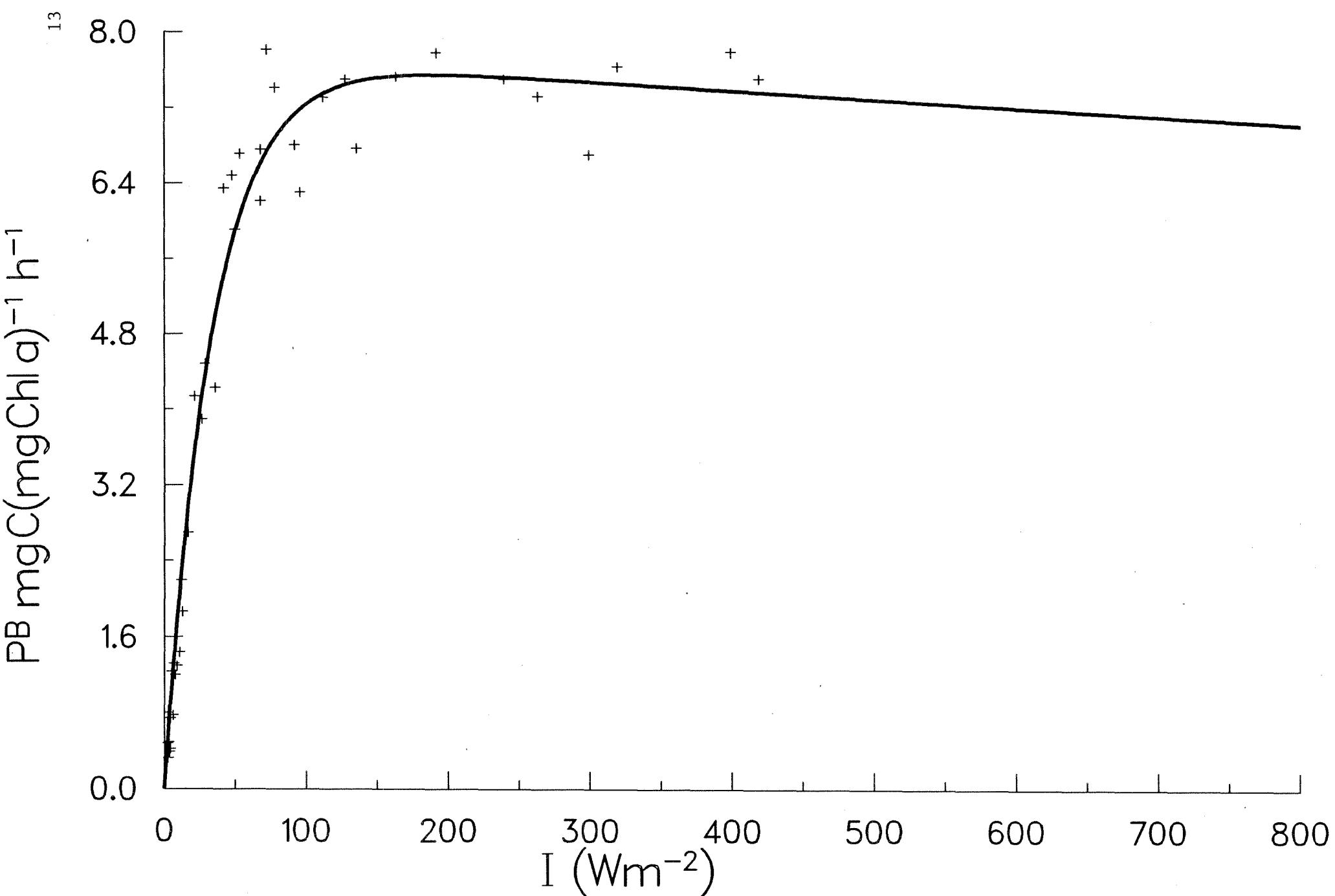


ID 8213438

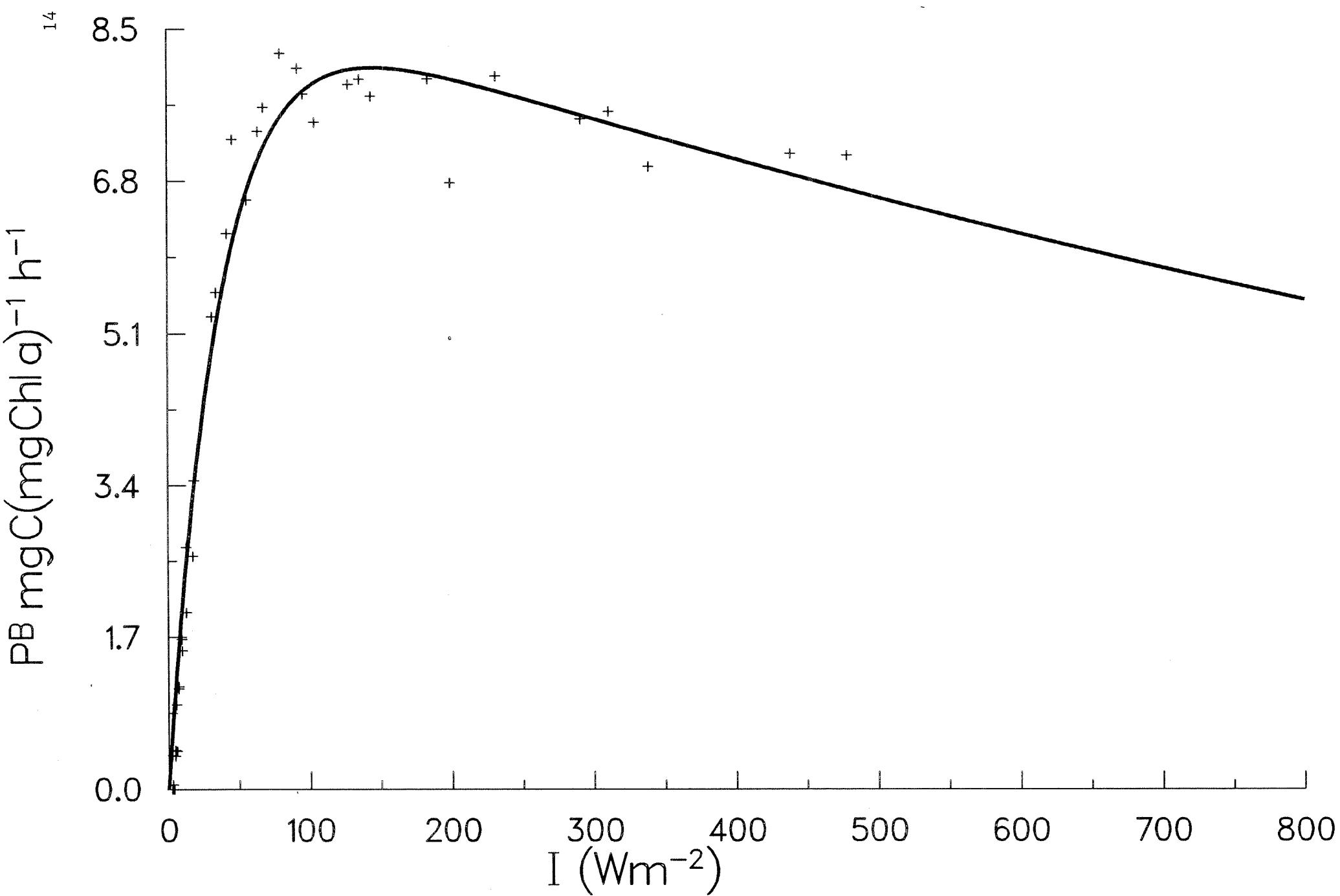
STA. 5

16/08/1982

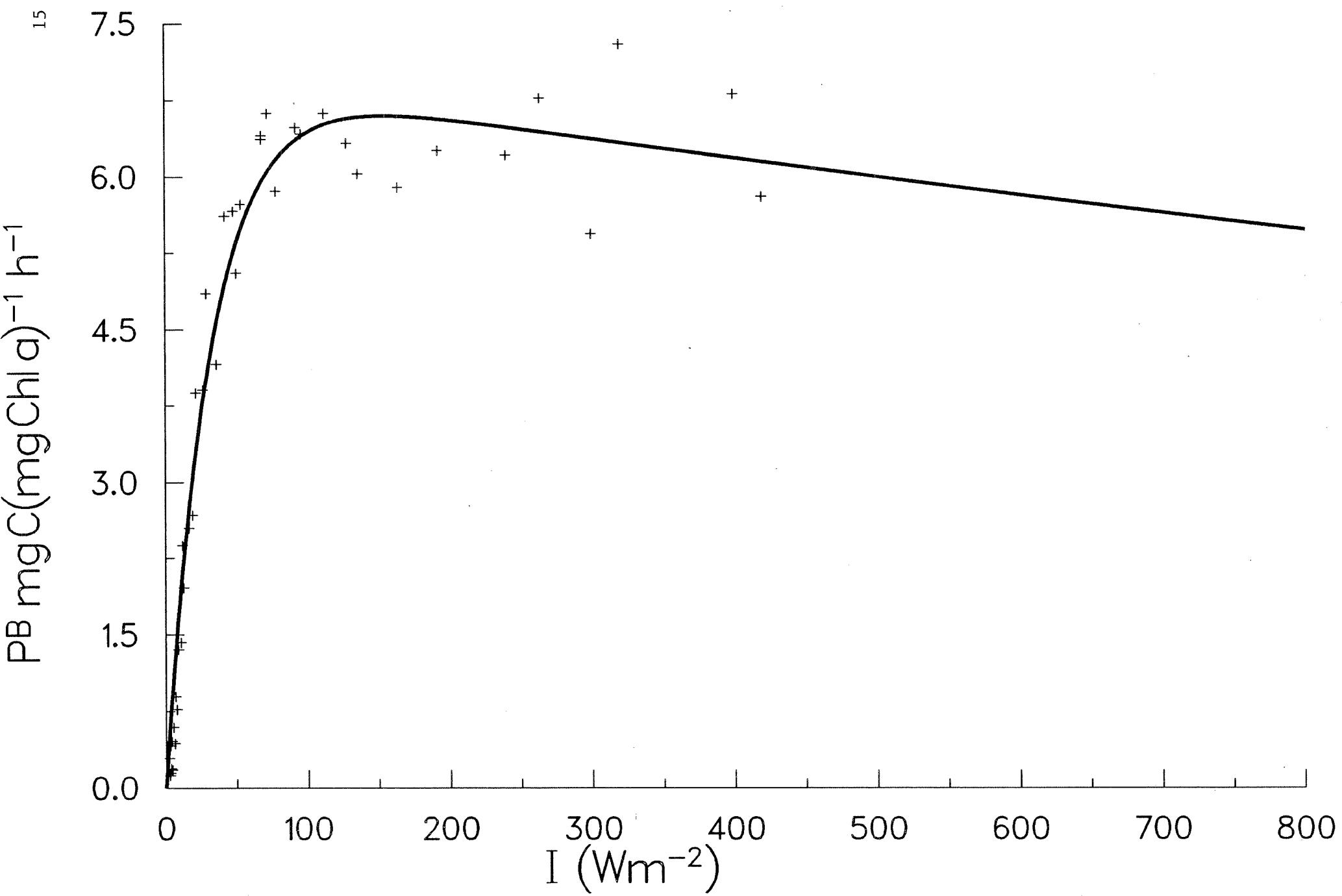
17 M



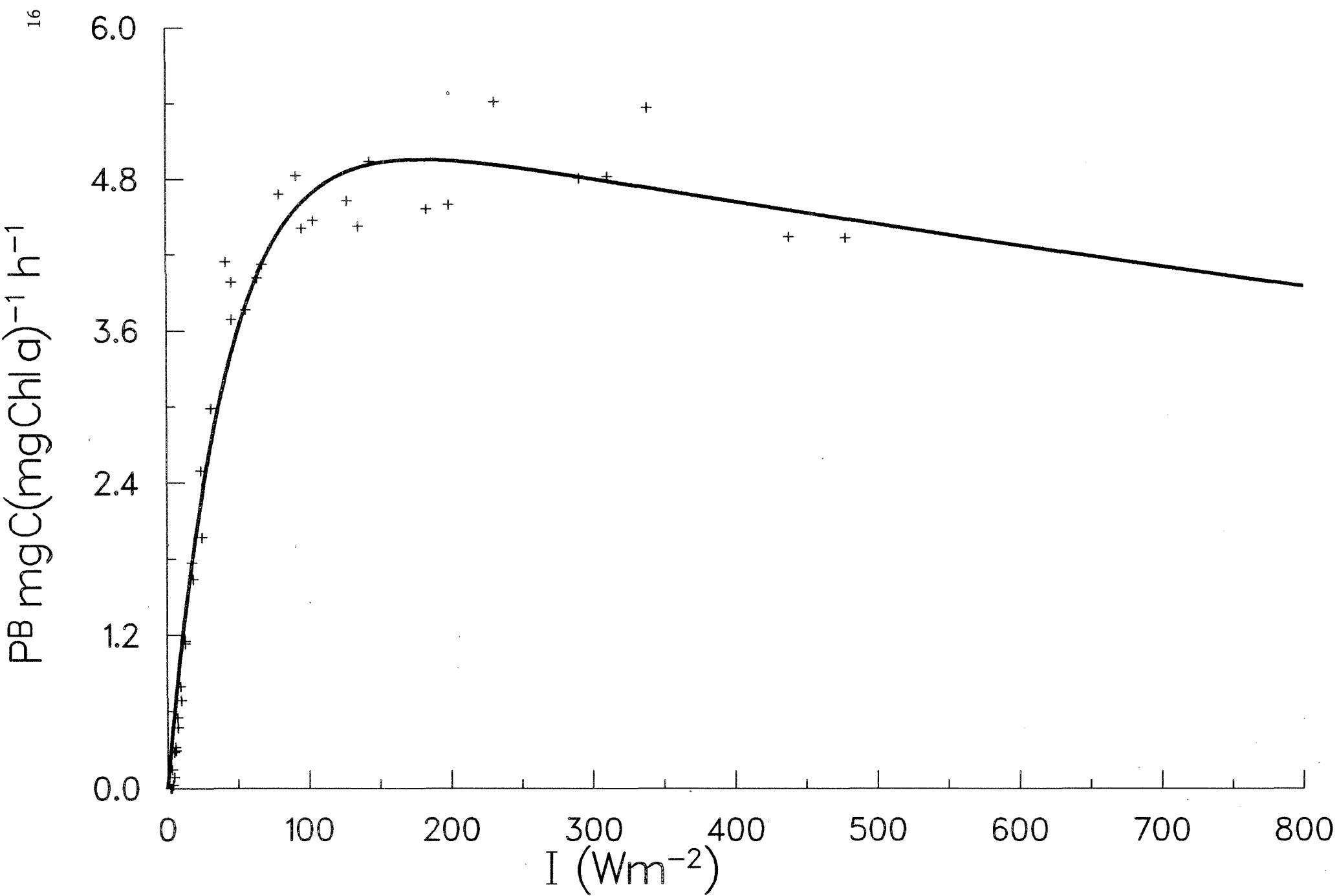
ID 8213439 STA. 5 16/08/1982 10 M



ID 8213477 STA. 7 17/08/1982 20 M



ID 8213478 STA. 7 17/08/1982 10 M

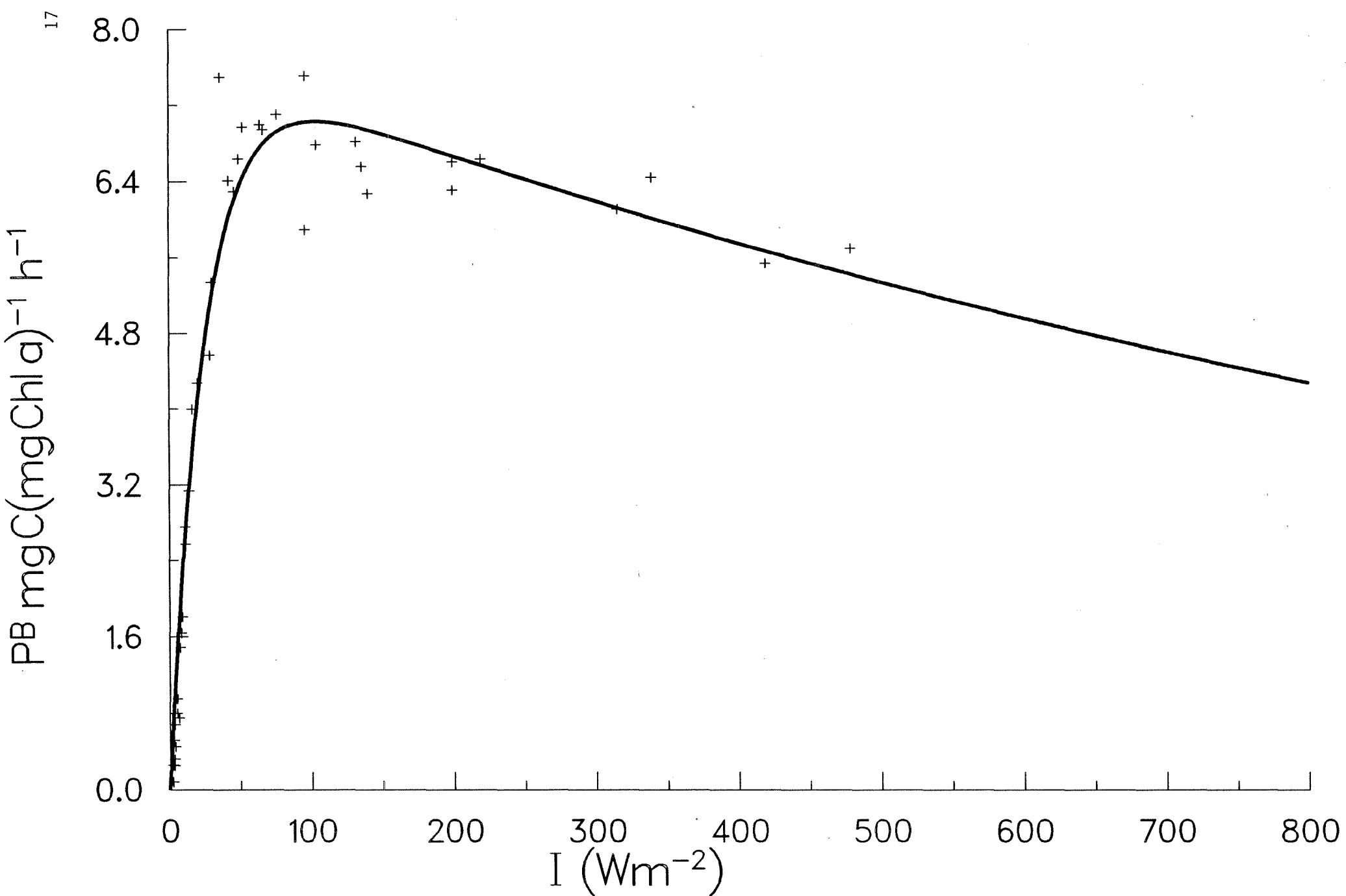


ID 8213505

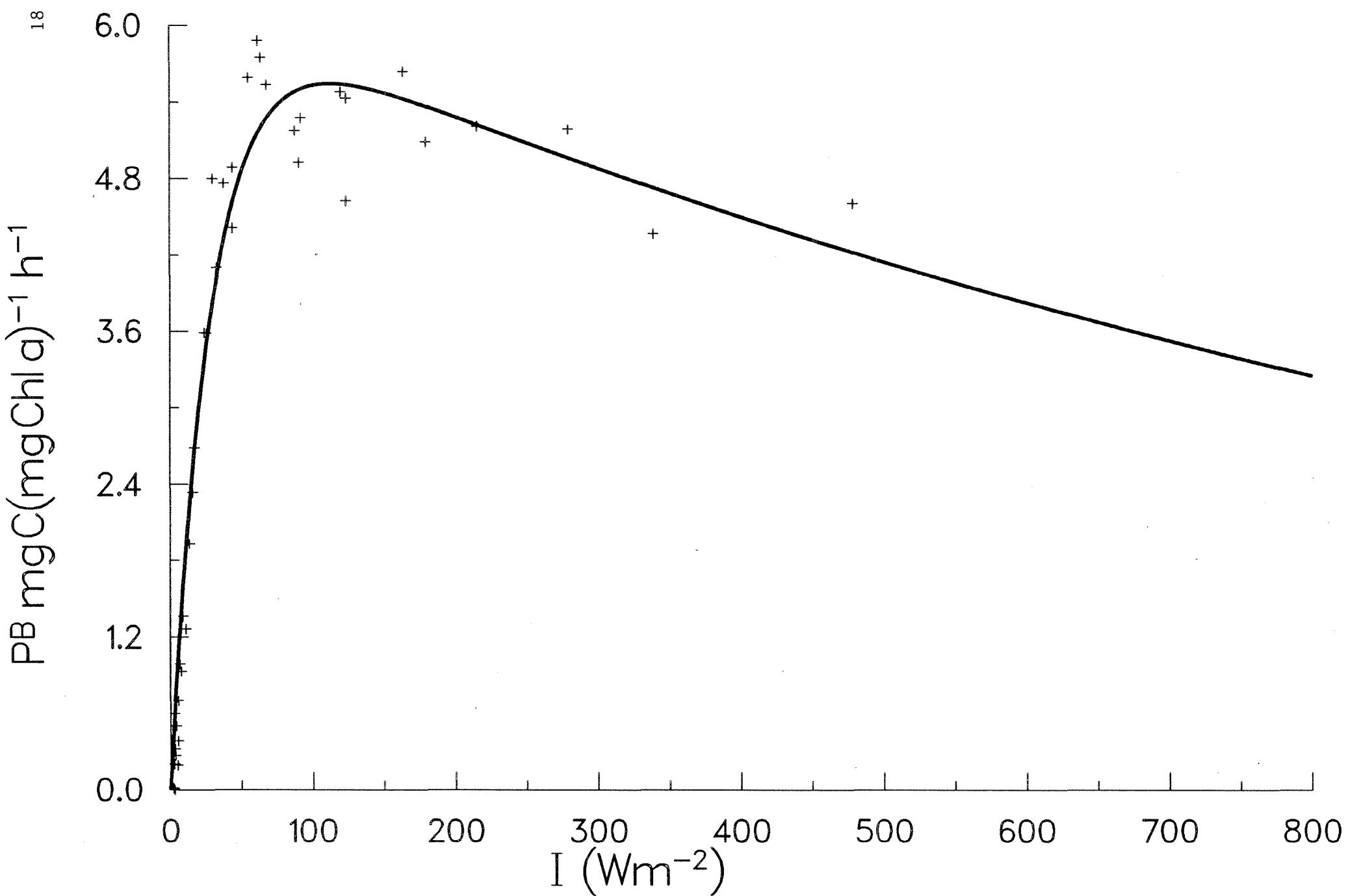
STA. 9

17/08/1982

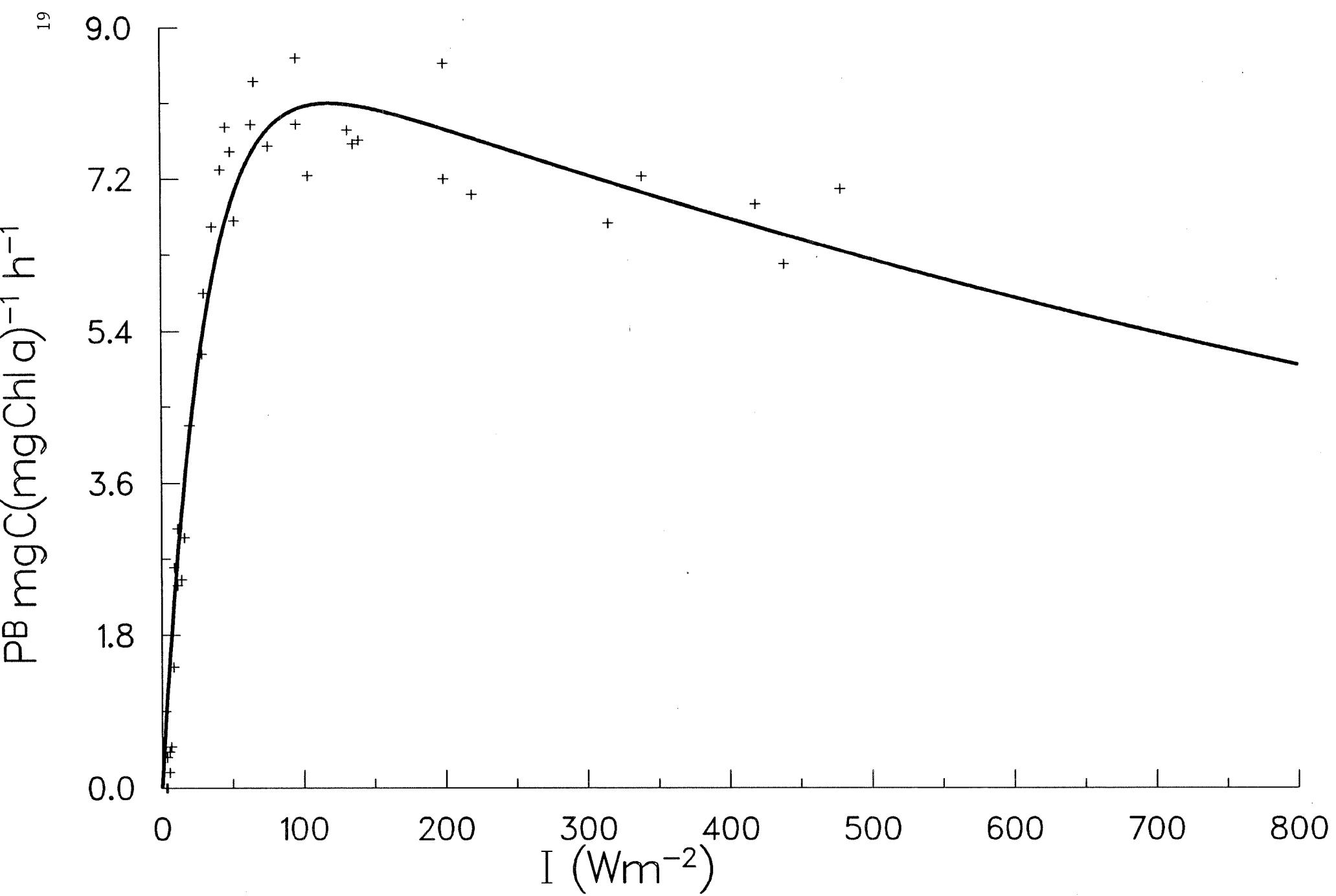
11 M



ID 8213506 STA. 9 17/08/1982 20 M



ID 8213531 STA. 11 18/08/1982 15 M

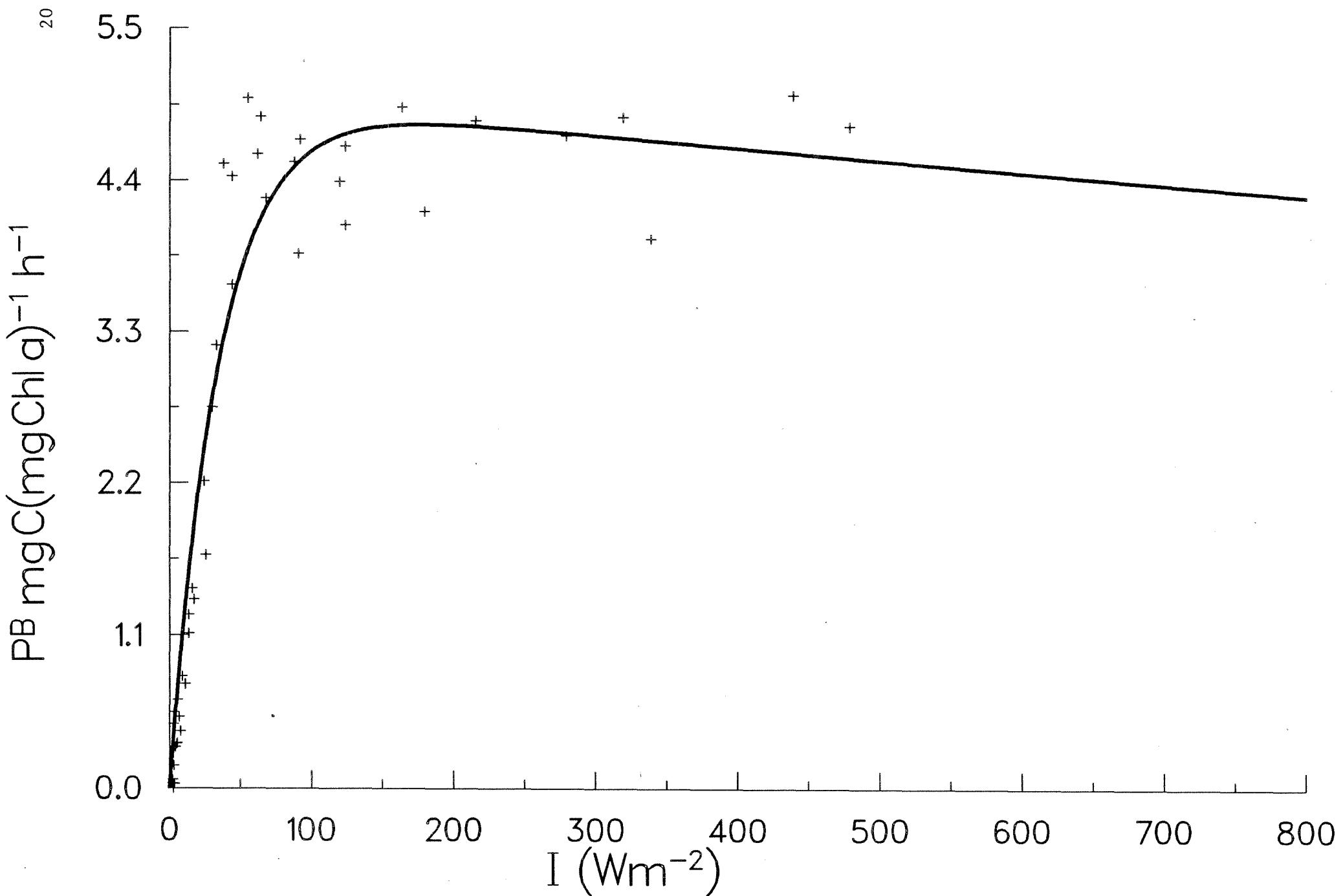


ID 8213532

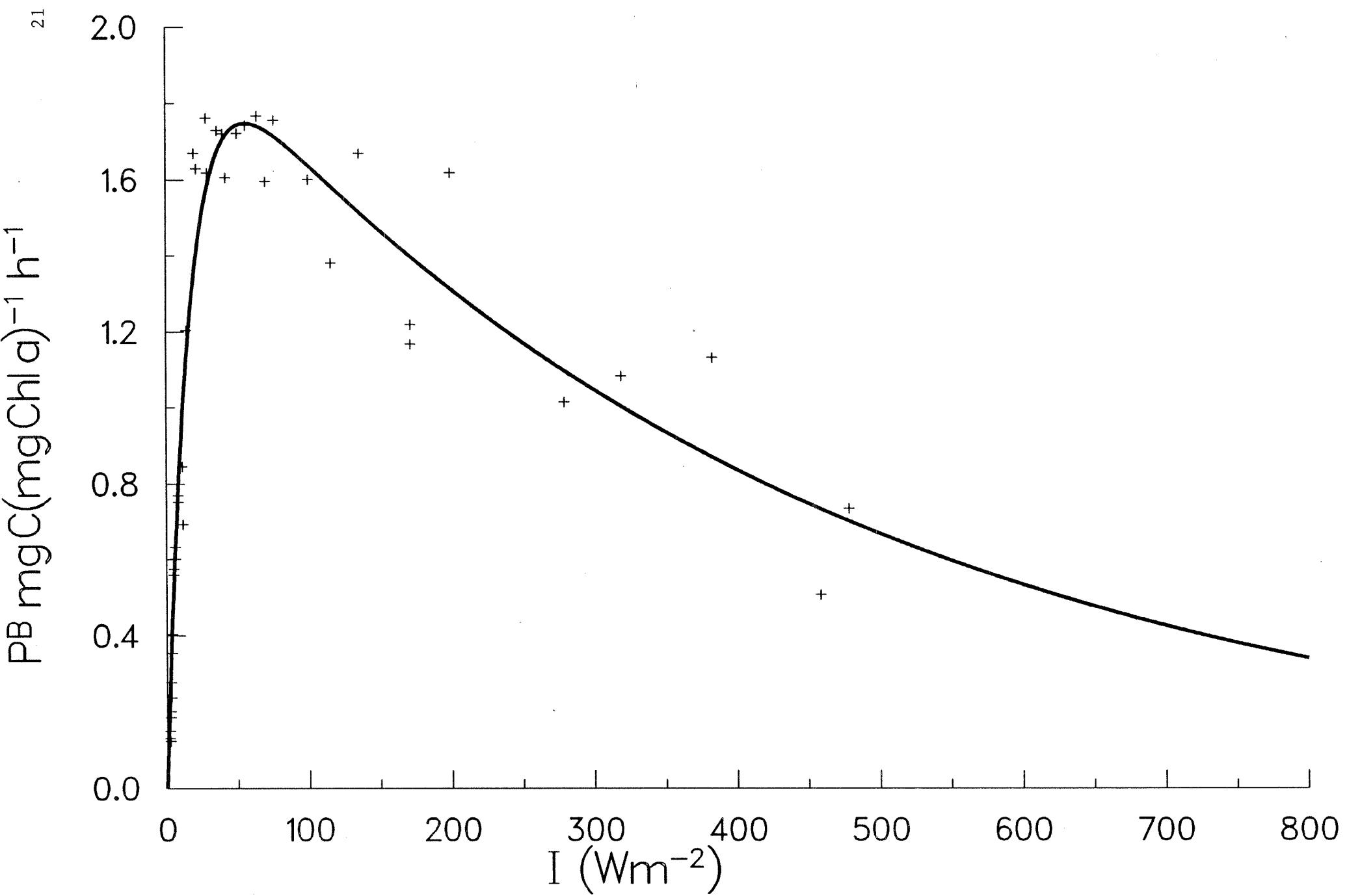
STA. 11

18/08/1982

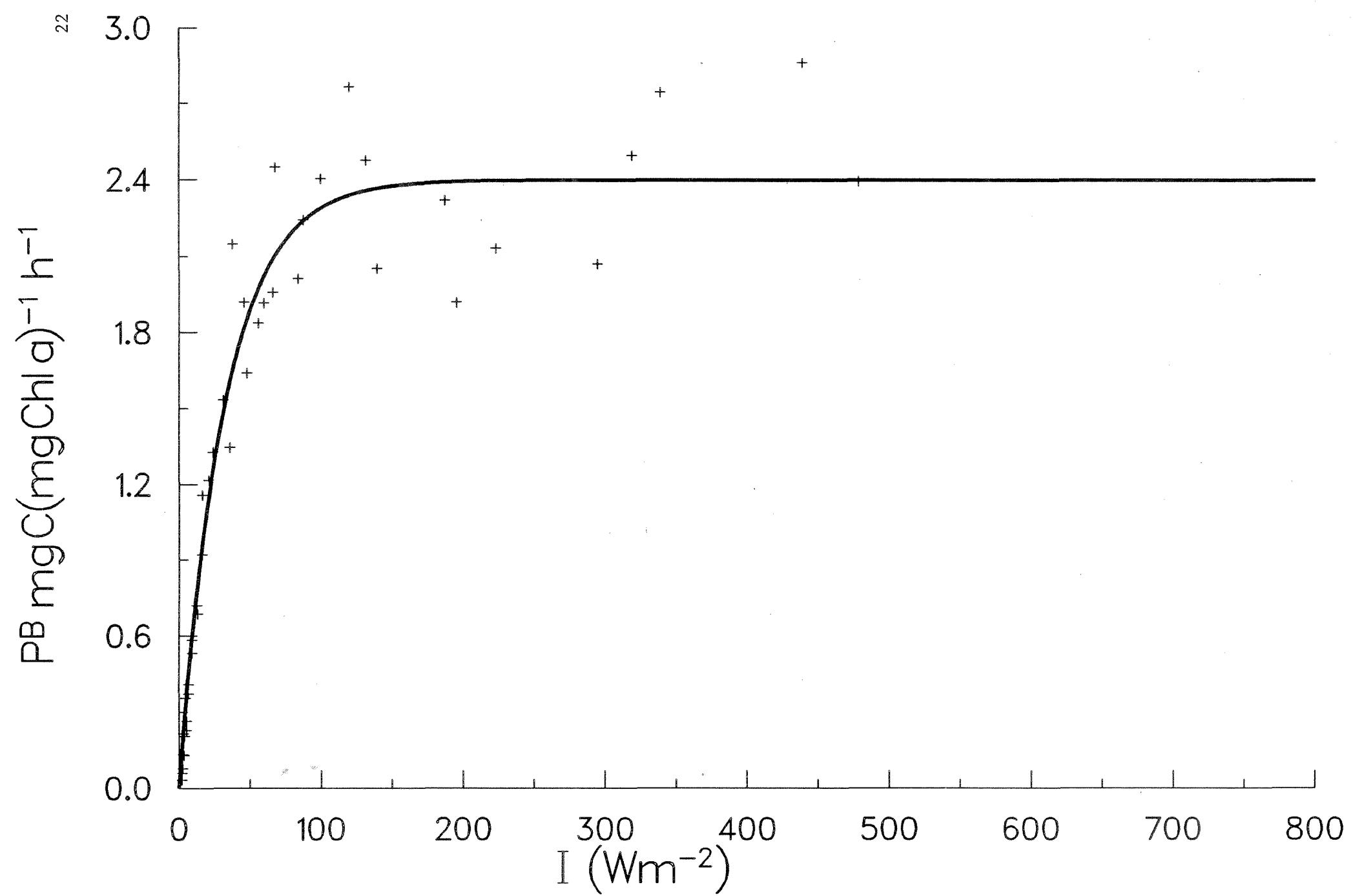
10 M



ID 8213560 STA. 13 18/08/1982 35 M



ID 8213561 STA. 13 18/08/1982 10 M

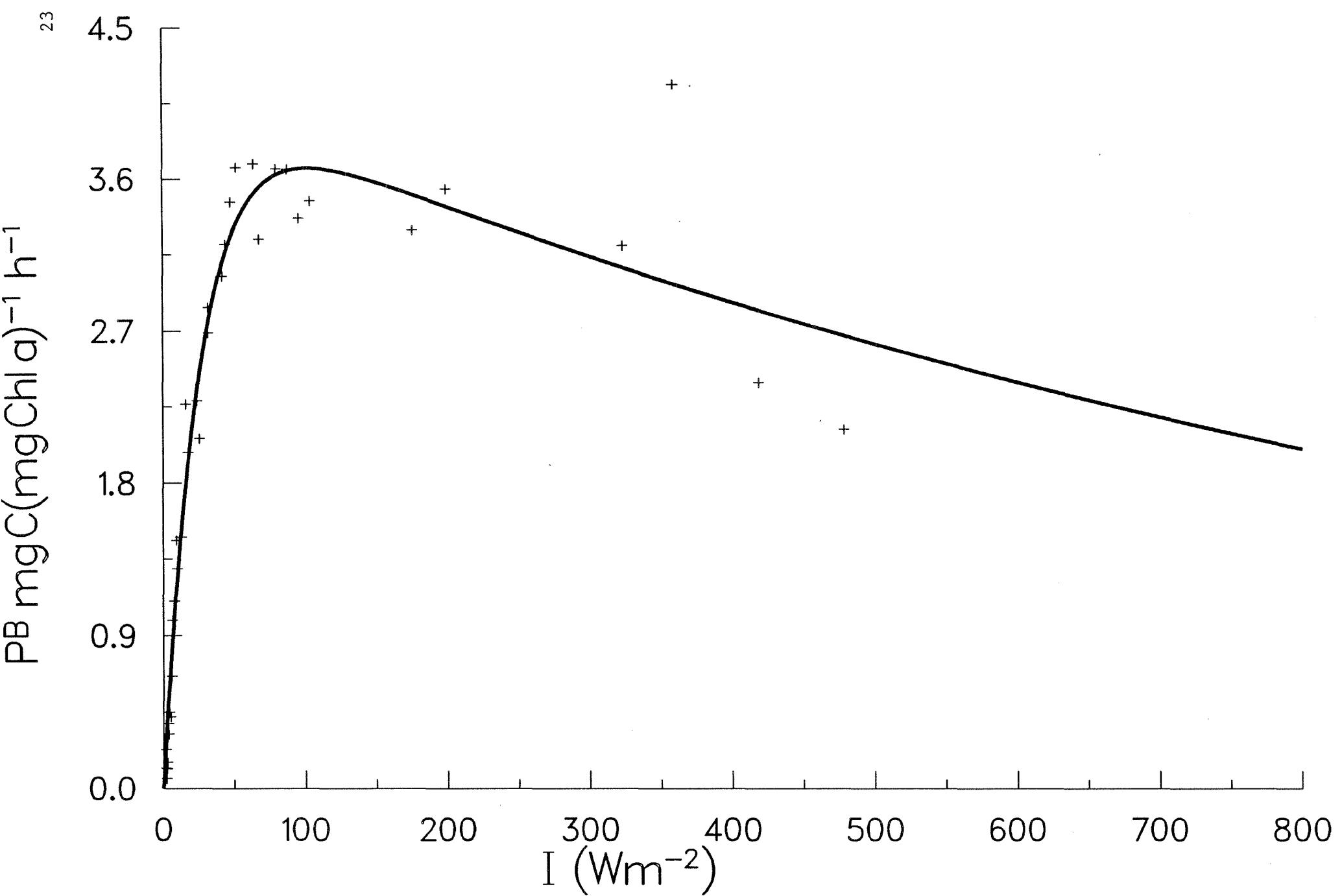


ID 8213589

STA. 15

18/08/1982

19 M

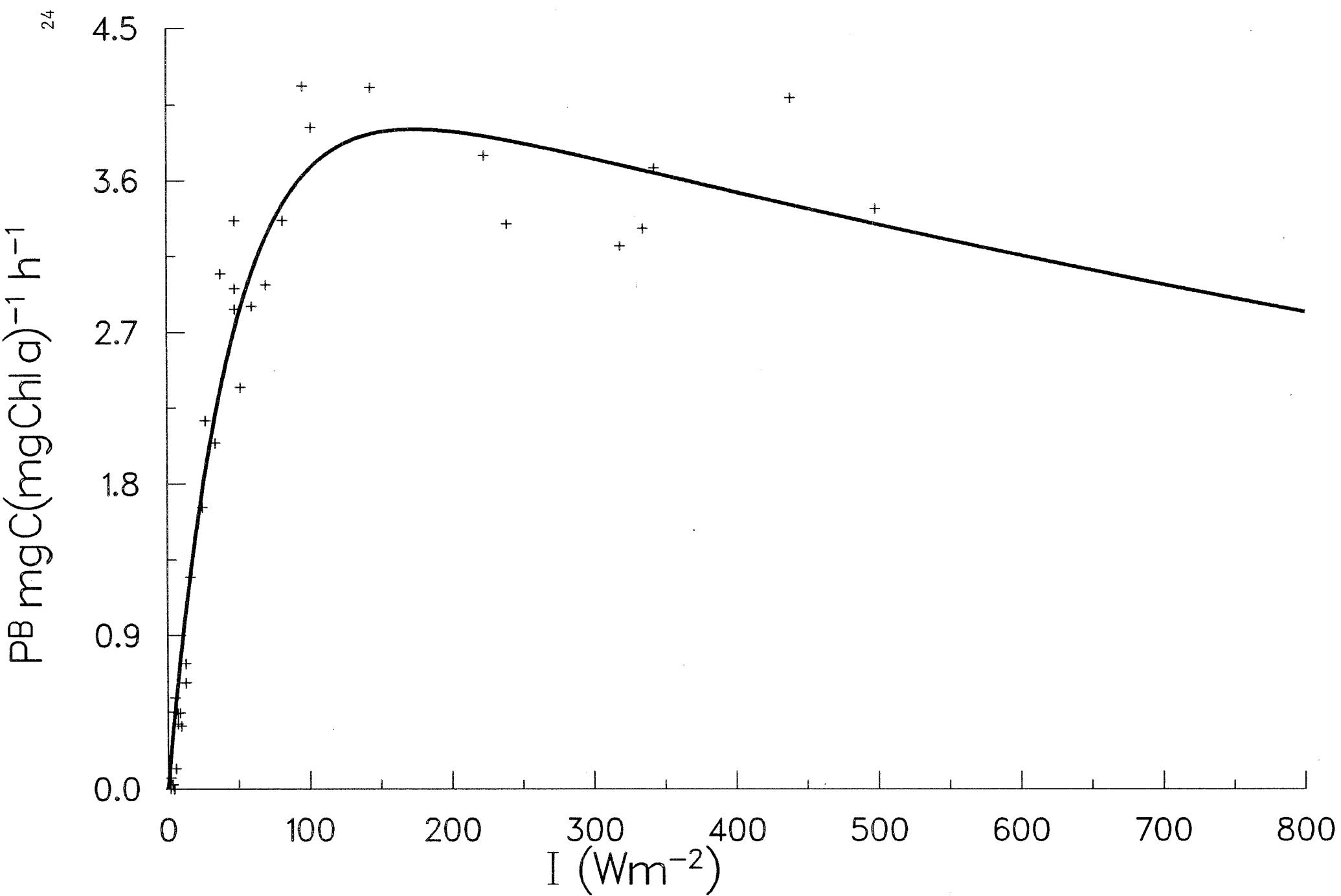


ID 8213590

STA. 15

18/08/1982

10 M

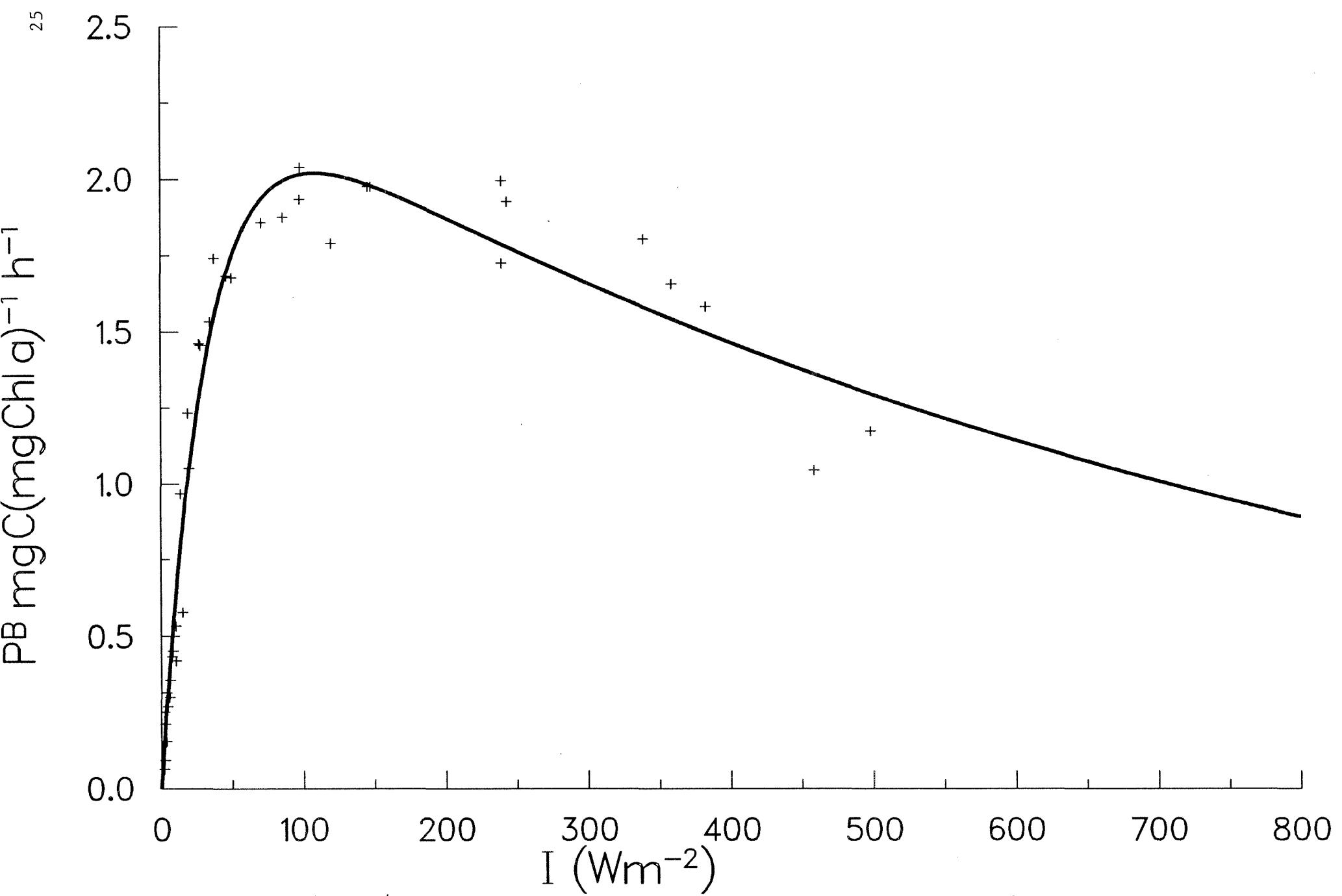


ID 8213614

STA. 17

19/08/1982

30 M

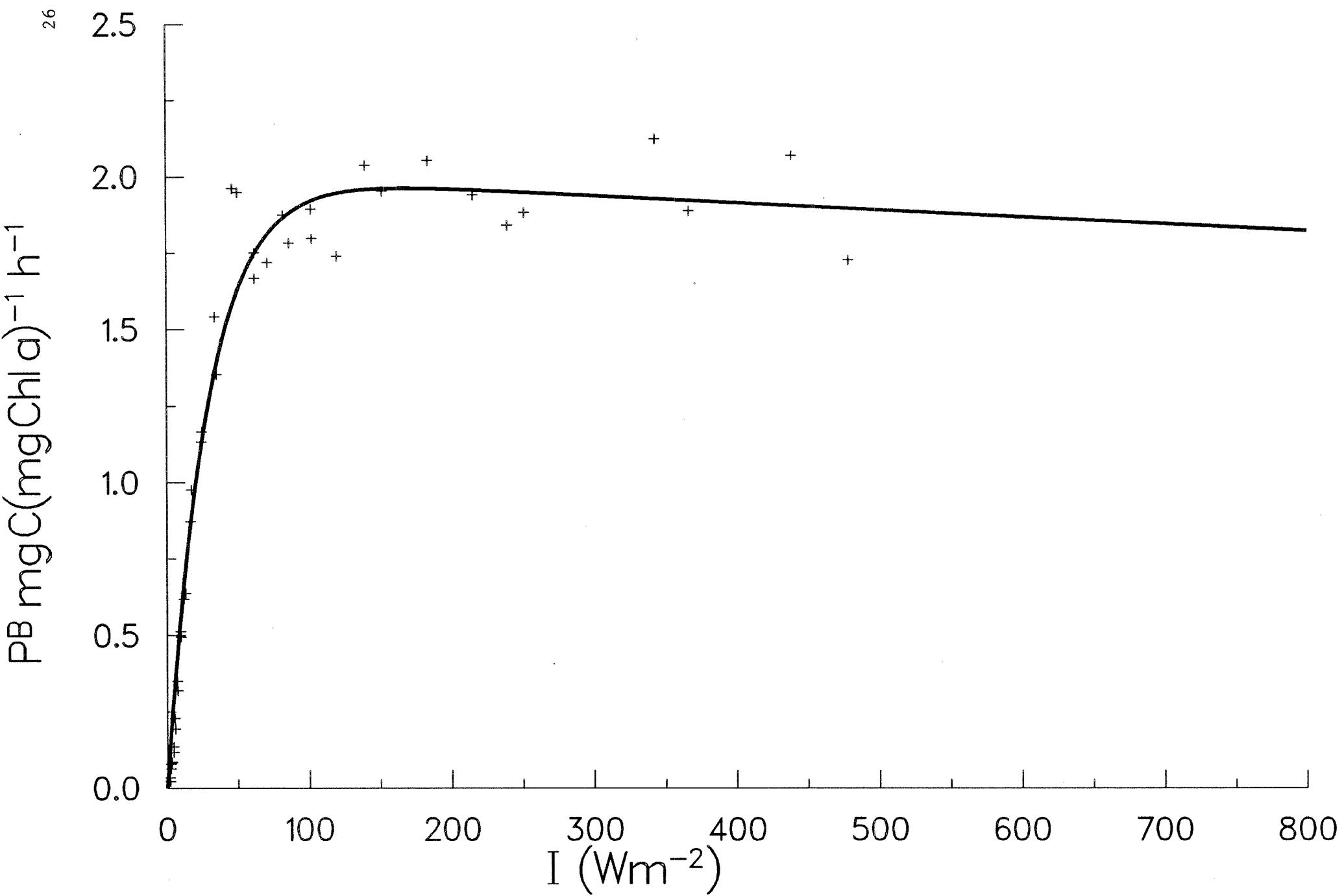


ID 8213615

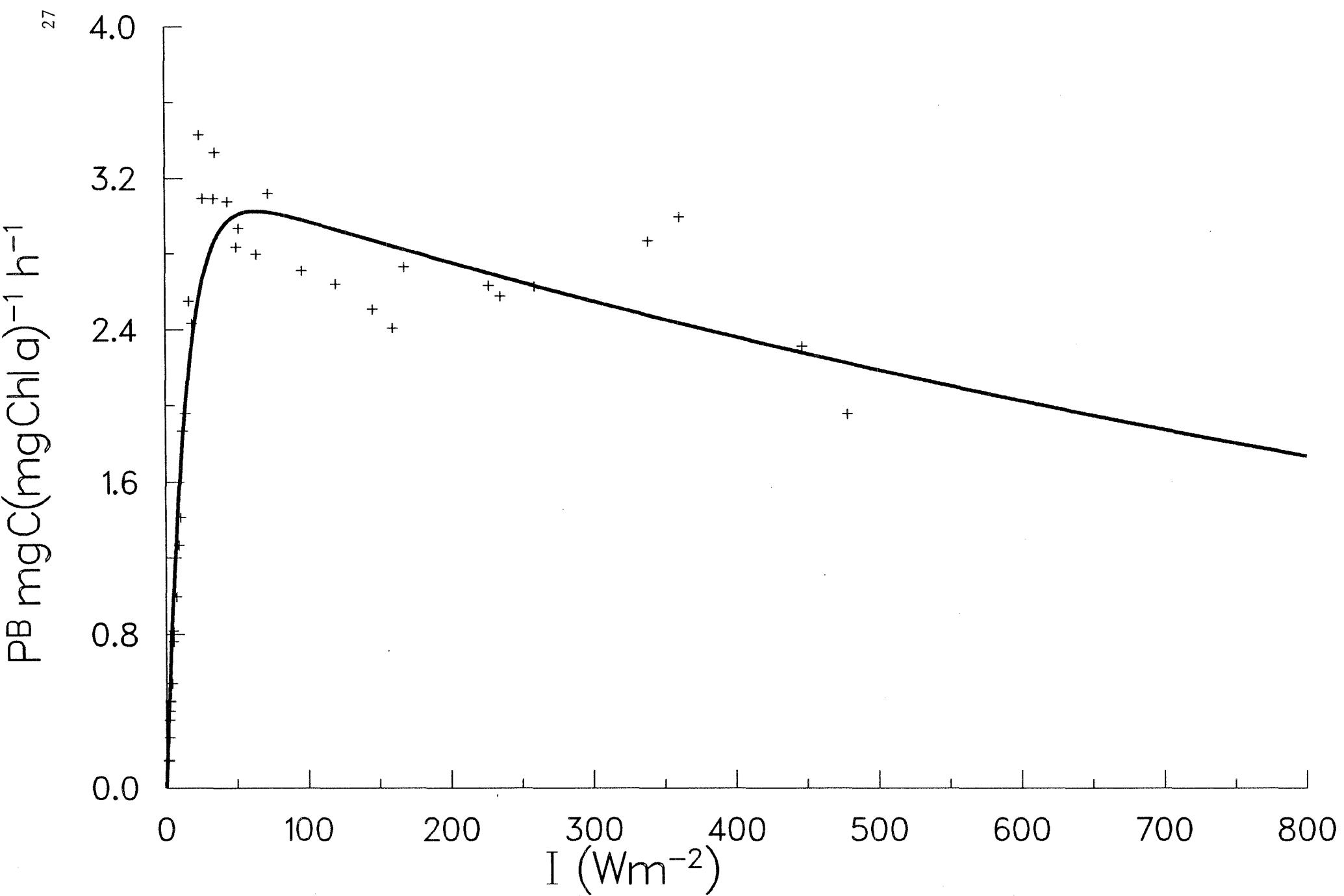
STA. 17

19/08/1982

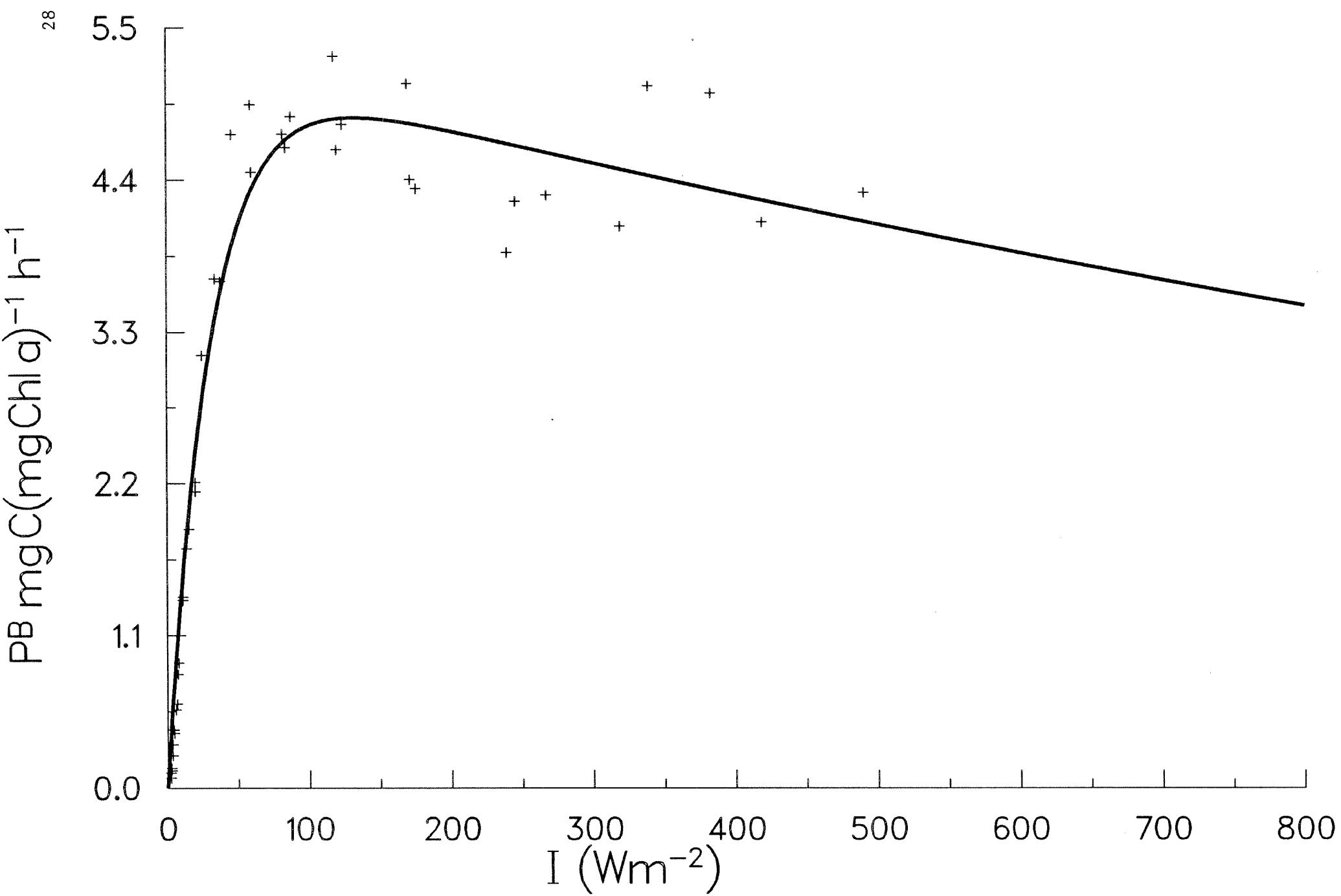
10 M



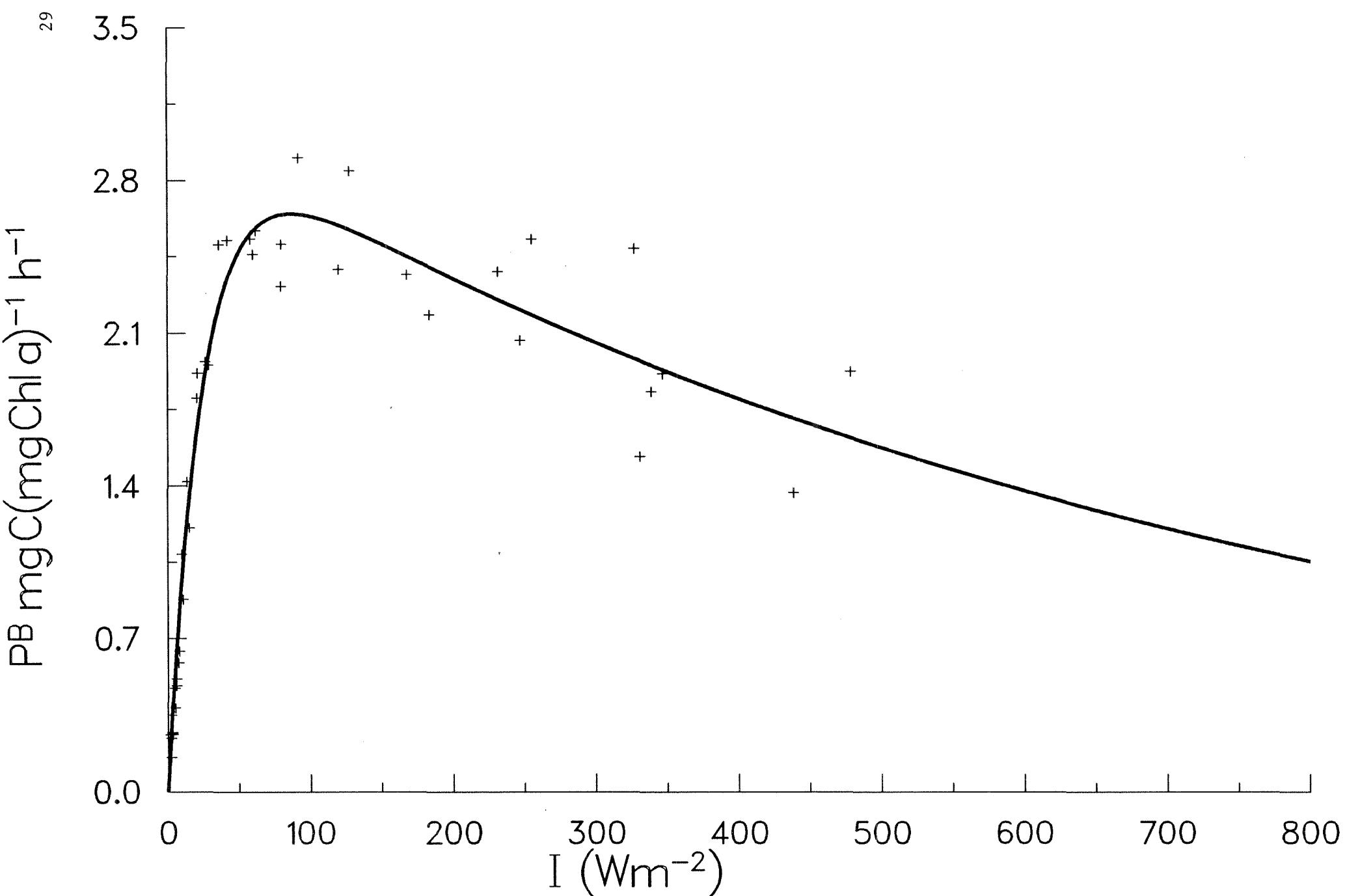
ID 8213690 STA. 24 20/08/1982 45 M



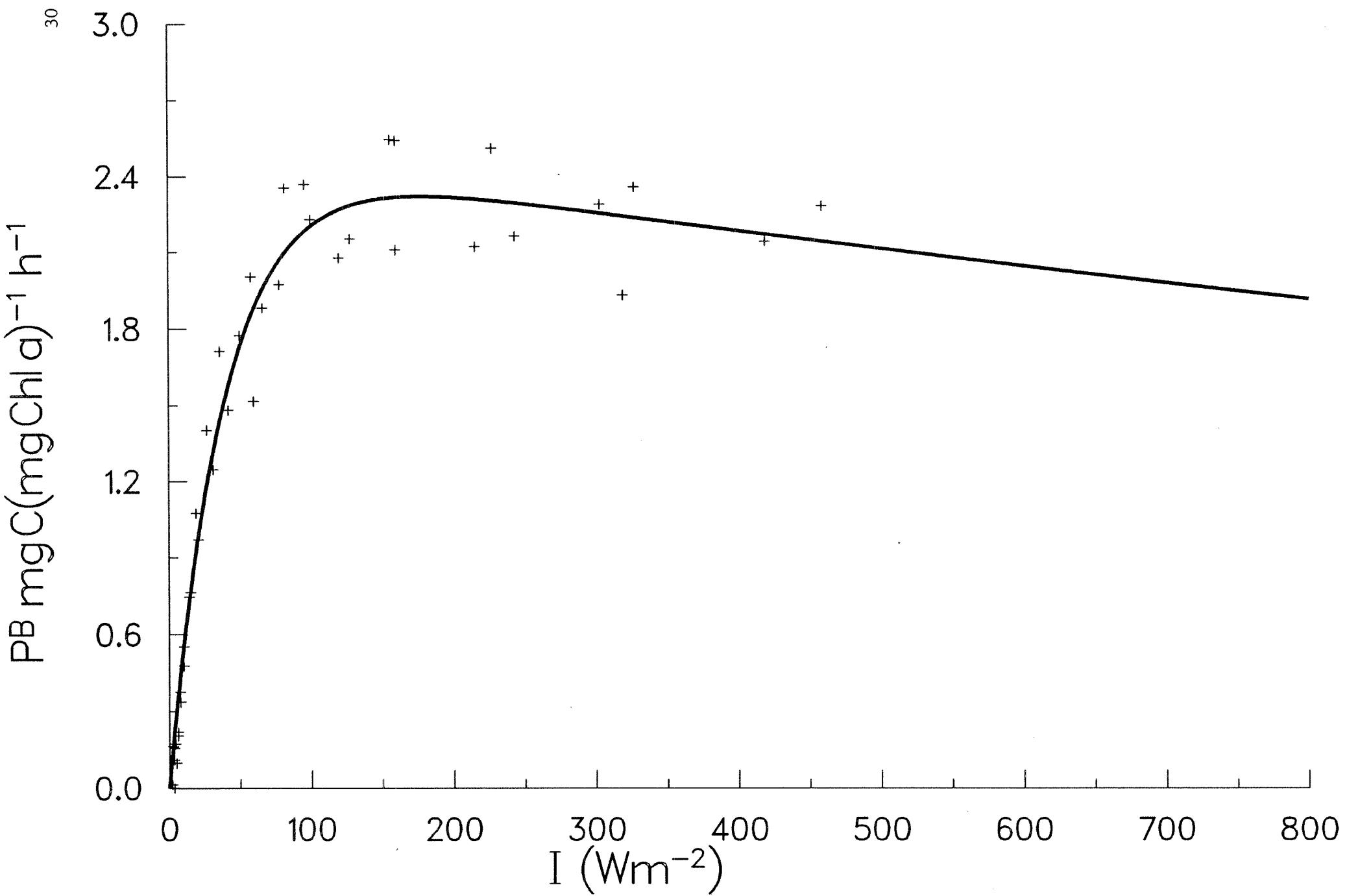
ID 8213691 STA. 24 20/08/1982 10 M



ID 8213738 STA. 28 21/08/1982 45 M



ID 8213739 STA. 28 21/08/1982 10 M

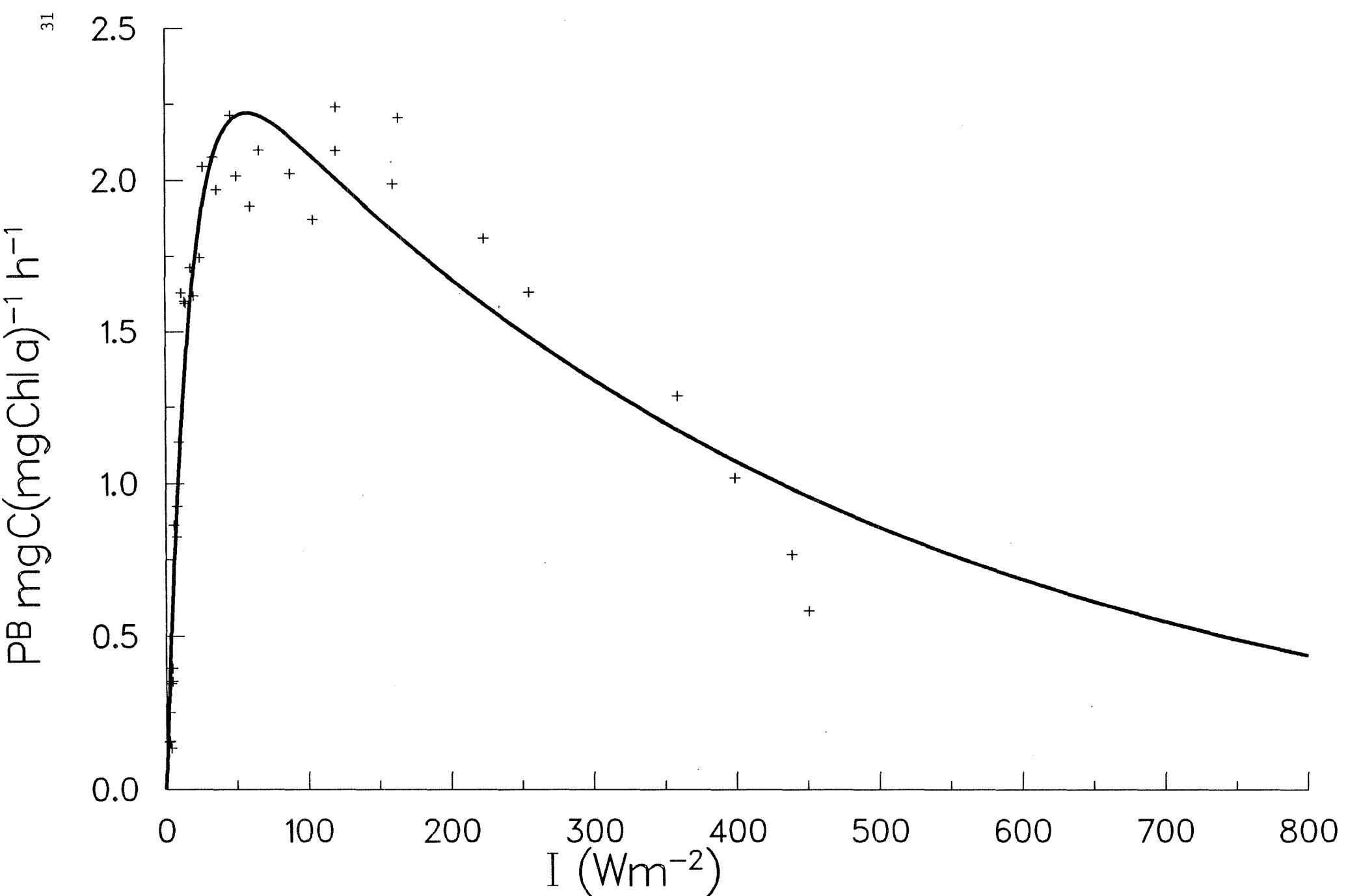


ID 8213809

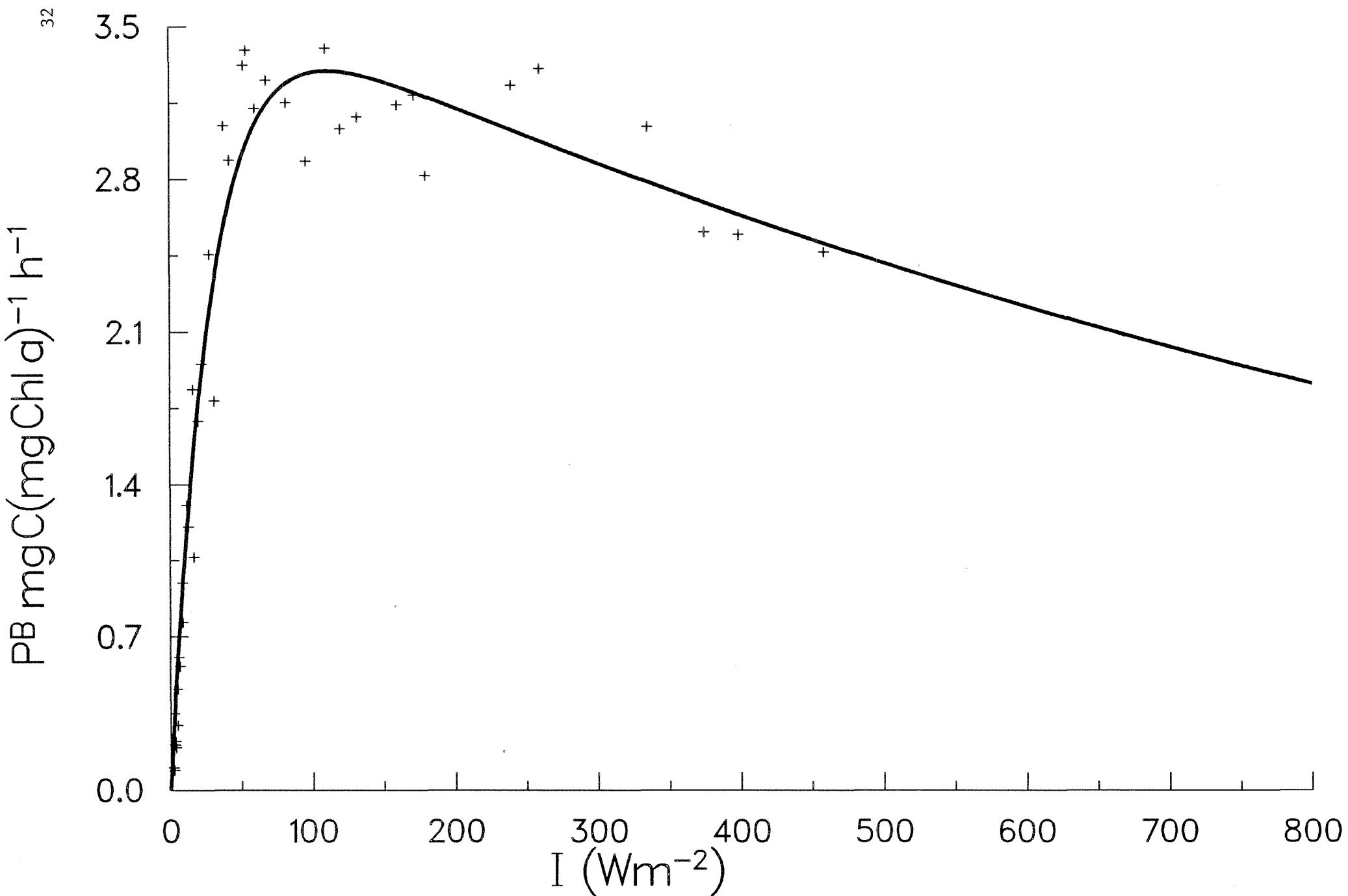
STA. 32

22/08/1982

45 M



ID 8213810 STA. 32 22/08/1982 10 M

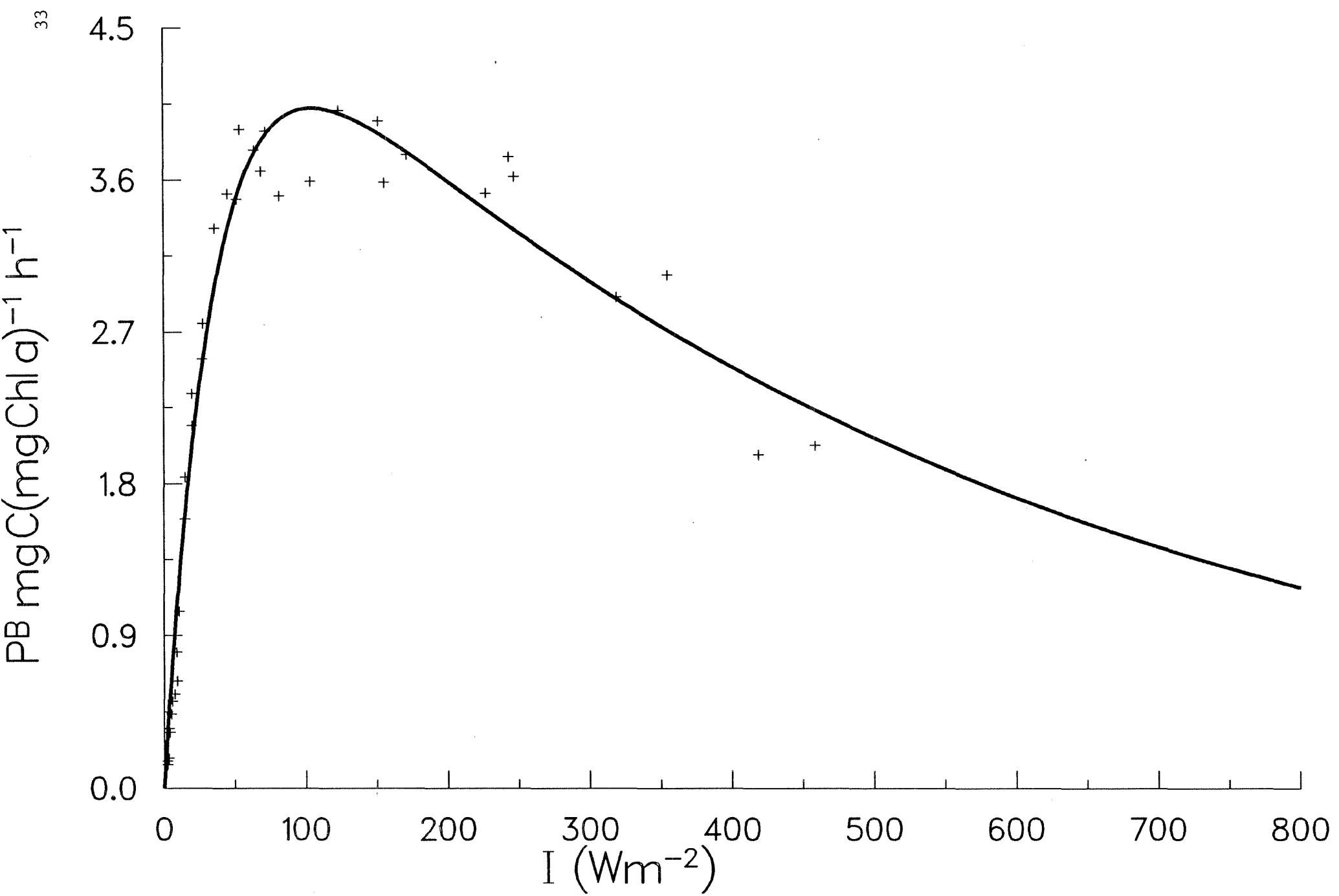


ID 8213852

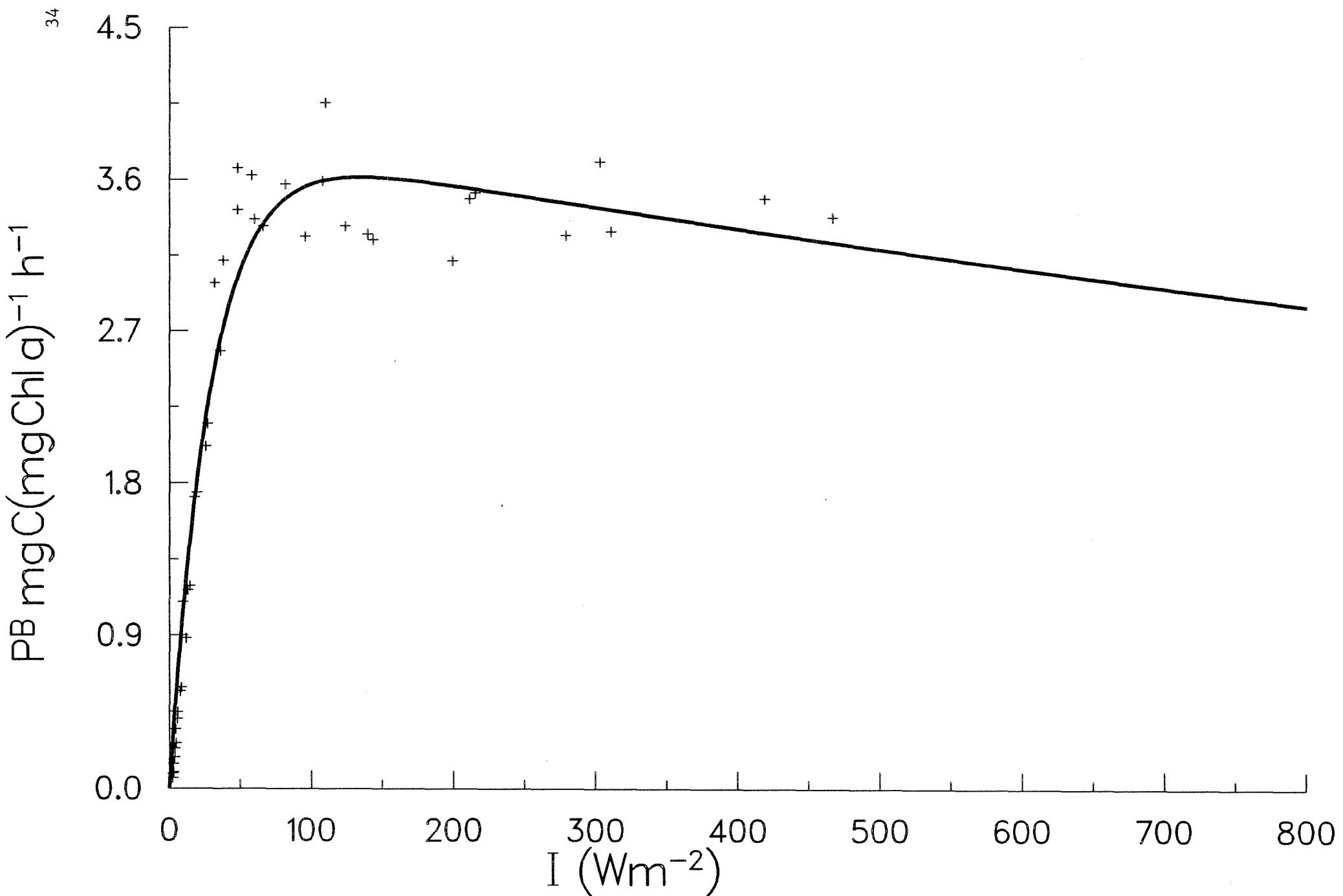
STA. 41

23/08/1982

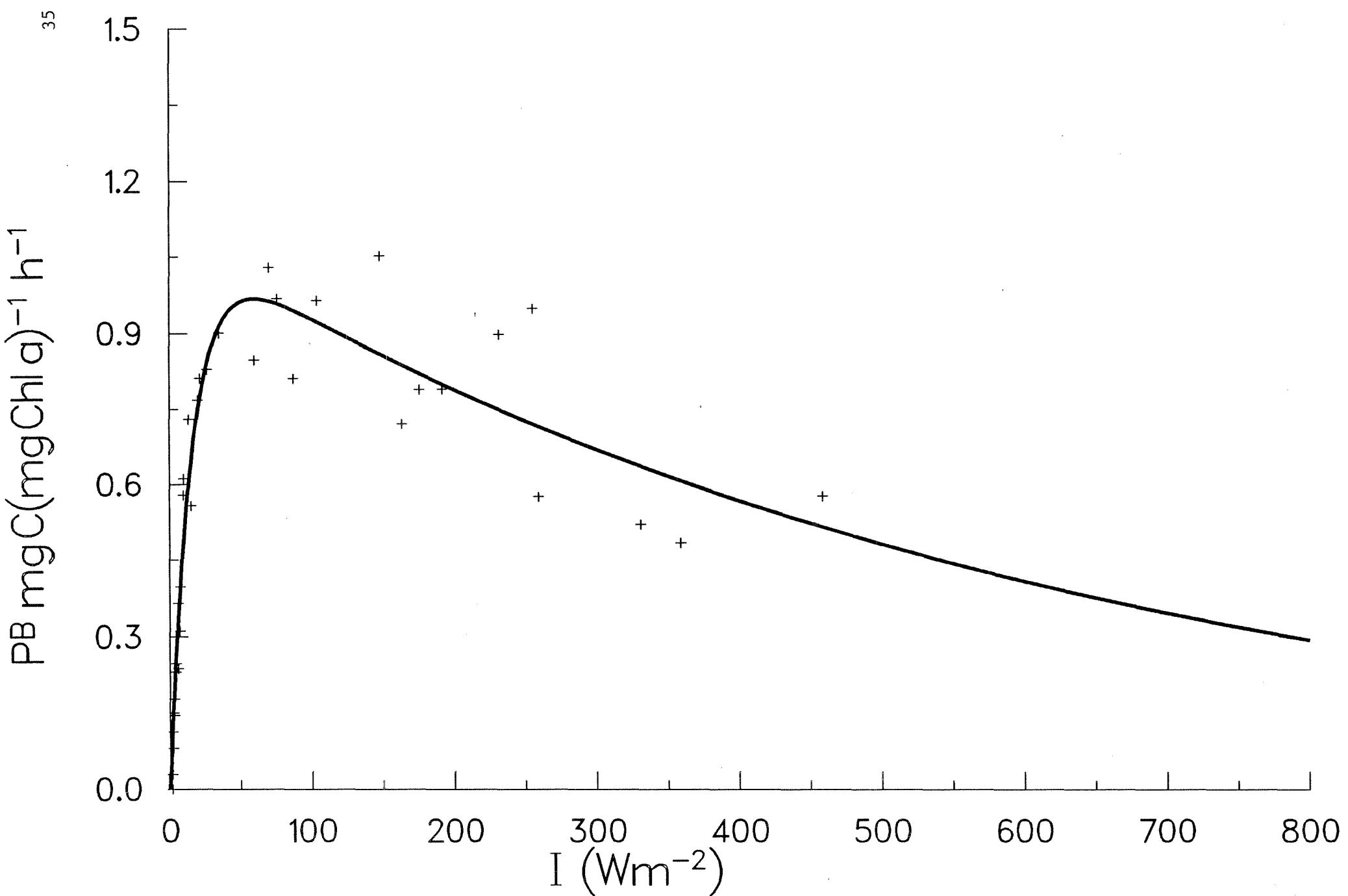
25 M



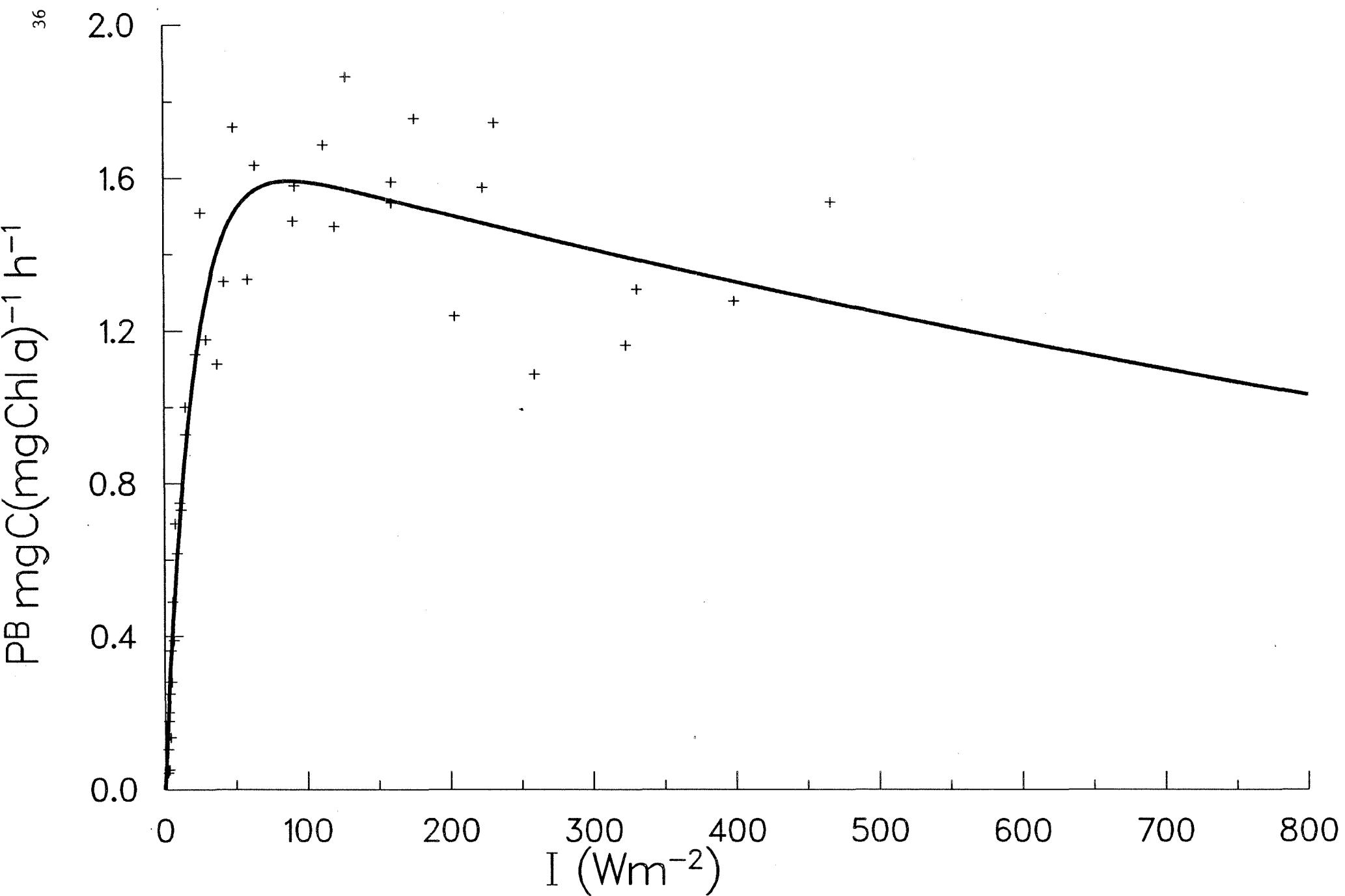
ID 8213853 STA. 41 23/08/1982 10 M



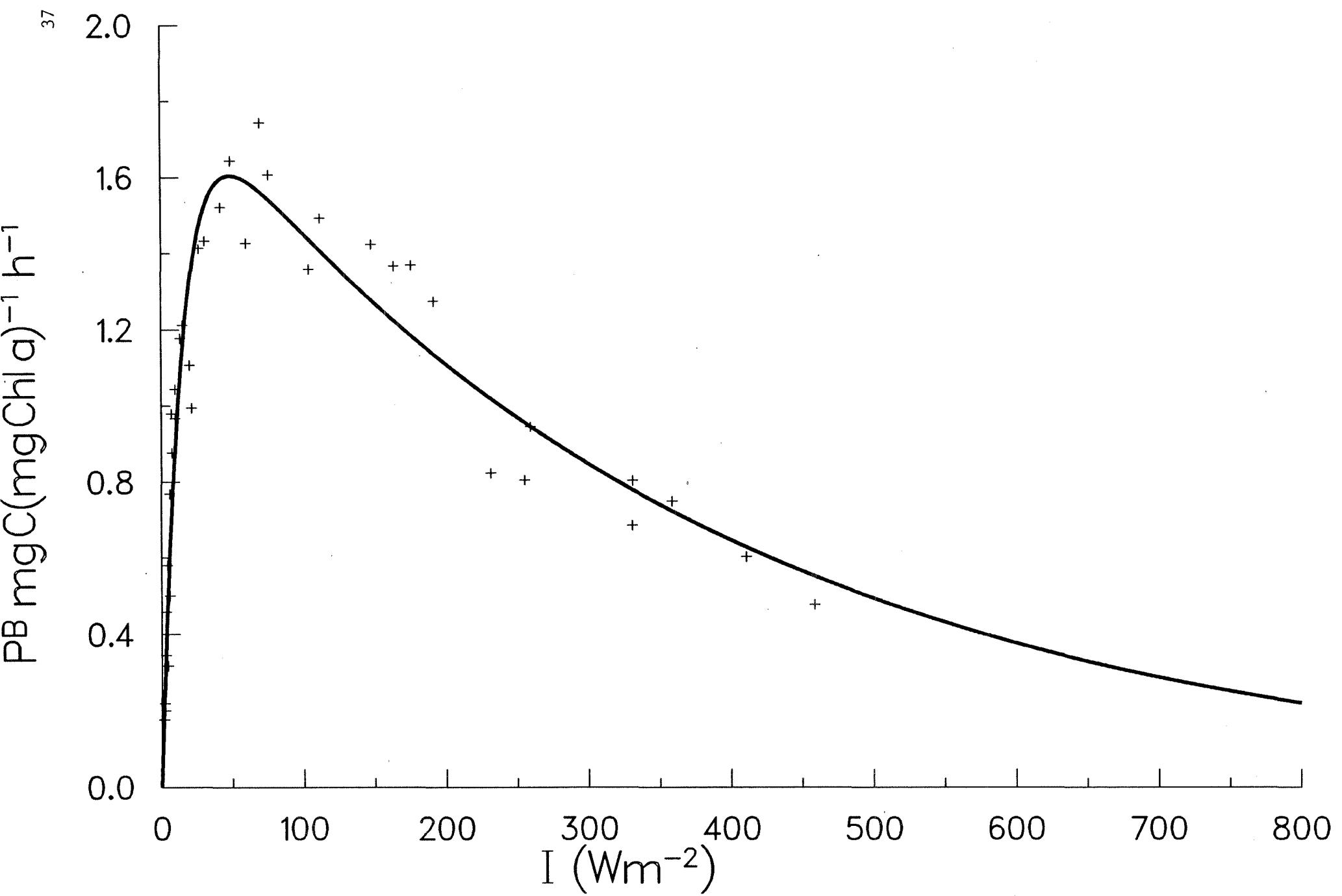
ID 8213867 STA. 44 24/08/1982 45 M



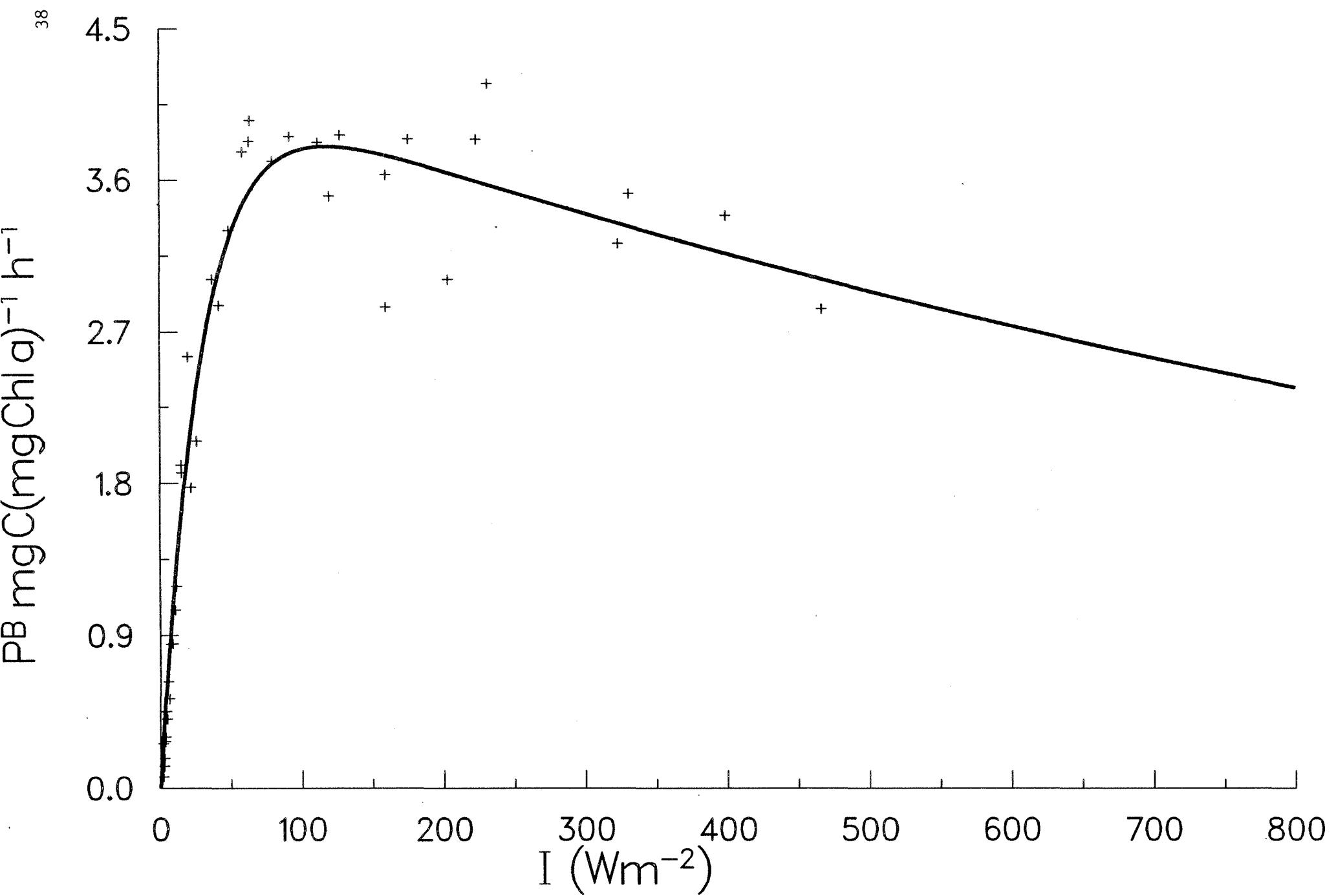
ID 8213868 STA. 44 24/08/1982 10 M



ID 8213932 STA. 48 25/08/1982 25 M



ID 8213933 STA. 48 25/08/1982 10 M

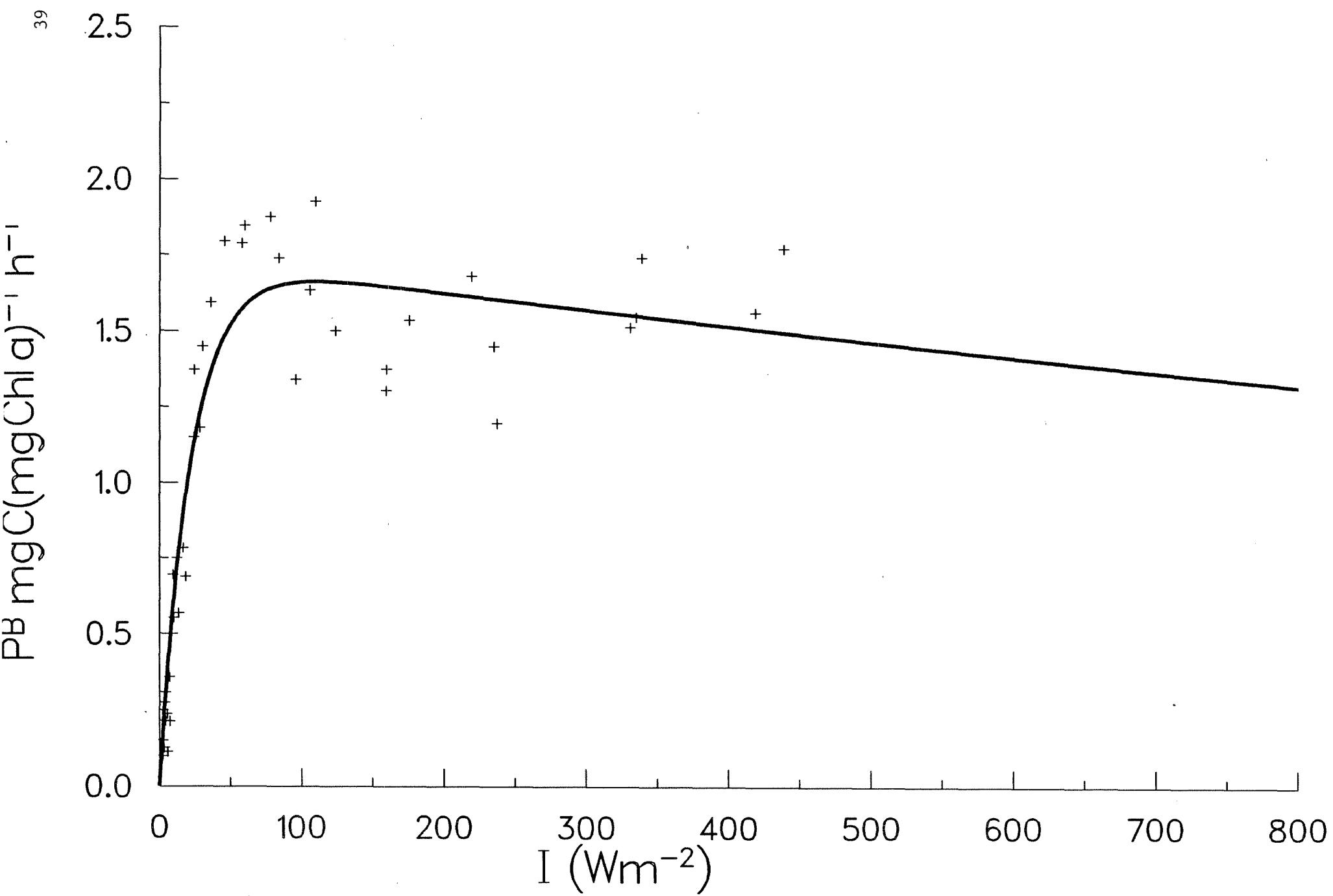


ID 8214014

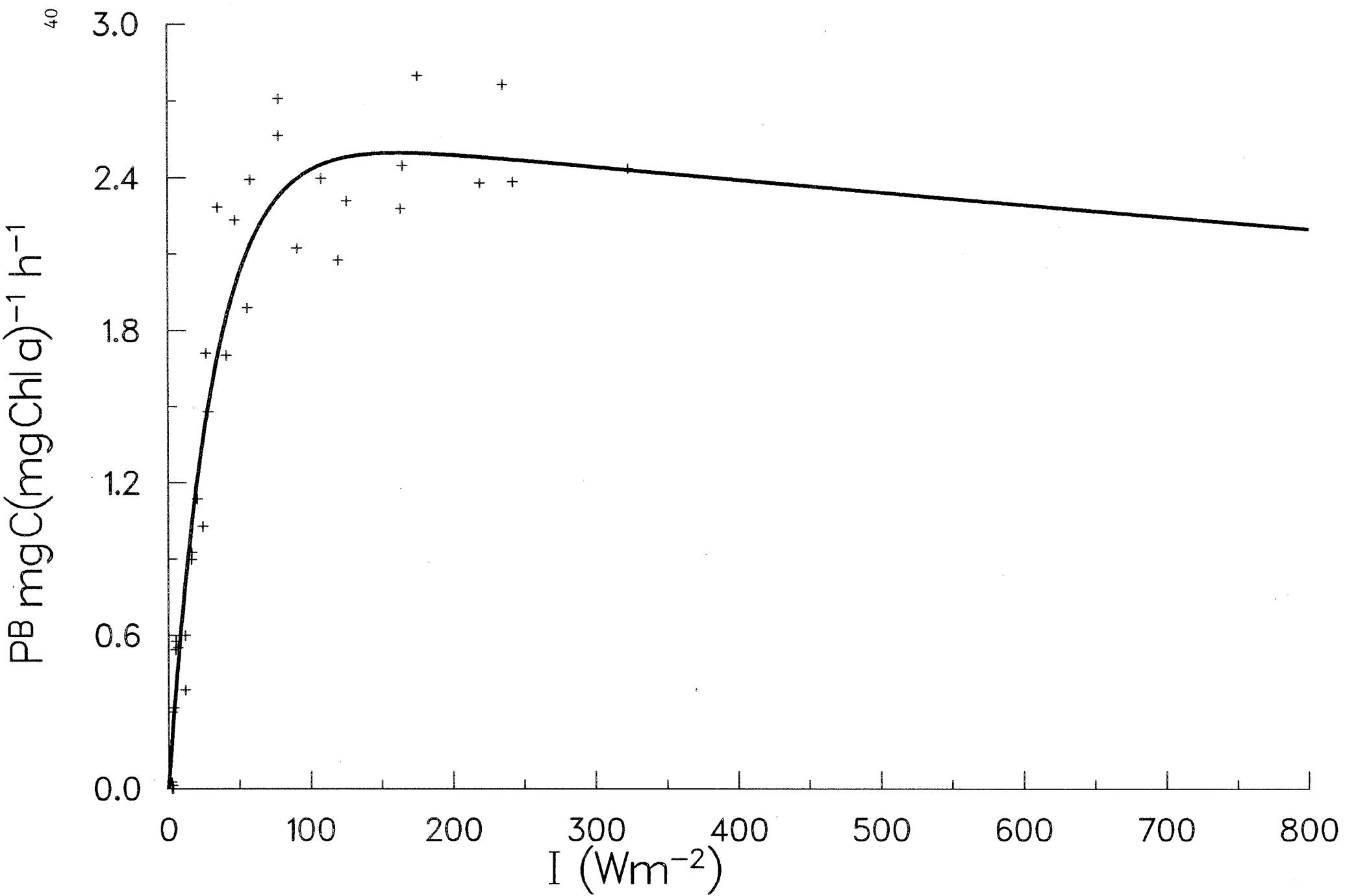
STA. 52

26/08/1982

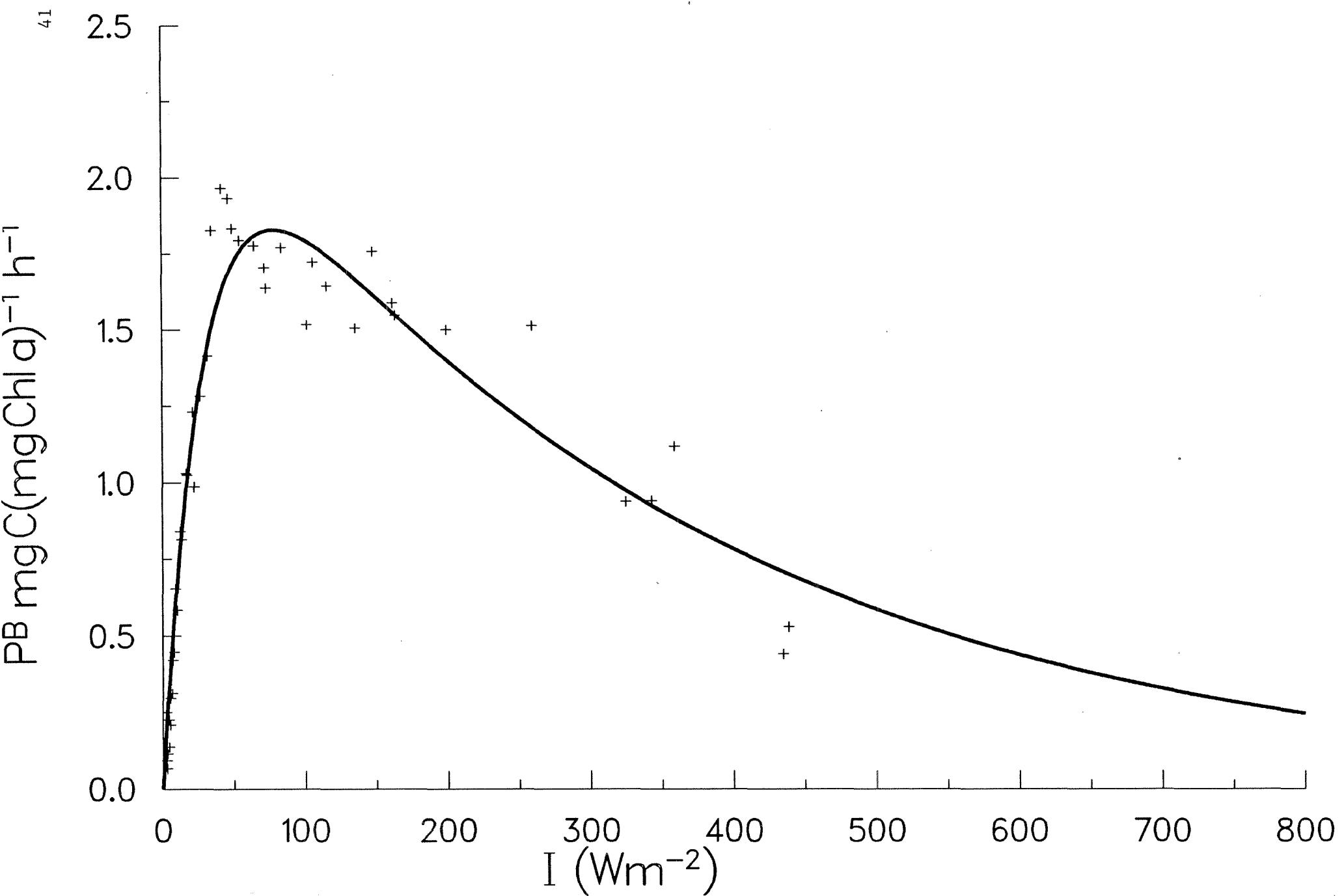
25 M



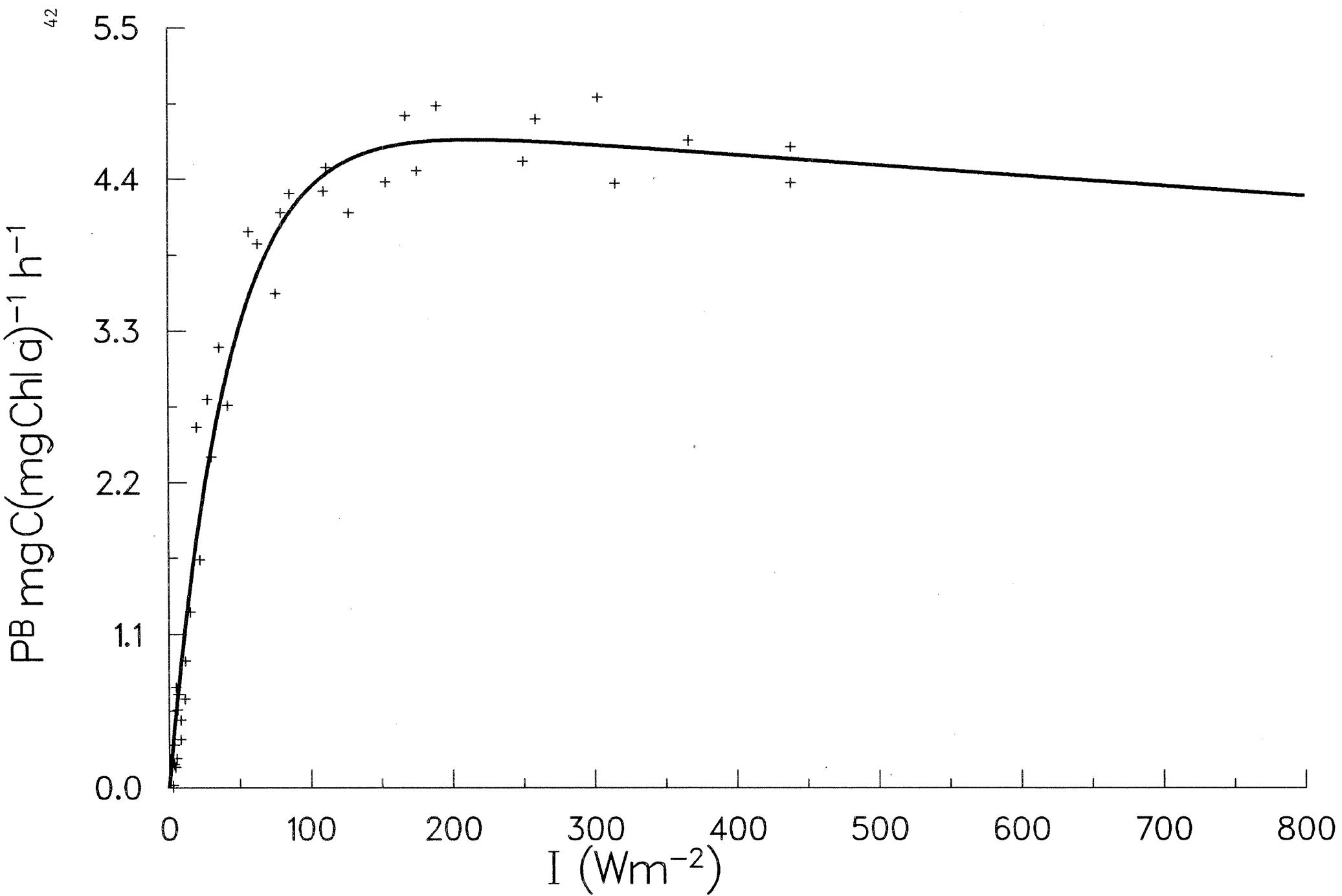
ID 8214015 STA. 52 26/08/1982 10 M



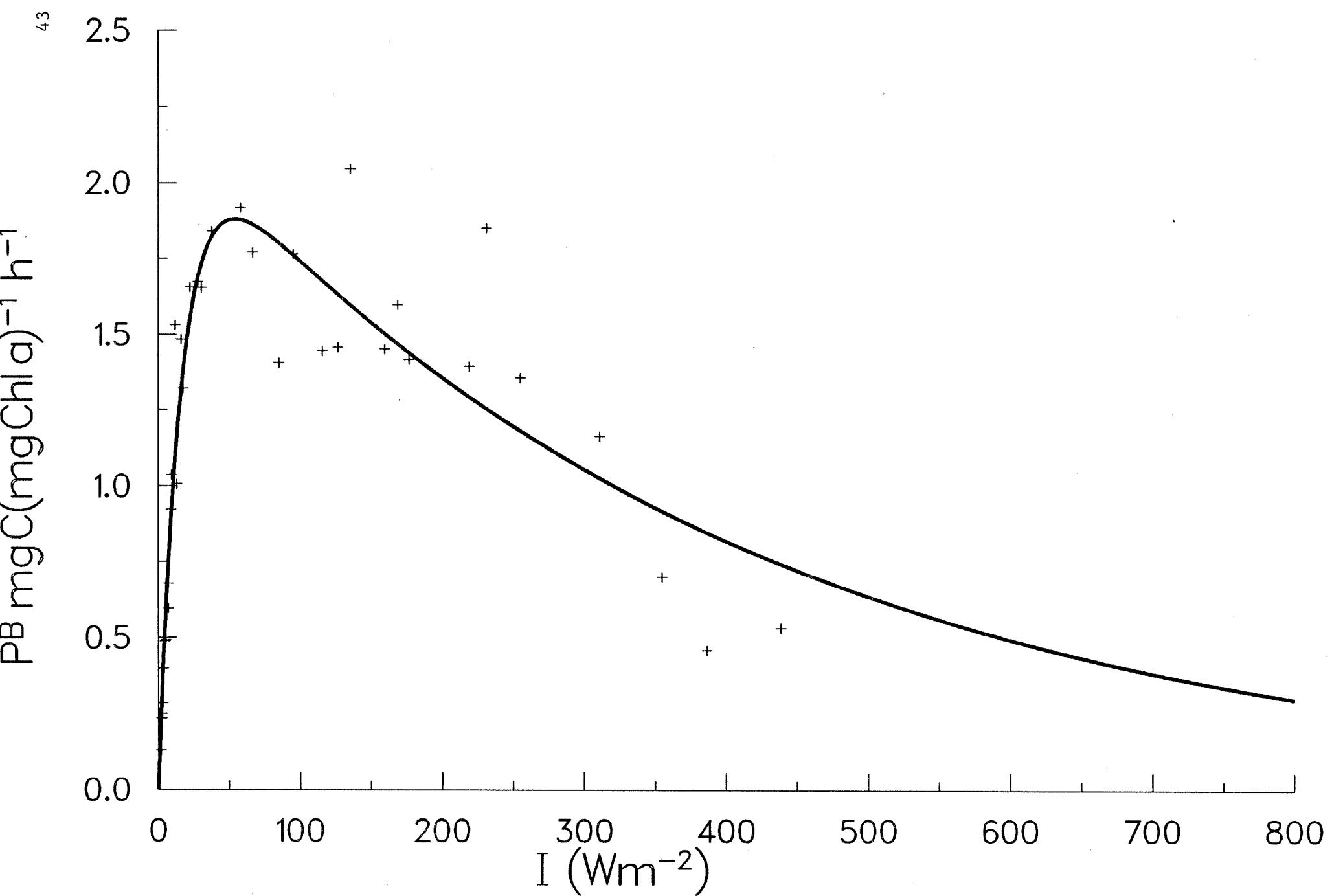
ID 8214084 STA. 56 27/08/1982 30 M



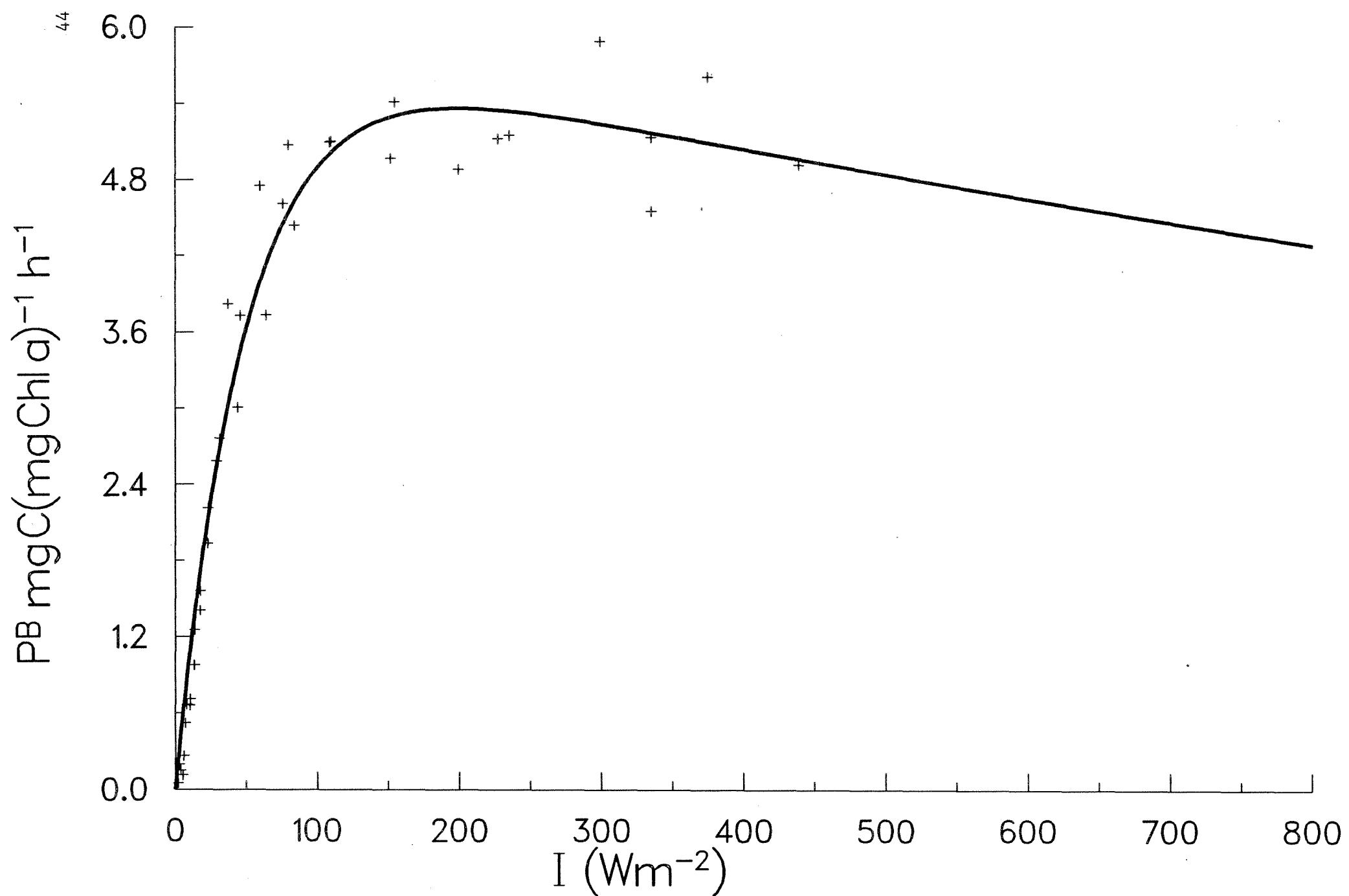
ID 8214085 STA. 56 27/08/1982 10 M



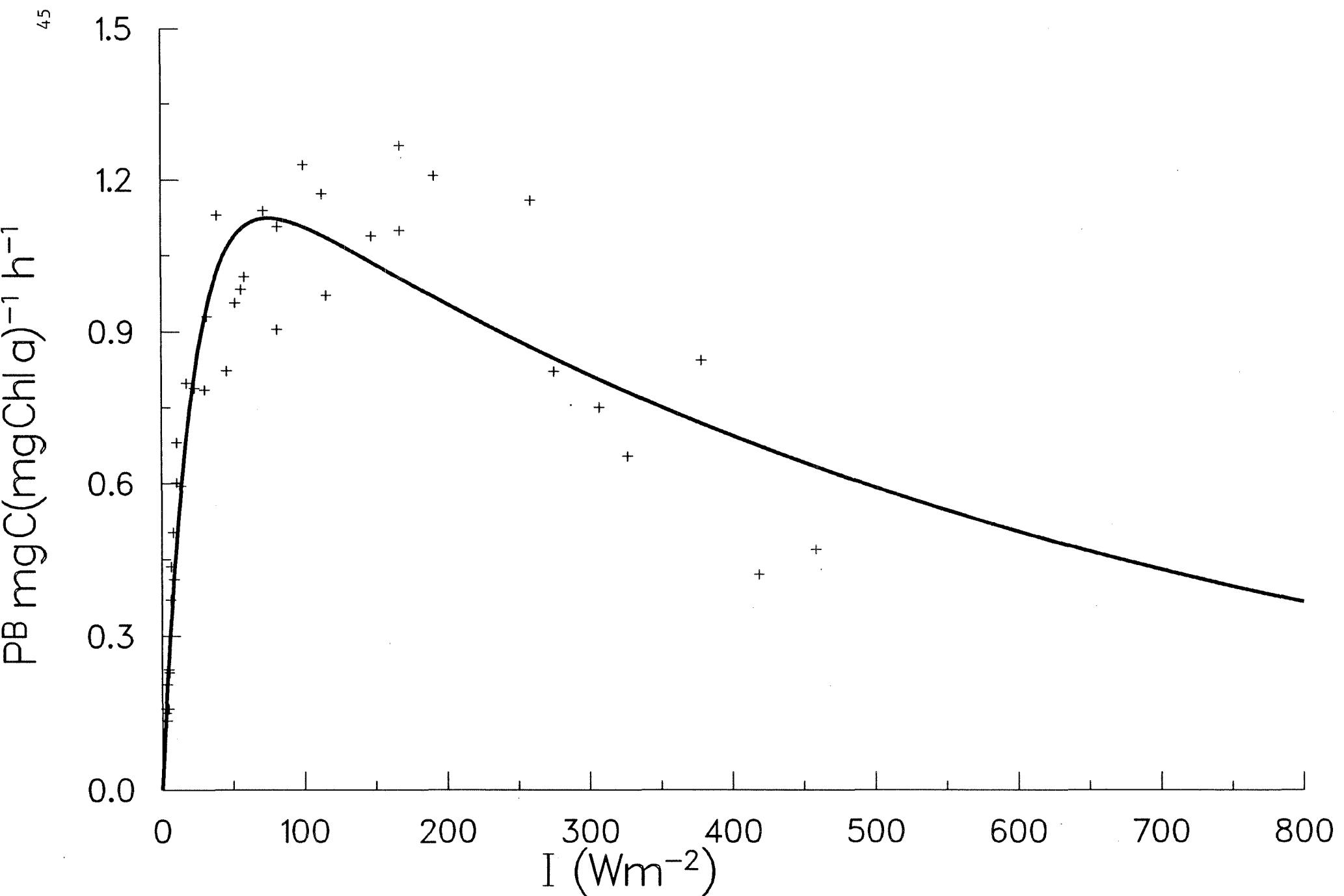
ID 8214160 STA. 58 28/08/1982 40 M



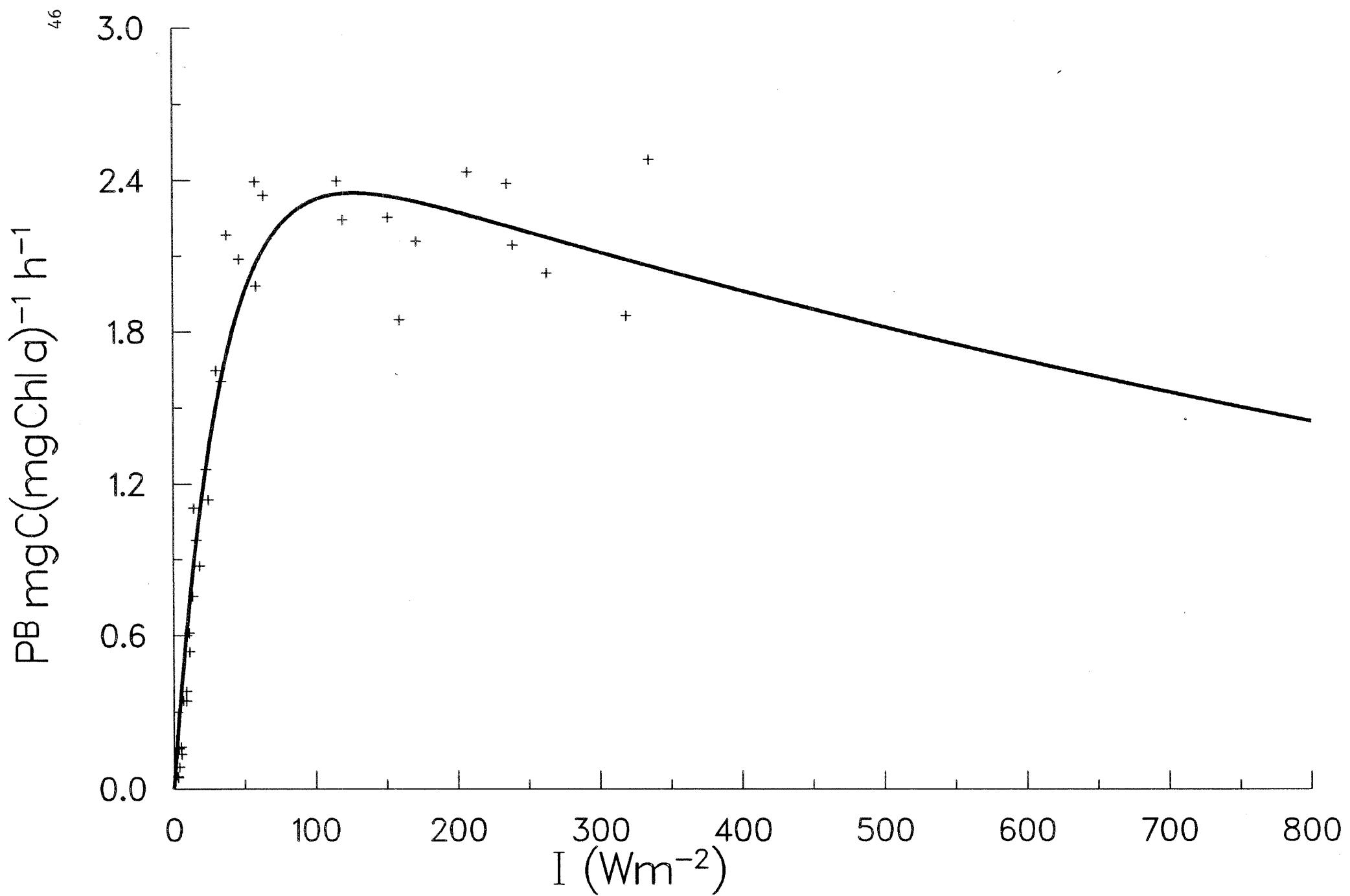
ID 8214161 STA. 58 28/08/1982 10 M



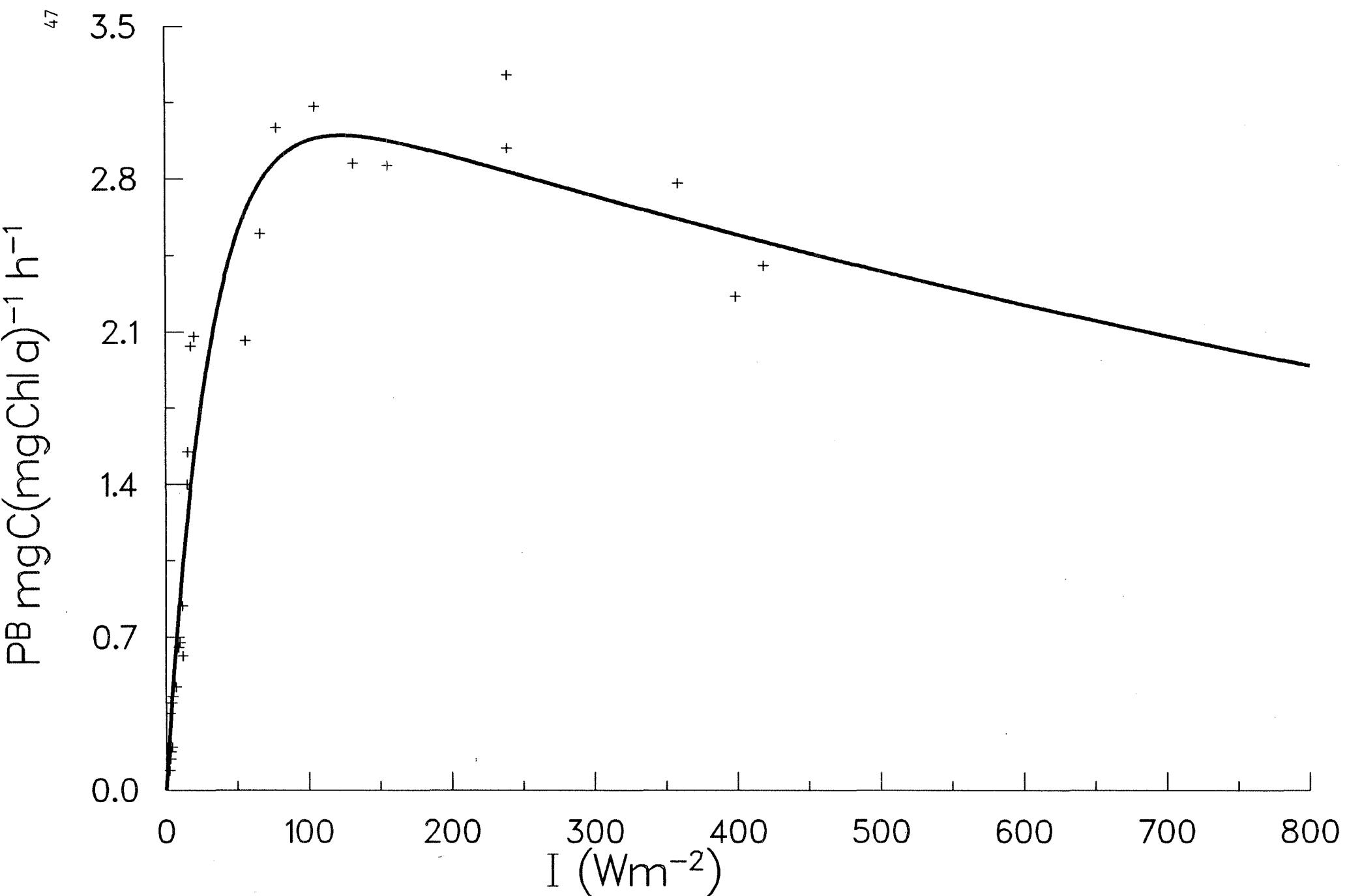
ID 8214207 STA. 60 29/08/1982 40 M



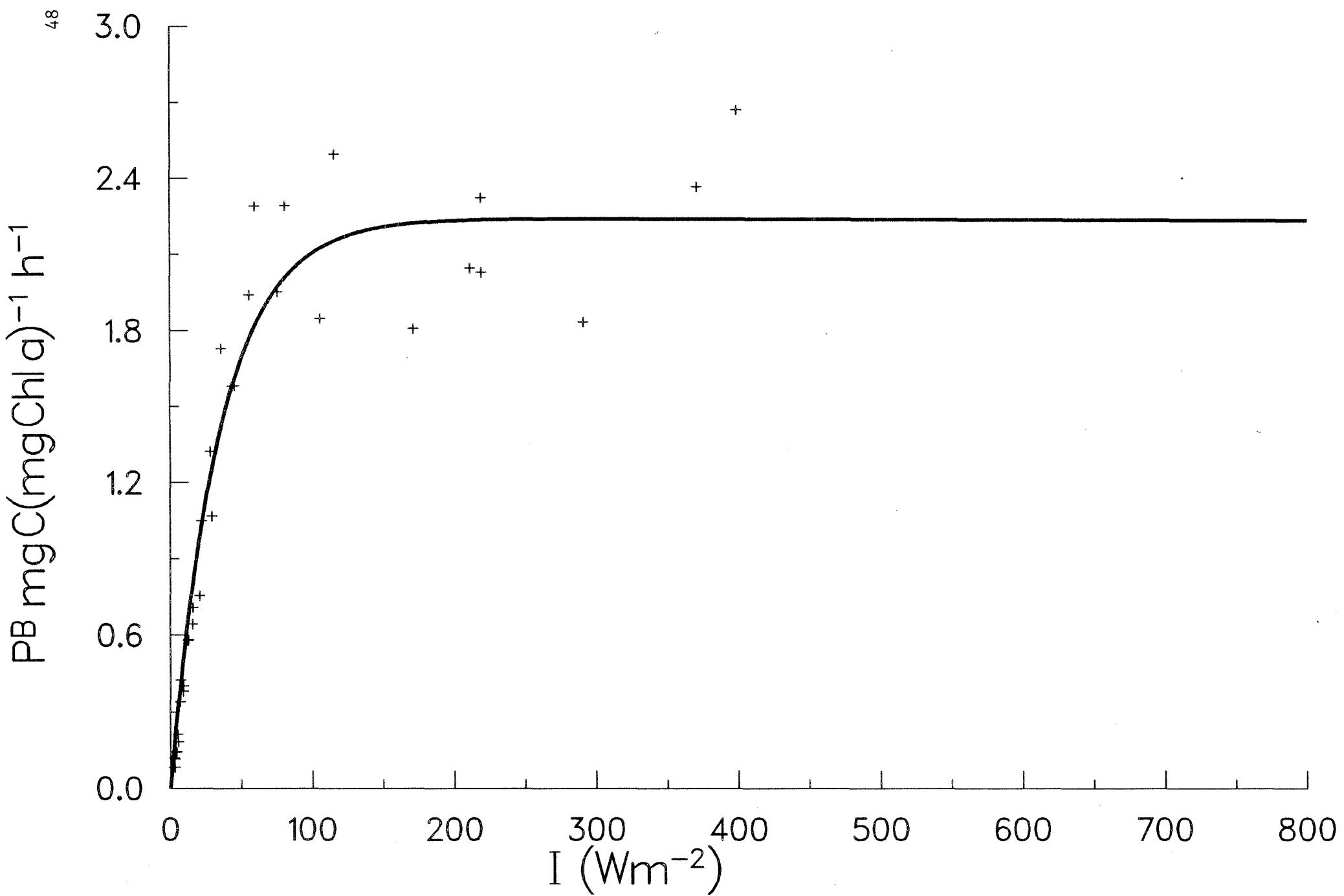
ID 8214208 STA. 60 29/08/1982 10 M



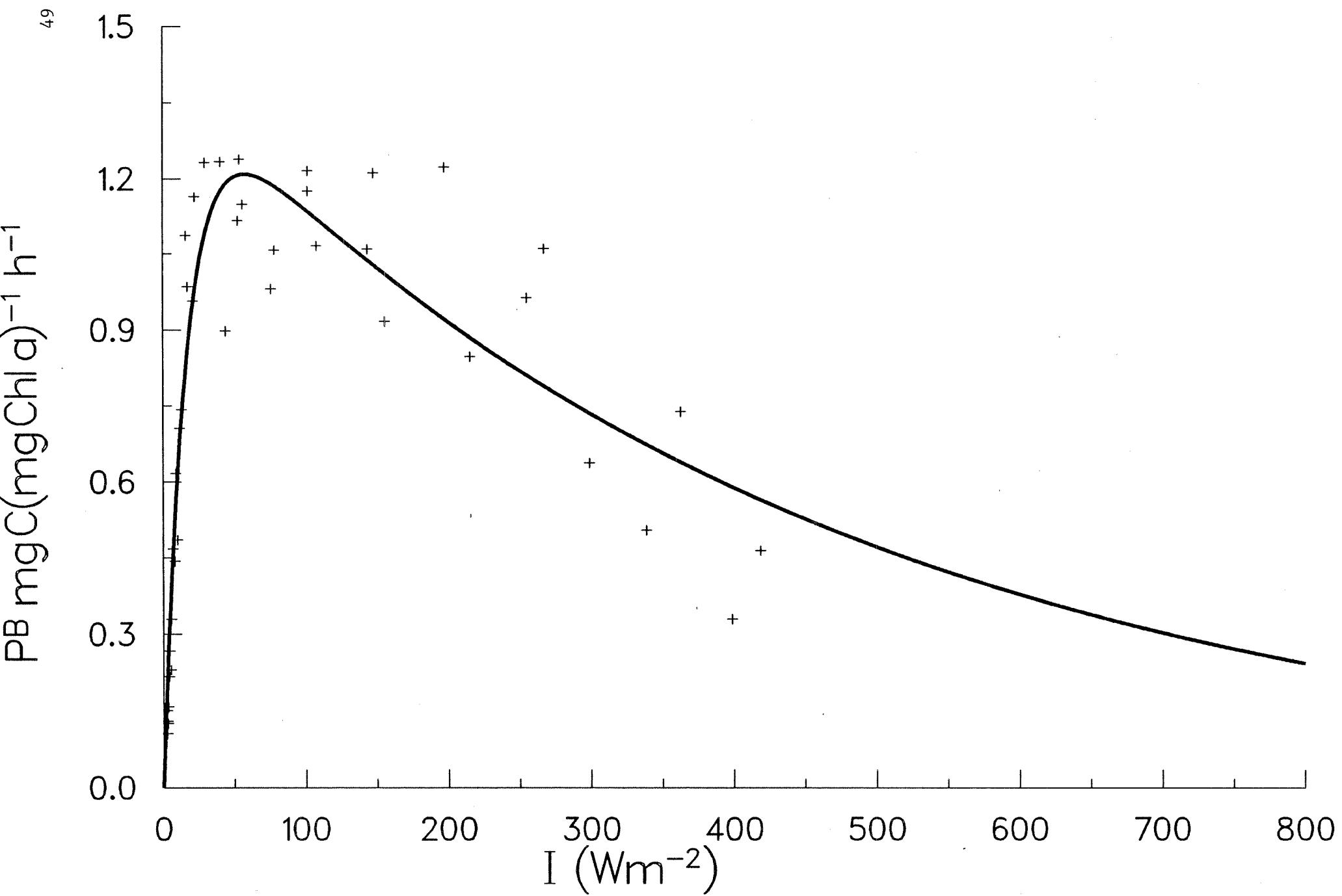
ID 8214266 STA. 65 30/08/1982 30 M



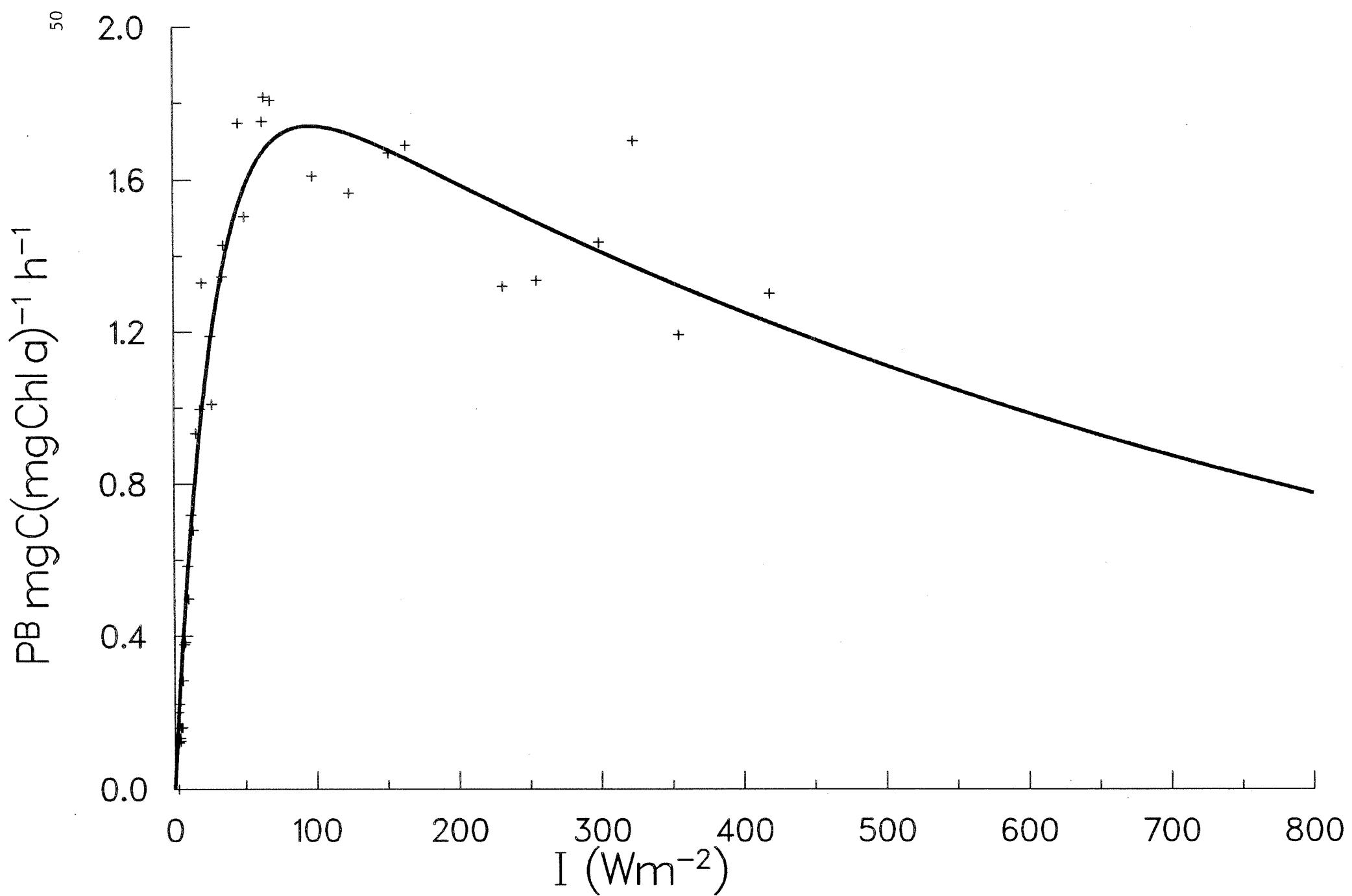
ID 8214267 STA. 65 30/08/1982 10 M



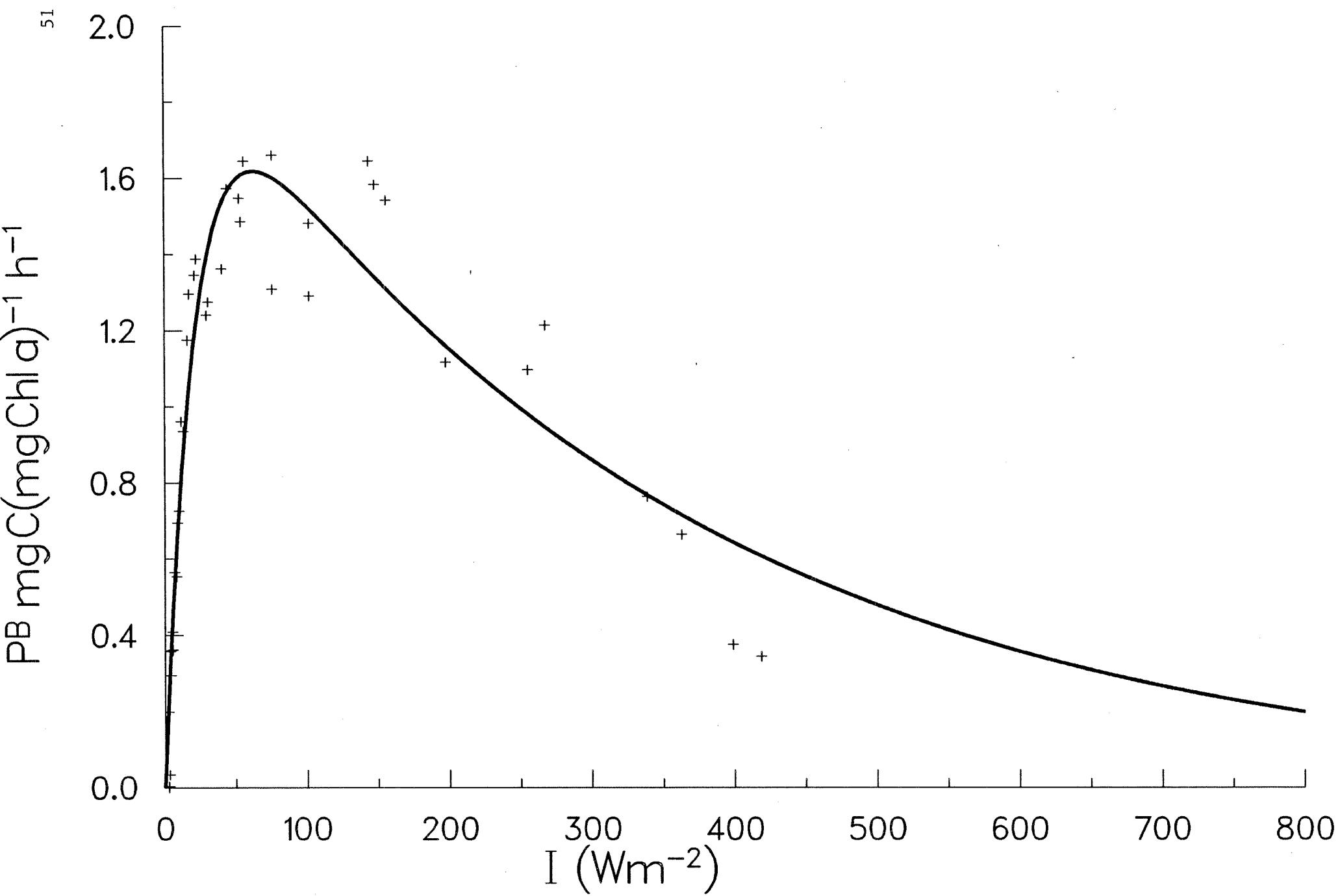
ID 8214323 STA. 69 31/08/1982 40 M



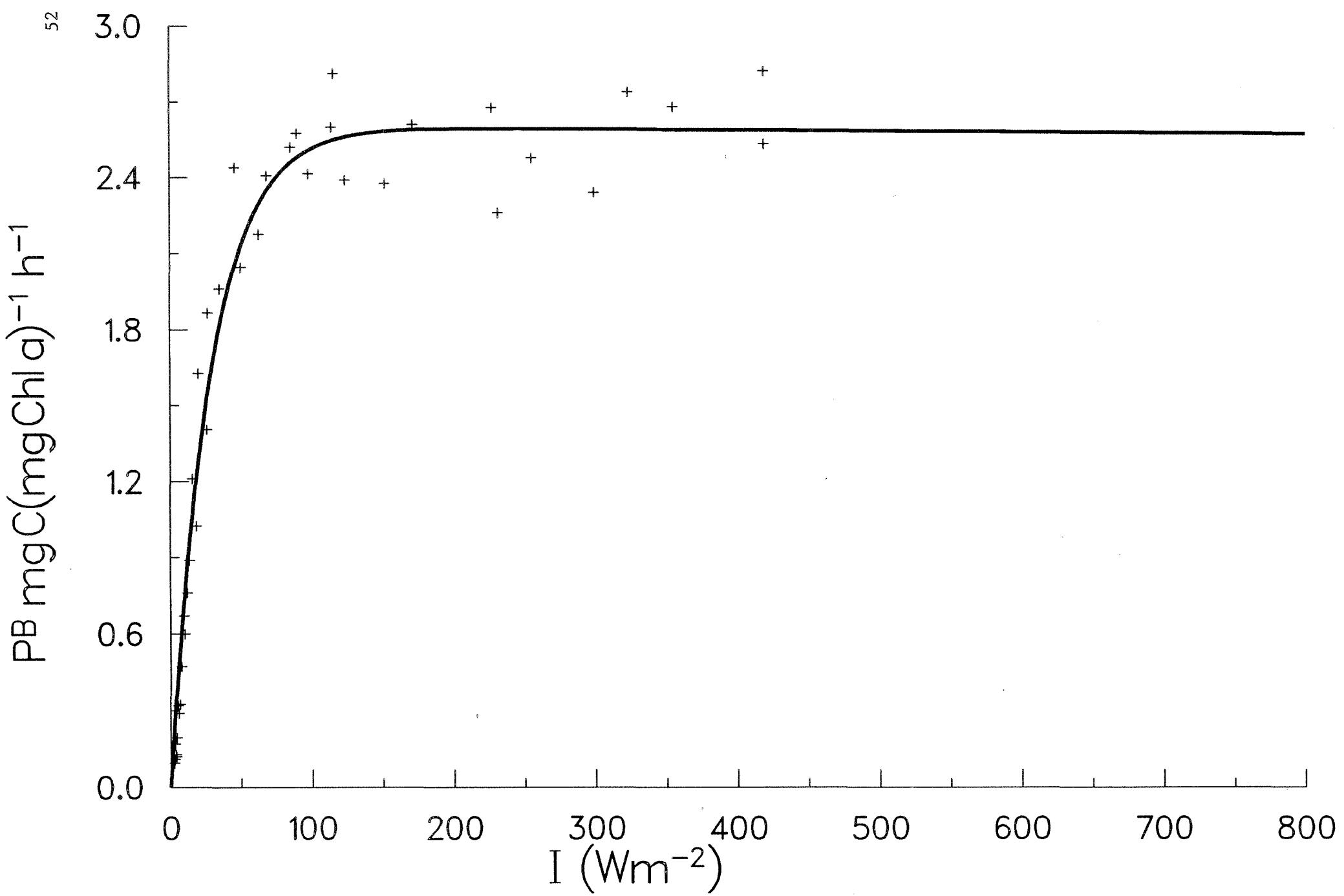
ID 8214324 STA. 69 31/08/1982 10 M



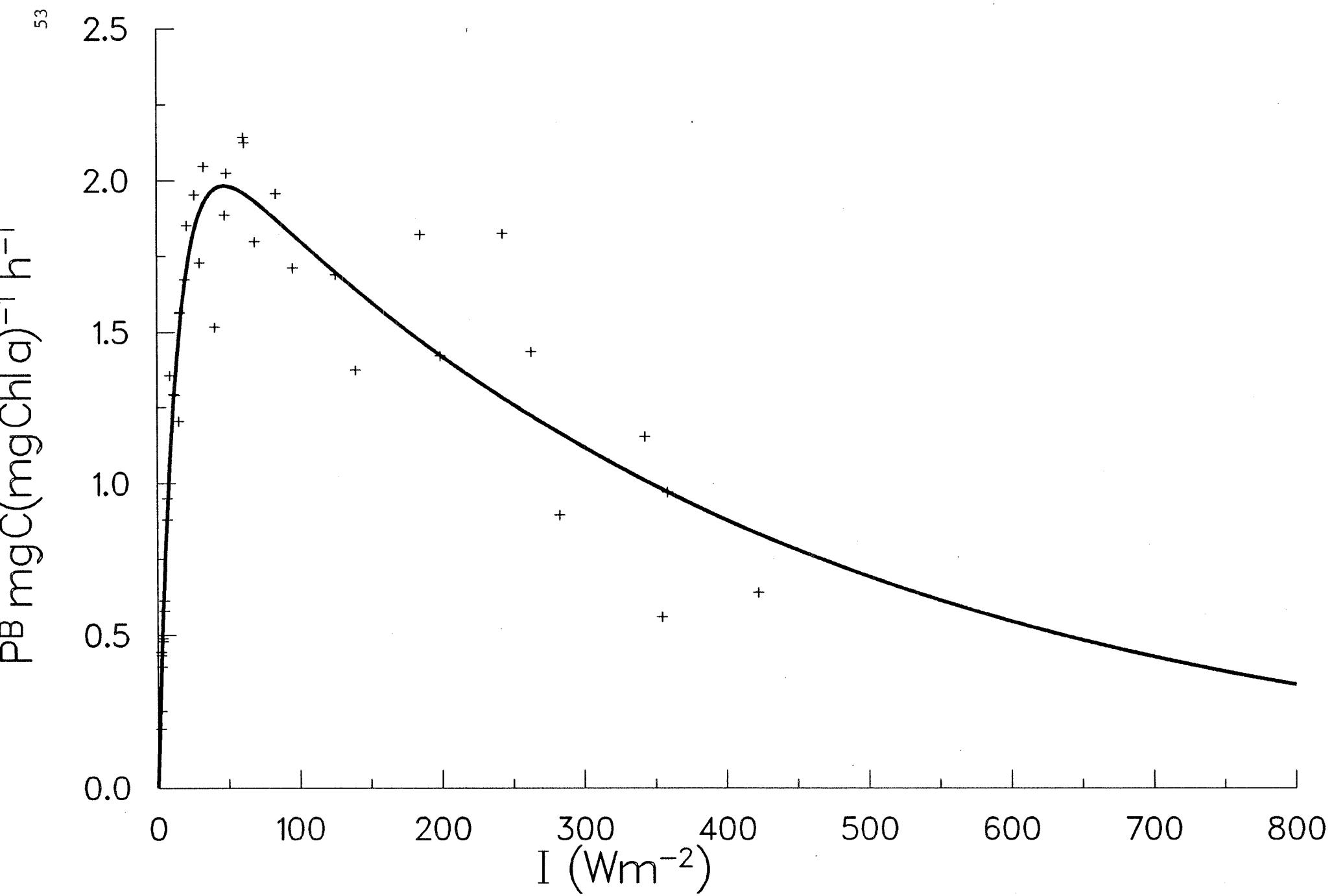
ID 8214416 STA. 75 01/09/1982 35 M



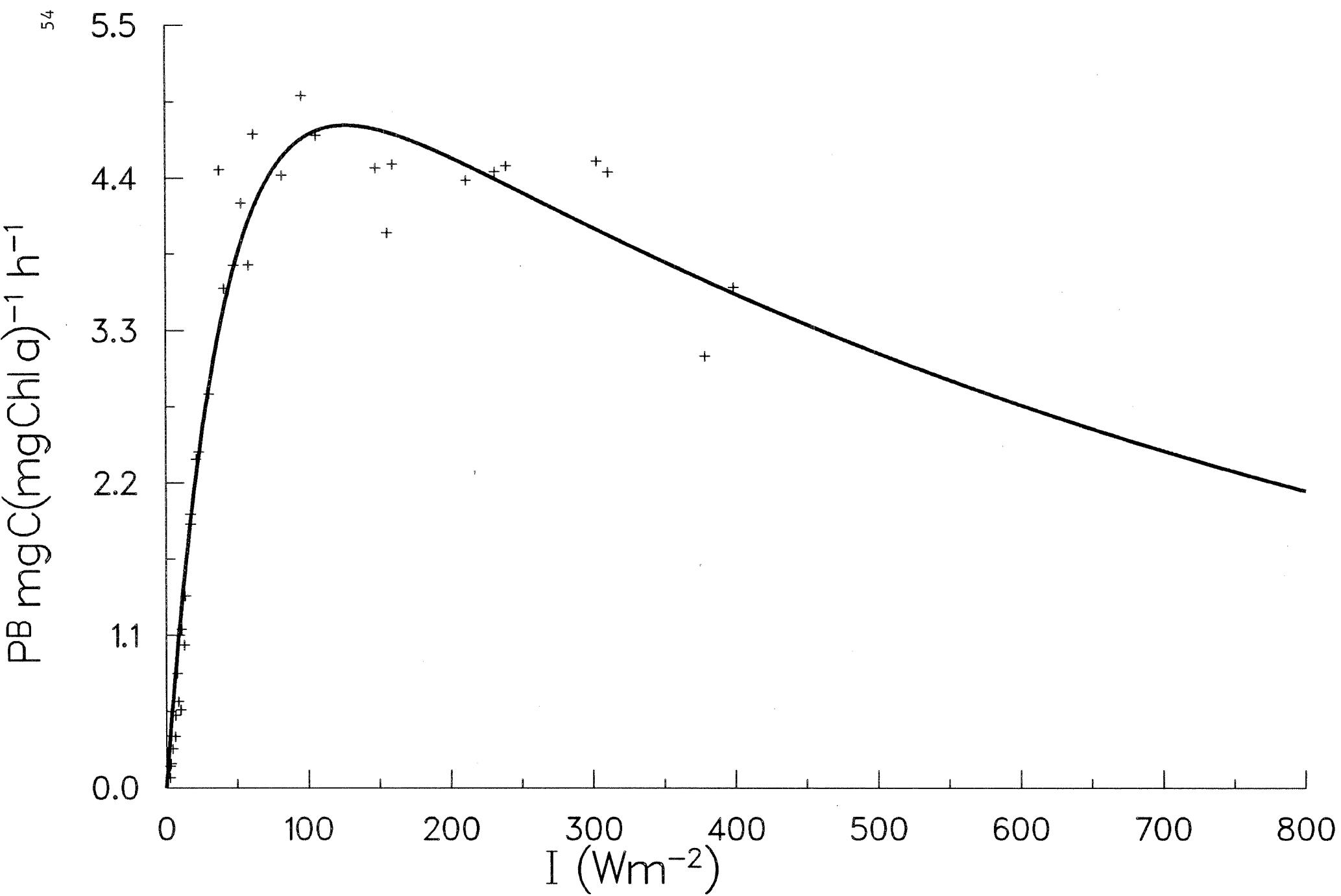
ID 8214417 STA. 75 01/09/1982 10 M



ID 8214470 STA. 80 02/09/1982 60 M



ID 8214471 STA. 80 02/09/1982 10 M

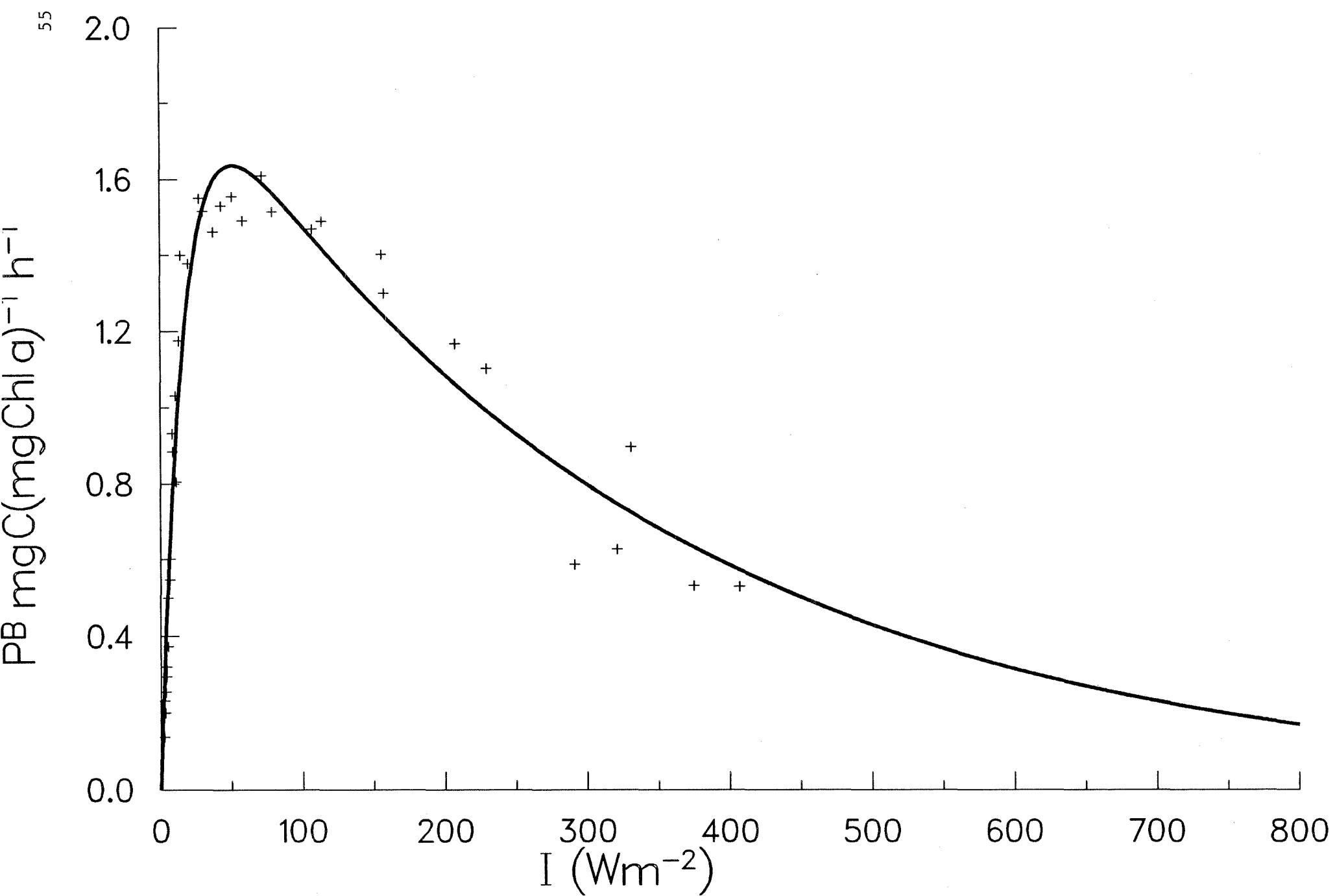


ID 8214555

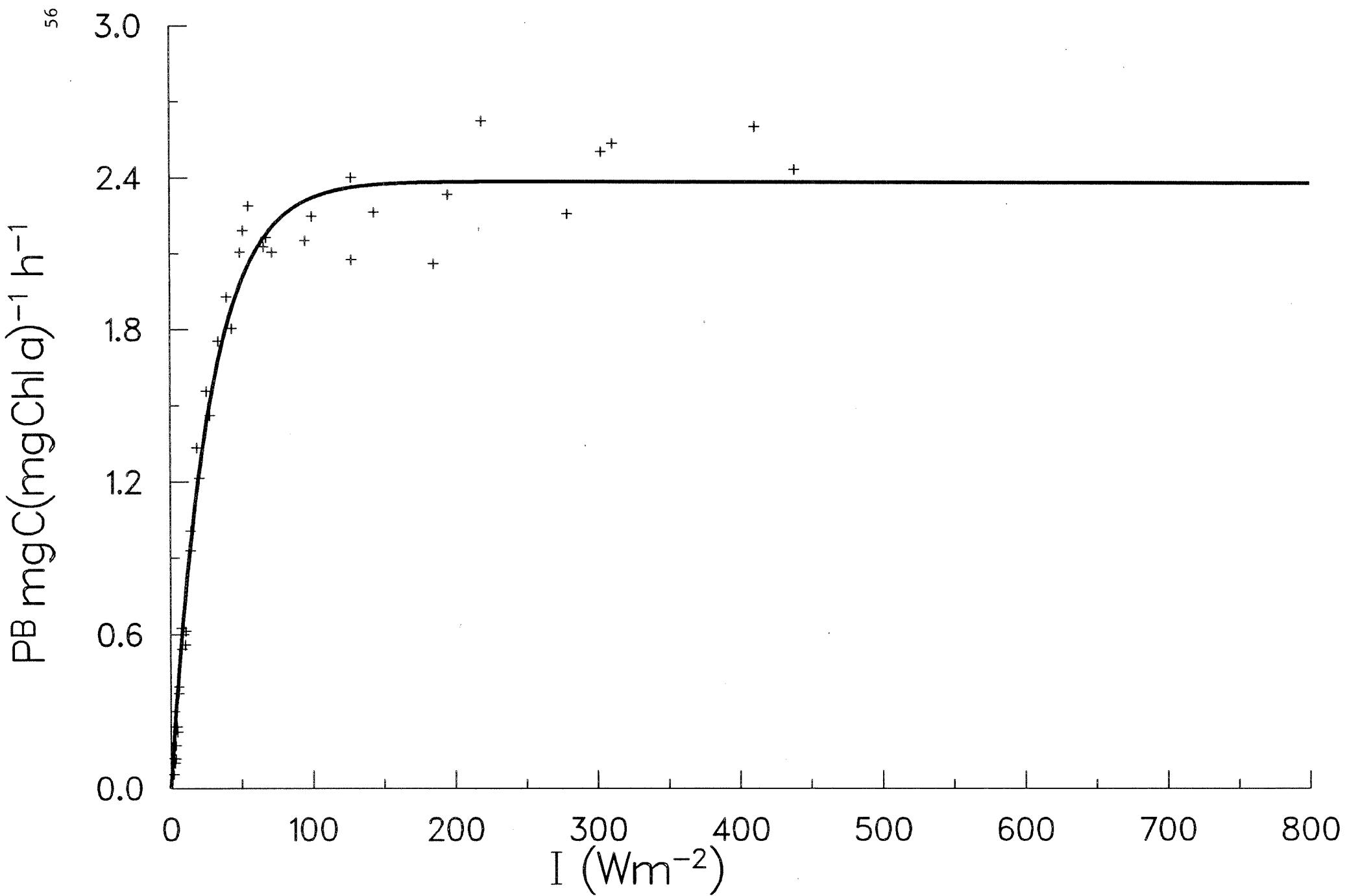
STA. 88

03/09/1982

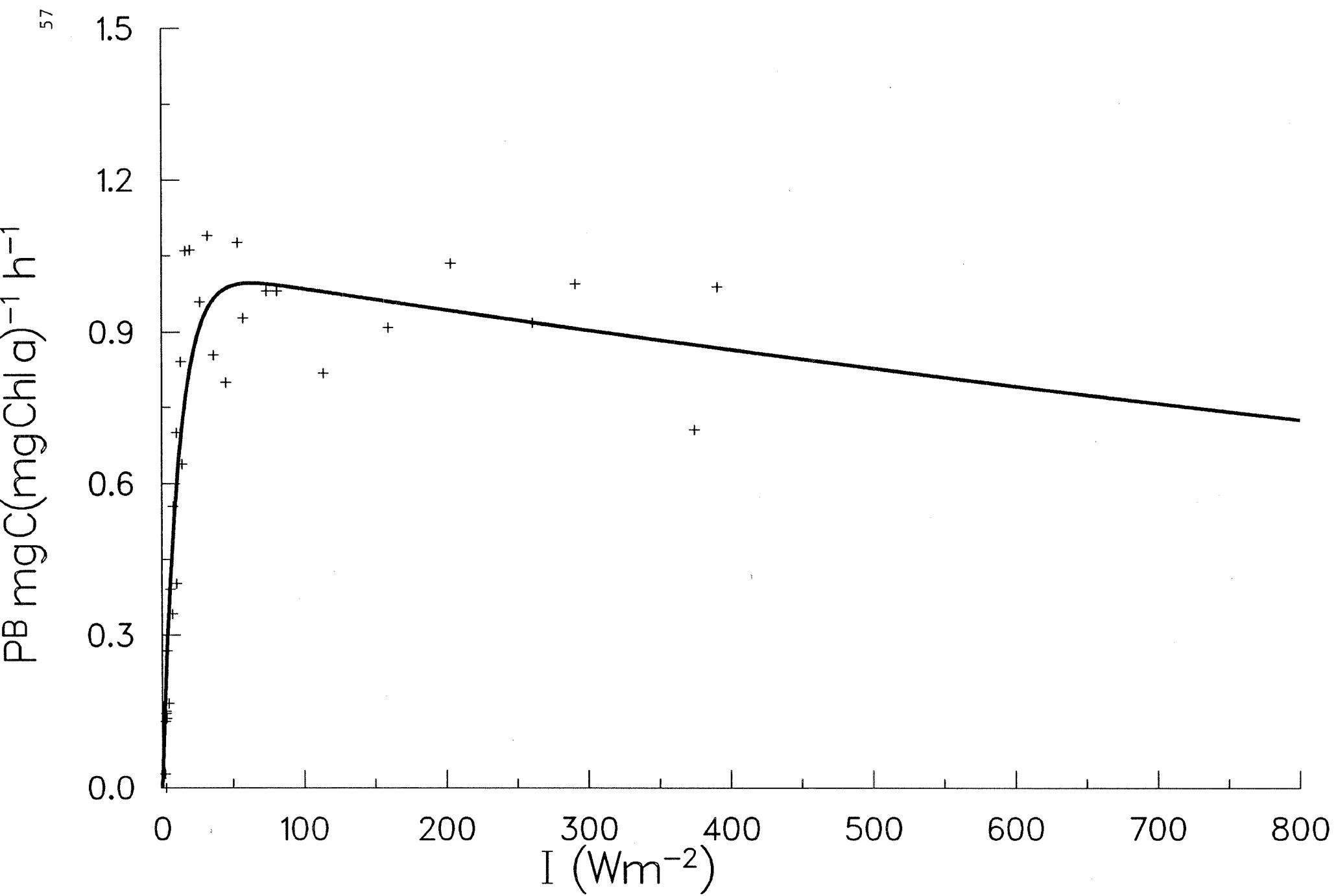
40 M



ID 8214556 STA. 88 03/09/1982 10 M



ID 8214608 STA. 90 04/09/1982 60 M

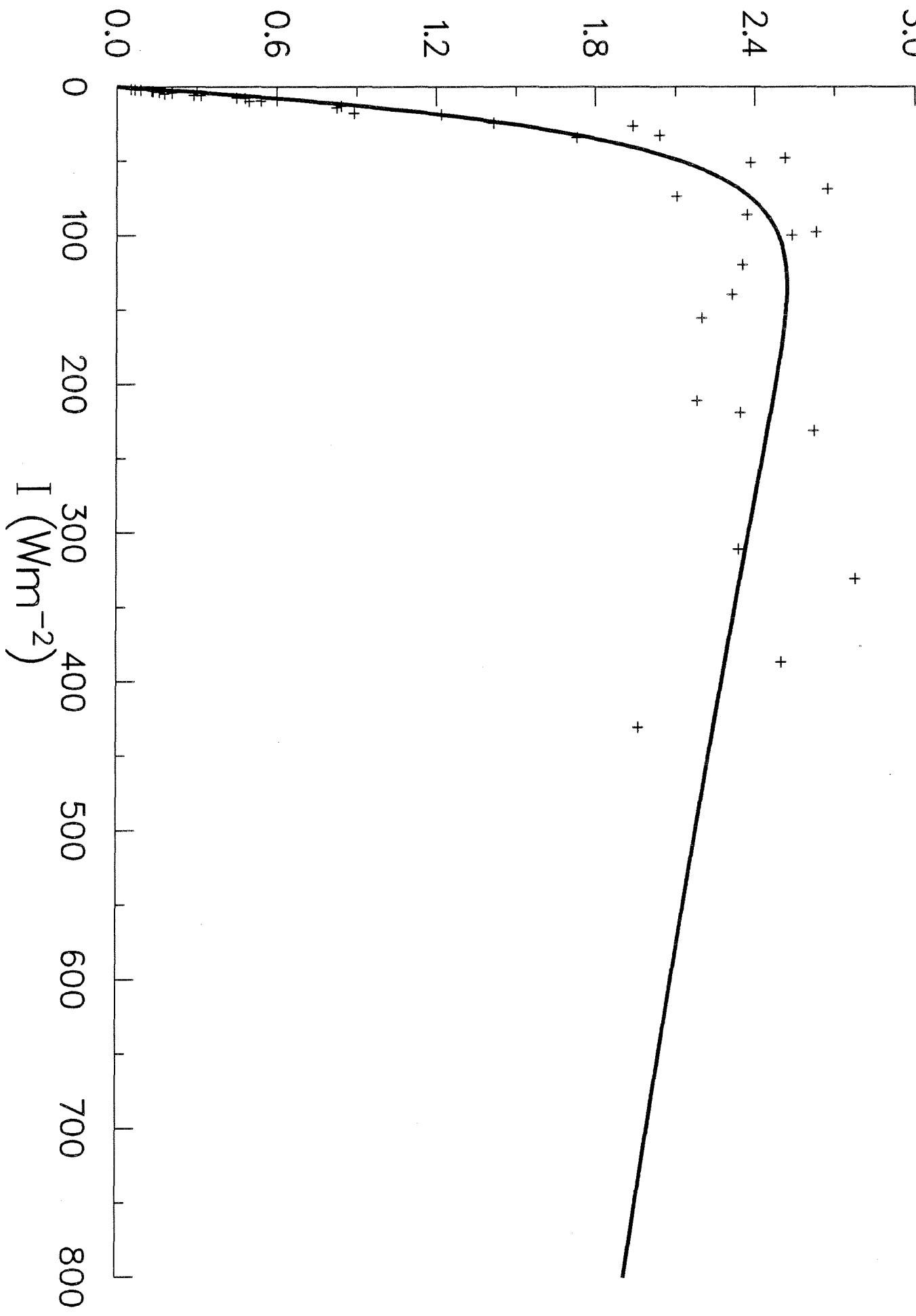


ID 8214609 STA. 90 04/09/1982 10 M

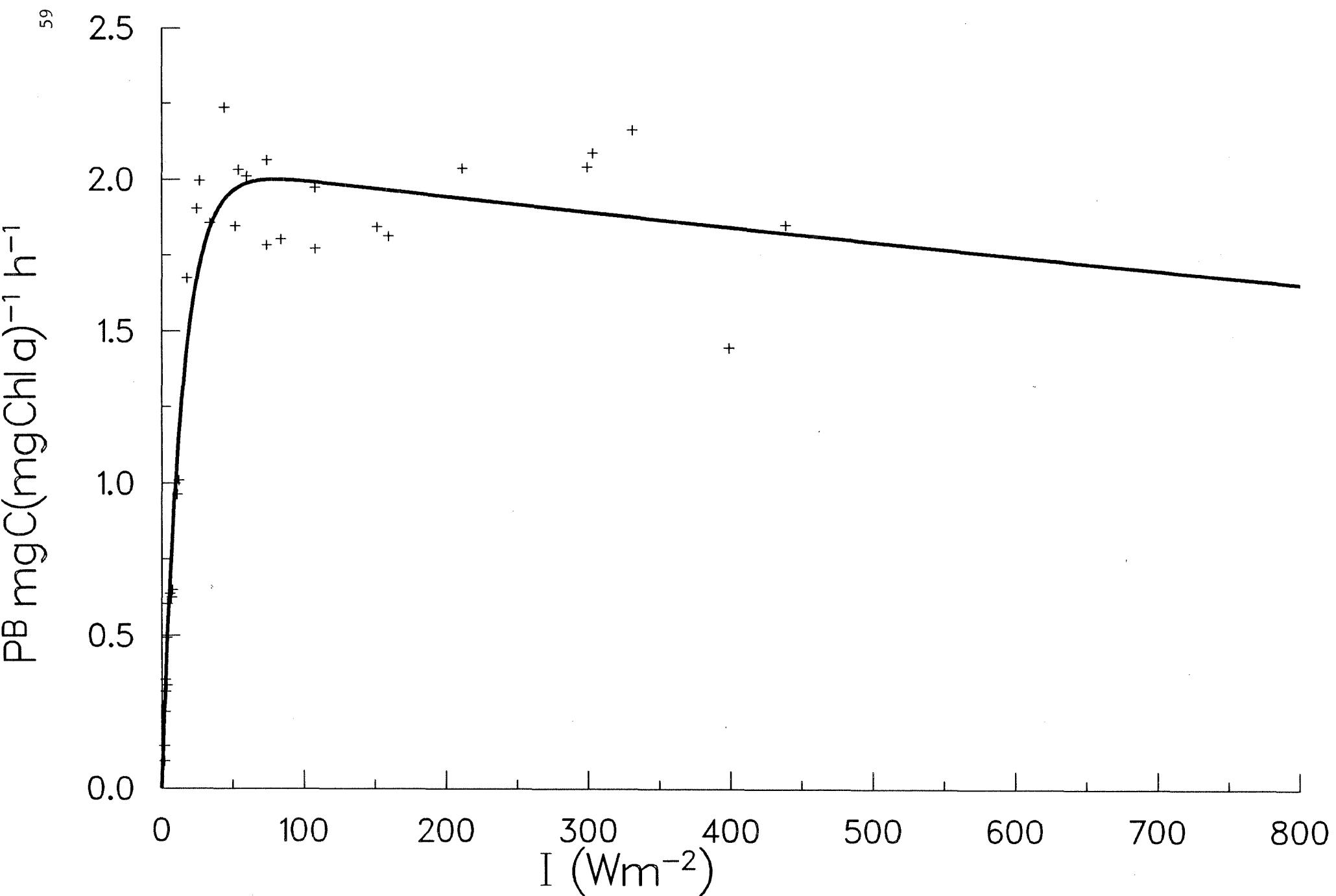
58

3.0

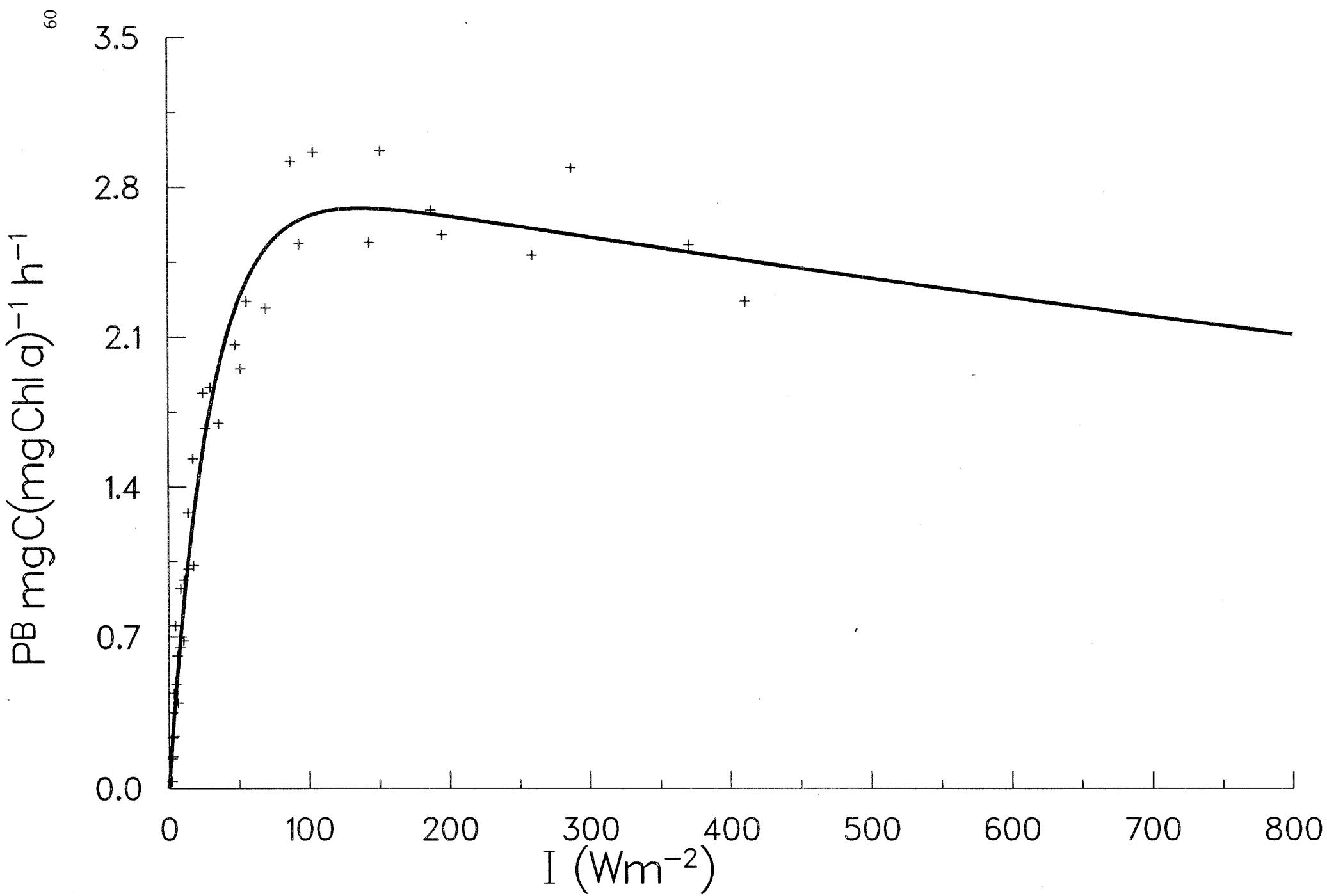
PB mgC(mgChl a) $^{-1}$  h $^{-1}$



ID 8214694 STA. 99 05/09/1982 40 M



ID 8214695 STA. 99 05/09/1982 10 M

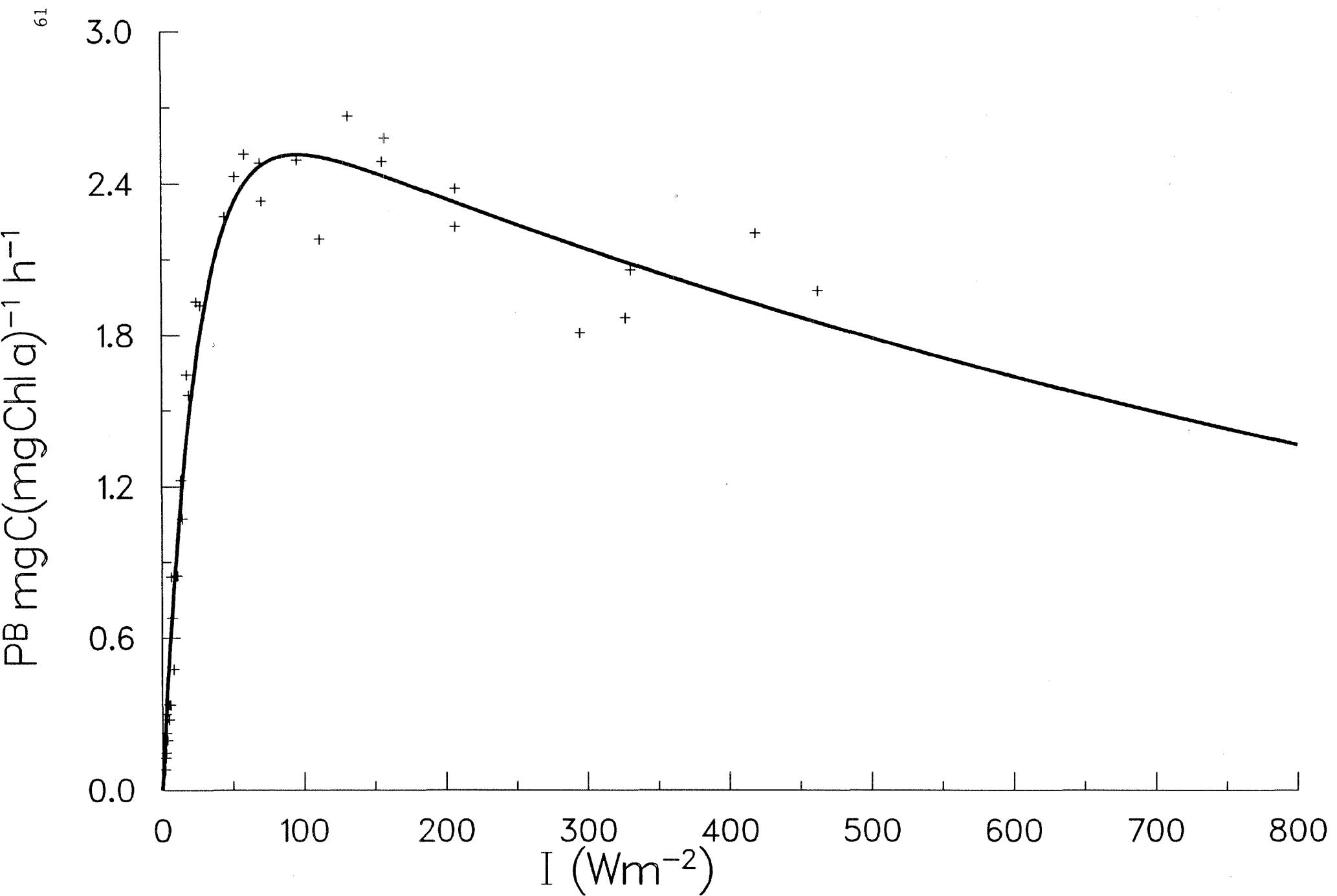


ID 8214779

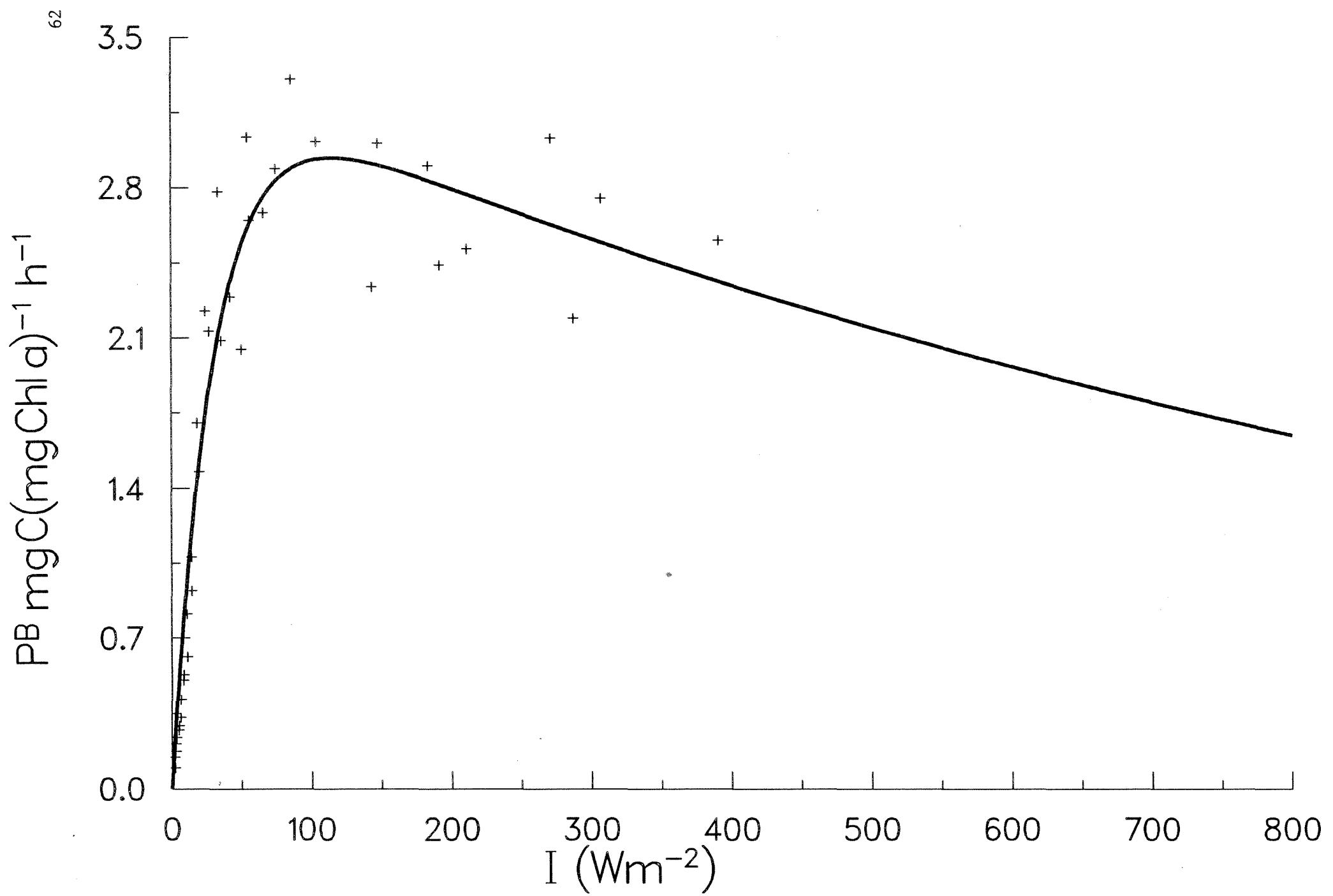
STA. 112

06/09/1982

50 M



ID 8214780 STA. 112 06/09/1982 10 M



PI DATA



## UNITS

P = mg C m<sup>-3</sup> h<sup>-1</sup> (mg Chl)<sup>-1</sup>

I = W m<sup>-2</sup>

P<sub>S</sub> = mg C mg Chl<sup>-1</sup> h<sup>-1</sup>

$\alpha$  = mg C (mg Chl)<sup>-1</sup> h<sup>-1</sup> w<sup>-1</sup> m<sup>-2</sup>

$\beta$  = mg C (mg Chl)<sup>-1</sup> h<sup>-1</sup> w<sup>-1</sup> m<sup>-2</sup>

Organic particulates are in mg m<sup>-3</sup> and inorganic nutrients in mg at m<sup>-3</sup>. The 90% confidence interval for P<sub>S</sub>,  $\alpha$  and  $\beta$  are shown in the closed brackets below the estimates for each parameter.

LABRADOR SHELF AND HUDSON BAY 1982

LAT  $46^{\circ}56.10' N$  LONG  $59^{\circ}33.40' W$  DATE 13/08/1982 DEPTH 28.3 M

I	P	I	P	I	P	I	P
439	.44	379	1.16	379	.57	283	1.14
271	.90	211	1.58	159	1.48	155	1.76
140	2.21	104	1.91	102	2.15	90	2.23
78	1.78	76	2.04	64	2.22	54	1.95
50	2.46	49	2.33	40	2.27	37	2.22
36	2.32	30	2.02	22	2.19	20	1.77
16	1.59	15	1.89	12	1.45	12	1.67
99	1.11	99	1.23	7	.82	7	.82
5	.59	5	.69	4	.36	4	.37
33	.20	3	.32	3	.14	2	.06
2	.12	2	.16				

PARAMETER VALUES

PS :	2.88	ALPHA :	.163	BETA :	.0099
( 2.73, 3.04 )		( .152, .174 )		( .0083, .0115 )	

SAMPLE TEMP             $13.9^{\circ}\text{C}$             INCUBATION TEMP             $13.0^{\circ}\text{C}$

CHLOROPHYLL :        1.07                    NITRATE :        .00

AMMONIA :            2.28                    SILICATE :        1.51

PHOSPHATE :        .40

LABRADOR SHELF AND HUDSON BAY 1982

LAT	46°56.10' N	LONG	59°33.40' W	DATE	13/08/1982	DEPTH	10 M
I	P	I	P	I	P	I	P
458	.97	419	1.12	319	.98	311	1.27
255	1.20	215	1.22	191	1.11	151	1.55
128	1.03	112	1.49	106	1.38	86	1.54
78	1.33	76	1.29	58	1.58	56	1.57
42	1.26	42	1.39	42	1.71	32	1.81
30	1.68	25	1.71	22	1.42	19	1.72
16	1.52	14	1.09	12	1.08	11	.92
9	.91	7	.45	6	.34	5	.50
4	.20	4	.18	3	.13	3	.04
2	.08	2	.01	2	.00		

PARAMETER VALUES

PS :	1.70	ALPHA :	.130	BETA :	.0024
(	1.60, 1.81 )	(	.114, .145 )	(	.0016, .0031 )

SAMPLE TEMP      16.6°C      INCUBATION TEMP      13.0°C

CHLOROPHYLL :      .78      NITRATE :      .00

AMMONIA :      1.14      SILICATE :      1.52

PHOSPHATE :      .10

LABRADOR SHELF AND HUDSON BAY 1982

LAT 53°53.00' N    LONG 54°50.80' W    DATE 16/08/1982    DEPTH 17 M

I	P	I	P	I	P	I	P
478	3.76	399	3.64	399	3.28	327	4.07
235	3.31	215	4.04	199	4.26	171	4.34
140	3.77	128	4.28	120	3.99	88	4.34
88	4.57	84	3.97	70	4.68	63	4.60
62	4.18	50	4.17	46	4.21	42	4.09
36	3.83	36	3.85	26	2.98	26	2.37
19	2.64	19	1.96	15	1.78	12	1.50
11	1.33	11	1.02	8	1.11	8	.63
6	.93	6	1.33	5	.77	5	.56
4	.54	4	.28	3	.22	3	.56
2	.05	2	.00	2	.15		

PARAMETER VALUES

PS :	4.92	ALPHA :	.172	BETA :	.0041
(	4.68, 5.16 )	(	.161, .183 )	(	.0029, .0053 )

SAMPLE TEMP                  6.0°C                  INCUBATION TEMP                  9.0°C

CHLOROPHYLL :                .18                  NITRATE :                .00

AMMONIA :                    .68                  SILICATE :                .35

PHOSPHATE :                .13

LABRADOR SHELF AND HUDSON BAY 1982

LAT 53°53.00' N		LONG 54°50.80' W		DATE 16/08/1982		DEPTH	10 M
I	P	I	P	I	P	I	P
458	2.20	399	2.50	359	2.72	319	2.19
309	3.13	211	3.03	199	2.79	169	2.95
144	2.78	136	2.97	120	3.12	104	2.63
92	2.69	90	3.12	72	2.64	65	2.89
64	2.60	54	2.75	47	3.01	44	2.74
41	2.83	35	1.92	31	2.56	23	2.64
21	1.75	17	1.16	14	1.31	13	1.33
12	.97	10	.89	9	.64	8	1.03
7	.68	6	.27	6	.32	4	.27
2	.01	2	.02				

PARAMETER VALUES

PS : 3.27	ALPHA : .122	BETA : .0023
( 3.08, 3.46 )	( .112, .132 )	( .0014, .0032 )

SAMPLE TEMP            9.0°C            INCUBATION TEMP            9.0°C

CHLOROPHYLL : .23            NITRATE : .00

AMMONIA : .69            SILICATE : .24

PHOSPHATE : .00

LABRADOR SHELF AND HUDSON BAY 1982

LAT  $54^{\circ}45.00' N$  LONG  $55^{\circ}52.00' W$  DATE 16/08/1982 DEPTH 17 M

I	P	I	P	I	P	I	P
419	7.52	399	7.80	319	7.65	299	6.71
263	7.33	239	7.51	191	7.79	163	7.54
136	6.77	128	7.50	112	7.31	96	6.30
92	6.81	78	7.41	72	7.81	68	6.76
68	6.21	53	6.71	50	5.91	48	6.48
42	6.34	36	4.23	29	4.48	26	3.90
22	4.14	17	2.69	13	1.87	12	2.20
11	1.44	9	1.30	8	1.20	7	1.32
6	.77	5	1.24	5	.74	4	.42
4	.39	3	.49	3	.32	2	.48

PARAMETER VALUES

PS :	7.75	ALPHA :	.225	BETA :	.0009
(	7.37, 8.13 )	(	.211, .238 )	(	-.0006, .0024 )

SAMPLE TEMP  $8.0^{\circ}\text{C}$  INCUBATION TEMP  $8.5^{\circ}\text{C}$

CHLOROPHYLL : .14 NITRATE : .00

AMMONIA : .80 SILICATE : .47

PHOSPHATE : .13

LABRADOR SHELF AND HUDSON BAY 1982

LAT 54°45.00' N    LONG 55°52.00' W    DATE 16/08/1982    DEPTH 10 M

I	P	I	P	I	P	I	P
478	7.10	439	7.12	339	6.97	311	7.58
291	7.50	231	7.98	199	6.78	183	7.95
144	7.75	136	7.94	128	7.89	104	7.46
96	7.78	92	8.07	80	8.23	68	7.63
64	7.36	56	6.59	46	7.27	42	6.22
34	5.56	31	5.29	18	3.46	18	2.61
13	2.71	13	1.98	10	1.55	10	1.68
8	1.15	7	1.13	6	.43	6	.95
5	.37	5	.43	4	.00	3	.00
3	.05	3	.38	2	.00		

PARAMETER VALUES

PS : 9.04	ALPHA : .235	BETA : .0056
( 8.58, 9.51 )	( .221, .249 )	( .0036, .0076 )

SAMPLE TEMP                  8.0°C                  INCUBATION TEMP                  8.5°C

CHLOROPHYLL : .13                  NITRATE : .00

AMMONIA : 1.23                  SILICATE : .32

PHOSPHATE : .00

LABRADOR SHELF AND HUDSON BAY 1982

LAT  $55^{\circ}23.90' N$  LONG  $57^{\circ}25.30' W$  DATE 17/08/1982 DEPTH 20 M

I	P	I	P	I	P	I	P
419	5.81	399	6.82	319	7.30	299	5.44
263	.77	239	.22	191	.26	163	.90
136	.03	128	.33	112	.62	96	.42
92	.48	78	.86	72	.63	68	.41
68	.37	53	.73	50	.05	48	.66
42	.62	36	.16	29	.85	26	.91
22	.88	19	.68	17	.55	13	.96
12	.38	11	.42	9	.35	8	.77
7	.90	6	.44	5	.60	5	.18
4	.46	4	.19	3	.42	3	.15
3	.13	2	.29				

PARAMETER VALUES

PS : 6.98	ALPHA : .211	BETA : .0021
( 6.59, 7.37 )	( .197, .225 )	( .0005, .0037 )

SAMPLE TEMP  $3.4^{\circ}C$  INCUBATION TEMP  $5.0^{\circ}C$

CHLOROPHYLL : .15 NITRATE : .00

AMMONIA : .63 SILICATE : .23

PHOSPHATE : .22

LABRADOR SHELF AND HUDSON BAY 1982

LAT  $55^{\circ}23.90' N$  LONG  $57^{\circ}25.30' W$  DATE 17/08/1982 DEPTH 10 M

I	P	I	P	I	P	I	P
478	4.34	439	4.35	339	5.37	311	4.83
291	4.81	231	5.42	199	4.60	183	4.56
144	4.94	136	4.43	128	4.63	104	4.47
96	4.41	92	4.83	80	4.68	68	4.12
64	4.02	56	3.77	46	3.98	46	3.69
42	4.14	31	2.99	25	1.97	24	2.49
18	1.64	18	1.77	13	1.15	13	1.13
10	.69	10	.80	8	.47	7	.55
6	.29	6	.32	5	.28	5	.09
4	.02	3	.15	3	.00	2	.00
2	.00						

PARAMETER VALUES

PS :	5.41	ALPHA :	.123	BETA :	.0021
(	5.07, 5.74 )	(	.115, .130 )	(	.0008, .0034 )

SAMPLE TEMP                     $6.0^{\circ}\text{C}$                     INCUBATION TEMP                     $5.0^{\circ}\text{C}$

CHLOROPHYLL :                 .29                    NITRATE :                 .00

AMMONIA :                    1.04                    SILICATE :                 .42

PHOSPHATE :                 .16

## LABRADOR SHELF AND HUDSON BAY 1982

LAT 56° 2.20' N    LONG 58° 8.80' W    DATE 17/08/1982    DEPTH 11 M

I	P	I	P	I	P	I	P
478	5.71	419	5.55	339	6.46	315	6.12
219	6.64	199	6.32	199	6.61	140	6.28
136	6.56	132	6.82	104	6.79	96	7.52
96	5.90	76	7.10	66	6.94	64	7.00
52	6.97	49	6.64	46	6.30	42	6.41
36	7.50	30	5.34	29	4.57	20	4.27
16	4.00	14	3.14	11	2.75	11	2.57
99	1.81	8	1.64	8	1.49	7	.75
5	.95	5	.80	4	.45	4	.68
33	.25	3	.32	3	.51	3	.08
2	.26						

## PARAMETER VALUES

PS :	7.73	ALPHA :	.299	BETA :	.0057
(	7.38, 8.08 )	(	.280, .319 )	(	.0039, .0074 )

SAMPLE TEMP                  6.8°C                  INCUBATION TEMP                  3.5°C

CHLOROPHYLL :                  .09                  NITRATE :                  .00

AMMONIA :                  .37                  SILICATE :                  .25

PHOSPHATE :                  .16

LABRADOR SHELF AND HUDSON BAY 1982

LAT 56° 2.20' N    LONG 58° 8.80' W    DATE 17/08/1982    DEPTH 20 M

I	P	I	P	I	P	I	P
478	4.61	339	4.37	279	5.19	215	5.21
179	5.09	163	5.64	124	5.43	124	4.62
120	5.48	92	5.28	90	4.92	88	5.18
68	5.54	64	5.75	62	5.88	55	5.59
44	4.88	44	4.41	38	4.76	33	4.10
30	4.80	26	3.59	24	3.59	17	2.68
16	2.34	14	1.93	11	1.26	9	1.36
8	.93	7	.99	6	.70	5	.39
5	.19	4	.50	4	.27	3	.32
3	.00	3	.20	2	.01	2	.02

PARAMETER VALUES

PS :	6.22	ALPHA :	.207	BETA :	.0050
(	5.87, 6.57	)	( .193, .221 )	(	.0032, .0069 )

SAMPLE TEMP                    3.0°C                    INCUBATION TEMP            3.5°C

CHLOROPHYLL :                .13                    NITRATE :                .00

AMMONIA :                    1.62                    SILICATE :                .33

PHOSPHATE :                .31

LABRADOR SHELF AND HUDSON BAY 1982

LAT 57° 1.90' N    LONG 59°54.40' W    DATE 18/08/1982    DEPTH 15 M

I	P	I	P	I	P	I	P
478	7.08	439	6.19	419	6.90	339	7.23
315	6.67	219	7.01	199	8.57	199	7.20
140	7.66	136	7.61	132	7.78	104	7.24
96	8.64	96	7.85	76	7.59	66	8.36
64	7.84	52	6.70	49	7.52	46	7.81
42	7.31	36	6.63	30	5.85	29	5.13
20	4.28	16	2.96	14	2.46	11	3.06
11	2.39	9	2.60	8	1.42	7	.48
5	:18	5	.42	4	.00	4	.36
3	:00						

PARAMETER VALUES

PS :	9.04	ALPHA :	.289	BETA :	.0067
(	8.55, 9.54 )	(	.268, .310 )	(	.0045, .0089 )

SAMPLE TEMP                          3.0°C                          INCUBATION TEMP                  5.0°C

CHLOROPHYLL :                        .07                                  NITRATE :                        .00

AMMONIA :                             .77                                  SILICATE :                        .31

PHOSPHATE :                        .24

LABRADOR SHELF AND HUDSON BAY 1982

LAT 57° 1.90' N    LONG 59°54.40' W    DATE 18/08/1982    DEPTH 10 M

I	P	I	P	I	P	I	P
478	4.81	439	5.04	339	3.98	319	4.87
279	4.73	215	4.84	179	4.18	163	4.94
124	4.65	124	4.08	120	4.39	92	4.70
90	3.87	88	4.54	68	4.27	64	4.86
62	4.59	55	5.00	44	3.64	44	4.43
38	4.52	33	3.20	30	2.75	26	1.68
24	2.21	17	1.36	16	1.44	14	1.25
14	1.11	11	.75	9	.81	8	.41
7	.52	6	.64	5	.33	5	.32
4	.30	4	.03	3	.16	3	.46
3	.00	2	.06	2	.04		

PARAMETER VALUES

PS :	5.01	ALPHA :	.140	BETA :	.0009
(	4.63, 5.39 )	(	.127, .153 )	(	-.0005, .0024 )

SAMPLE TEMP                    5.8°C                    INCUBATION TEMP            5.0°C

CHLOROPHYLL :                .10                    NITRATE :                .00

AMMONIA :                    .52                    SILICATE :                .21

PHOSPHATE :                .21

LABRADOR SHELF AND HUDSON BAY 1982

LAT 57°54.50' N    LONG 60°55.90' W    DATE 18/08/1982    DEPTH 35 M

I	P	I	P	I	P	I	P
478	.74	458	.51	383	1.13	319	1.09
279	1.02	199	1.62	171	1.22	171	1.17
136	1.67	116	1.38	100	1.60	76	1.76
70	1.60	64	1.77	56	1.74	50	1.72
42	1.61	40	1.72	36	1.73	29	1.62
28	1.76	22	1.63	20	1.67	14	1.20
12	.69	11	.85		.77		.75
6	.63	6	.60		.58		.56
4	.35	4	.40		.24		.28
3	.18	2	.12		.15		.13

PARAMETER VALUES

PS :	2.05	ALPHA :	.123	BETA :	.0046
(	1.96, 2.15 )	(	.114, .131 )	(	.0039, .0053 )

SAMPLE TEMP                          3.5°C                                  INCUBATION TEMP                          6.0°C

CHLOROPHYLL :                        2.33    NITRATE :                        .16

AMMONIA :                             .87    SILICATE :                        1.66

PHOSPHATE :                        .23

## LABRADOR SHELF AND HUDSON BAY 1982

LAT 57°54.50' N    LONG 60°55.90' W    DATE 18/08/1982    DEPTH 10 M

I	P	I	P	I	P	I	P
478	2.39	439	2.86	339	2.74	319	2.49
295	2.07	223	2.13	195	1.92	187	2.32
140	2.05	132	2.48	120	2.76	100	2.40
88	2.24	84	2.01	68	2.45	66	1.96
60	1.92	56	1.84	48	1.64	46	1.92
38	2.15	36	1.35	31	1.53	24	1.33
21	1.22	16	1.16	16	.92	13	.69
12	.72	9	.53	9	.58	7	.41
7	.37	5	.27	5	.23	4	.36
4	.21	3	.13	3	.21	3	.08
3	.13	2	.06	2	.03		

## PARAMETER VALUES

PS :    2.40                  ALPHA :    .074                  BETA :    .0000  
 ( 2.25, 2.54 )                  ( .068, .080 )                  ( -.0005, .0005 )

SAMPLE TEMP    4.2°C                  INCUBATION TEMP    6.0°C

CHLOROPHYLL :    .33                  NITRATE :    .00

AMMONIA :    .48                  SILICATE :    .86

PHOSPHATE :    .17

LABRADOR SHELF AND HUDSON BAY 1982

LAT 59°15.30' N    LONG 62° 1.60' W    DATE 18/08/1982    DEPTH 19 M

I	P	I	P	I	P	I	P
478	2.12	419	2.39	359	4.17	323	3.21
199	3.54	175	3.30	104	3.47	96	3.37
88	3.66	80	3.66	68	3.24	64	3.69
52	3.67	48	3.46	44	3.21	42	3.02
32	2.84	32	2.69	26	2.06	24	2.29
18	1.98	16	2.27	13	1.48	12	1.48
10	1.30	99	1.46	8	1.10	7	.99
6	.66	5	.42	5	.45	4	.32
4	.38	3	.15	3	.12	2	.06
2	.12	2	.23				

PARAMETER VALUES

PS :	4.12	ALPHA :	.151	BETA :	.0037
(	3.88, 4.36 )	(	.140, .162 )	(	.0026, .0049 )

SAMPLE TEMP                  3.0°C                  INCUBATION TEMP                  4.5°C

CHLOROPHYLL :                  .10                  NITRATE :                  .00

AMMONIA :                  1.66                  SILICATE :                  .36

PHOSPHATE :                  .45

LABRADOR SHELF AND HUDSON BAY 1982

LAT 59°15.30' N    LONG 62° 1.60' W    DATE 18/08/1982    DEPTH 10 M

I	P	I	P	I	P	I	P
498	3.44	439	4.10	343	3.68	335	3.32
319	3.22	239	3.35	223	3.75	144	4.15
102	3.92	96	4.16	82	3.37	70	2.98
60	2.86	52	2.37	48	3.36	48	2.96
48	2.84	38	3.05	34	2.04	27	2.18
25	1.66	16	1.25	13	.62	13	.73
10	.37	9	.45	7	.44	7	.38
6	.12	5	.53	4	.00	4	.00
3	.03	3	.02	2	.06	2	.00

PARAMETER VALUES

PS :      4.42	ALPHA :      .093	BETA :      .0025
( 3.96, 4.89 )	( .085, .101 )	( .0008, .0041 )

SAMPLE TEMP                  5.2°C                  INCUBATION TEMP          4.5°C

CHLOROPHYLL :      .11                  NITRATE :      .00

AMMONIA :      .40                  SILICATE :      .32

PHOSPHATE :      .29

LABRADOR SHELF AND HUDSON BAY 1982

LAT  $60^{\circ}48.00' N$  LONG  $64^{\circ}19.00' W$  DATE 19/08/1982 DEPTH 30 M

I	P	I	P	I	P	I	P
498	1.18	458	1.05	383	1.58	359	1.66
339	1.81	243	1.93	239	2.00	239	1.73
148	1.98	146	1.98	120	1.79	98	2.04
98	1.94	86	1.88	71	1.86	50	1.68
46	1.68	37	1.74	35	1.53	28	1.46
27	1.46	20	1.05	19	1.23	15	.58
14	.97	10	.42	10	.53	8	.45
8	.43	6	.36	6	.30	5	.27
4	.31	4	.15	3	.21	3	.09
2	.06						

PARAMETER VALUES

PS :	2.41	ALPHA :	.072	BETA :	.0030
(	2.28, 2.53 )	(	.067, .076 )	(	.0023, .0036 )

SAMPLE TEMP       $1.0^{\circ}\text{C}$       INCUBATION TEMP       $4.0^{\circ}\text{C}$

CHLOROPHYLL :      2.60      NITRATE :      4.40

AMMONIA :      .94      SILICATE :      4.98

PHOSPHATE :      .86

LABRADOR SHELF AND HUDSON BAY 1982

LAT  $60^{\circ}48.00' N$  LONG  $64^{\circ}19.00' W$  DATE 19/08/1982 DEPTH 10 M

I	P	I	P	I	P	I	P
478	1.73	439	2.07	367	1.89	343	2.13
251	1.88	239	1.84	215	1.94	183	2.05
151	1.95	140	2.04	120	1.74	102	1.80
102	1.90	86	1.78	82	1.88	71	1.72
62	1.67	62	1.75	50	1.95	46	1.96
35	1.35	34	1.54	25	1.17	24	1.13
17	.98	17	.87	13	.64	12	.62
10	.50	10	.51	7	.32	7	.35
6	.19	5	.23	5	.12	4	.14
3	.08	3	.09	3	.06	2	.08
2	.02	2	.03				

PARAMETER VALUES

PS :	2.01	ALPHA :	.068	BETA :	.0002
(	1.93, 2.09 )	(	.064, .072 )	(	-.0001, .0006 )

SAMPLE TEMP             $1.1^{\circ}\text{C}$             INCUBATION TEMP             $4.0^{\circ}\text{C}$

CHLOROPHYLL :        5.36                    NITRATE :        1.61

AMMONIA :            .45                    SILICATE :        2.75

PHOSPHATE :        .52

LABRADOR SHELF AND HUDSON BAY 1982

LAT	5°60.00' N	LONG	40°65.00' W	DATE	20/08/1982	DEPTH	45 M
I	P	I	P	I	P	I	P
478	1.96	447	2.32	361	3.00	339	2.87
259	2.63	235	2.58	227	2.63	167	2.73
159	2.41	146	2.51	120	2.64	96	2.71
73	3.12	64	2.80	52	2.94	50	2.84
44	3.08	35	3.34	34	3.09	26	3.10
24	3.43	19	2.43	17	2.55	14	1.96
12	1.87	10	1.42	9	1.27	8	1.00
7	1.20	5	.82	5	.76	4	.54
3	.45	3	.45	2	.26	2	.35
2	.14	2	.14				

PARAMETER VALUES

PS :	3.21	ALPHA :	.230	BETA :	.0025
(	3.06, 3.36 )	(	.210, .249 )	(	.0017, .0032 )

SAMPLE TEMP	.2°C	INCUBATION TEMP	.5°C
-------------	------	-----------------	------

CHLOROPHYLL :	.63	NITRATE :	4.75
---------------	-----	-----------	------

AMMONIA :	.43	SILICATE :	5.48
-----------	-----	------------	------

PHOSPHATE :	.68
-------------	-----

LABRADOR SHELF AND HUDSON BAY 1982

LAT	5°60.00' N	LONG	40°65.00' W	DATE	20/08/1982	DEPTH	10 M
I	P	I	P	I	P	I	P
490	4.32	419	4.10	383	5.03	339	5.08
319	4.07	267	4.30	245	4.25	239	3.88
175	4.34	171	4.40	169	5.10	124	4.80
120	4.62	118	5.30	88	4.86	84	4.63
82	4.73	60	4.46	59	4.95	46	4.73
38	3.67	34	3.69	25	3.13	20	2.21
20	2.14	15	1.87	14	1.73	11	1.36
11	1.38	8	.90	8	.82	7	.61
6	.56	5	.39	5	.42	4	.31
4	.23	3	.13	3	.14	2	.07
2	.11						

PARAMETER VALUES

PS :	5.27	ALPHA :	.166	BETA :	.0027
(	5.00, 5.54 )	(	.154, .177 )	(	.0016, .0038 )

SAMPLE TEMP                  2.7°C                  INCUBATION TEMP                  2.7°C

CHLOROPHYLL :                  .92                  NITRATE :                  .74

AMMONIA :                  1.20                  SILICATE :                  1.47

PHOSPHATE :                  .29

LABRADOR SHELF AND HUDSON BAY 1982

LAT	9°61.00' N	LONG	15°67.00' W	DATE	21/08/1982	DEPTH	45 M
I	P	I	P	I	P	I	P
478	1.93	439	1.37	347	1.92	339	1.83
331	1.53	327	2.49	255	2.53	247	2.07
231	2.38	183	2.19	167	2.37	128	2.84
120	2.39	92	2.90	80	2.51	80	2.32
62	2.57	60	2.46	58	2.53	42	2.53
36	2.50	29	1.96	26	1.97	21	1.92
20	1.80	15	1.21	14	1.42	11	.88
10	1.09	8	.64	8	.59	6	.52
6	.48	5	.38	5	.47	4	.26
3	.27	3	.27	2	.24	2	.16
2	.26						

PARAMETER VALUES

PS :	3.07	ALPHA :	.121	BETA :	.0041
(	2.91, 3.22 )	(	.113, .129 )	(	.0032, .0049 )

SAMPLE TEMP	1.5°C	INCUBATION TEMP	1.5°C
-------------	-------	-----------------	-------

CHLOROPHYLL :	1.48	NITRATE :	4.21
---------------	------	-----------	------

AMMONIA :	.76	SILICATE :	4.53
-----------	-----	------------	------

PHOSPHATE :	.66
-------------	-----

LABRADOR SHELF AND HUDSON BAY 1982

LAT	9°61.00' N	LONG	15°67.00' W	DATE	21/08/1982	DEPTH	10 M
I	P	I	P	I	P	I	P
458	2.29	419	2.15	327	2.36	319	1.93
303	2.29	243	2.17	227	2.51	215	2.12
159	2.54	159	2.11	155	2.55	128	2.15
120	2.08	100	2.23	96	2.37	82	2.36
78	1.97	66	1.88	60	1.52	58	2.00
50	1.78	42	1.48	36	1.71	31	1.25
27	1.40	21	.97	19	1.07	15	.77
14	.75	10	.48	10	.55	8	.34
8	.37	6	.22	6	.21	5	.10
5	.17	4	.11	4	.00	4	.16
3	.16	2	.01				

PARAMETER VALUES

PS :	2.49	ALPHA :	.061	BETA :	.0008
(	2.35, 2.64 )	(	.057, .065 )	(	.0003, .0014 )

SAMPLE TEMP	1.5°C	INCUBATION TEMP	1.5°C
-------------	-------	-----------------	-------

CHLOROPHYLL :	3.39	NITRATE :	.71
---------------	------	-----------	-----

AMMONIA :	.37	SILICATE :	1.62
-----------	-----	------------	------

PHOSPHATE :	.32
-------------	-----

LABRADOR SHELF AND HUDSON BAY 1982

LAT 61°17.70' N    LONG 69° 9.10' W    DATE 22/08/1982    DEPTH 45 M

I	P	I	P	I	P	I	P
450	.58	439	.77	399	1.02	359	1.29
255	1.63	223	1.81	163	2.21	159	1.99
120	2.10	120	2.24	104	1.87	88	2.02
66	2.10	60	1.92	50	2.01	46	2.21
36	1.97	33	2.08	26	2.05	24	1.75
20	1.62	18	1.71	14	1.60	14	1.60
11	1.63	99	1.14	8	.93	8	.83
6	.87	5	.35	4	.40	4	.35
3	.13	3	.16	2	.15		

PARAMETER VALUES

PS :	2.62	ALPHA :	.150	BETA :	.0059
(	2.48, 2.76 )	(	.139, .162 )	(	.0048, .0069 )

SAMPLE TEMP                          .2°C                          INCUBATION TEMP                  5.5°C

CHLOROPHYLL :                         .61                          NITRATE :                         .46

AMMONIA :                                .57                          SILICATE :                         .50

PHOSPHATE :                           .57

## LABRADOR SHELF AND HUDSON BAY 1982

LAT  $61^{\circ}17.70' N$  LONG  $69^{\circ}9.10' W$  DATE 22/08/1982 DEPTH 10 M

I	P	I	P	I	P	I	P
458	2.47	399	2.55	375	2.56	335	3.04
259	3.31	239	3.23	179	2.82	171	3.19
159	3.14	132	3.09	120	3.03	110	3.40
96	2.88	82	3.15	68	3.26	60	3.13
54	3.39	52	3.32	42	2.89	38	3.05
31	1.79	28	2.46	22	1.95	20	1.69
17	1.07	16	1.84	13	1.21	12	1.31
9	.77	9	.95	7	.57	6	.61
5	.46	5	.30	4	.19	4	.22
3	.21	3	.09	3	.21	2	.10

## PARAMETER VALUES

PS : 3.72	ALPHA : .124	BETA : .0032
( 3.52, 3.91 )	( .116, .132 )	( .0022, .0042 )

SAMPLE TEMP  $2.3^{\circ}C$  INCUBATION TEMP  $5.5^{\circ}C$ 

CHLOROPHYLL : .91 NITRATE : .00

AMMONIA : .45 SILICATE : .55

PHOSPHATE : .47

LABRADOR SHELF AND HUDSON BAY 1982

LAT 61° 6.50' N    LONG 69°32.30' W    DATE 23/08/1982    DEPTH 25 M

I	P	I	P	I	P	I	P
458	2.02	419	1.97	355	3.03	319	2.91
247	3.62	243	3.74	227	3.52	171	3.75
155	3.59	151	3.95	124	4.01	104	3.59
82	3.51	72	3.89	69	3.65	64	3.78
54	3.90	52	3.49	45	3.52	36	3.31
28	2.75	27	2.54	20	2.33	20	2.14
15	1.84	15	1.59	11	1.04	9	.63
9	.80	7	.55	6	.51	5	.44
4	.33	4	.35	3	.18	2	.14
2	.16						

PARAMETER VALUES

PS :	5.24	ALPHA :	.135	BETA :	.0097
(	4.92, 5.56 )	(	.128, .143 )	(	.0079, .0116 )

SAMPLE TEMP                          2.7°C                          INCUBATION TEMP                  6.5°C

CHLOROPHYLL :                      1.84                                  NITRATE :                      .29

AMMONIA :                            .57                                  SILICATE :                        1.18

PHOSPHATE :                        .58

LABRADOR SHELF AND HUDSON BAY 1982

LAT 61° 6.50' N    LONG 69°32.30' W    DATE 23/08/1982    DEPTH 10 M

I	P	I	P	I	P	I	P
466	3.39	419	3.50	311	3.30	303	3.71
279	3.28	215	3.53	211	3.49	199	3.12
144	3.25	140	3.28	124	3.33	110	4.06
108	3.59	96	3.27	82	3.57	66	3.33
60	3.37	58	3.63	48	3.42	48	3.67
38	3.12	36	2.58	32	2.98	27	2.15
26	2.02	19	1.74	18	1.72	14	1.19
13	1.17	12	.88	10	1.10	8	.59
7	.57	6	.45	6	.41	5	.26
4	.35	4	.24	4	.18	3	.10
3	.14	3	.06	2	.09		

PARAMETER VALUES

PS :	3.84	ALPHA :	.129	BETA :	.0014
(	3.65, 4.04 )	(	.120, .137 )	(	.0006, .0023 )

SAMPLE TEMP                    3.8°C                    INCUBATION TEMP            6.5°C

CHLOROPHYLL :                .42                    NITRATE :                .00

AMMONIA :                    .40                    SILICATE :                .31

PHOSPHATE :                .42

LABRADOR SHELF AND HUDSON BAY 1982

LAT 62°49.30' N    LONG 72°56.20' W    DATE 24/08/1982    DEPTH 45 M

I	P	I	P	I	P	I	P
458	.58	359	.49	331	.52	259	.58
255	.95	231	.90	191	.79	175	.79
163	.72	148	.05	104	.97	87	.81
76	.97	70	.03	60	.85	35	.90
26	.83	22	.81	20	.77	15	.56
14	.73	10	.61	10	.58	8	.40
7	.31	6	.24	6	.37	5	.25
4	.23	2	.15	2	.18	2	.08
2	.11		.03		.00		

PARAMETER VALUES

PS :	1.10	ALPHA :	.067	BETA :	.0018
(	1.03, 1.16	)	( .062, .073 )	( .0013, .0022 )	

SAMPLE TEMP                          .4°C                          INCUBATION TEMP                  2.5°C

CHLOROPHYLL :                        .21                          NITRATE :                        3.79

AMMONIA :                            1.05                          SILICATE :                        .82

PHOSPHATE :                        2.46

LABRADOR SHELF AND HUDSON BAY 1982

LAT 62°49.30' N		LONG 72°56.20' W		DATE 24/08/1982		DEPTH	10 M
I	P	I	P	I	P	I	P
466	1.54	399	1.28	331	1.31	323	1.16
259	1.09	231	1.74	223	1.58	203	1.24
175	1.76	159	1.59	159	1.54	128	1.86
120	1.47	112	1.69	92	1.58	90	1.49
64	1.63	59	1.33	49	1.73	42	1.33
37	1.11	30	1.18	26	1.51	22	1.14
15	.93	15	1.00	12	.73	11	.75
99	.62	8	.70	7	.39	6	.49
55	.28	5	.36	4	.14	3	.25
3	.05	3	.18	2	.04	2	.10

PARAMETER VALUES

PS :	1.70	ALPHA :	.085	BETA :	.0011
(	.1.61, 1.80 )	(	.077, .093 )	(	.0006, .0015 )

SAMPLE TEMP            3.8°C            INCUBATION TEMP            2.5°C

CHLOROPHYLL :        .30            NITRATE :        .00

AMMONIA :        .33            SILICATE :        .20

PHOSPHATE :        .37

LABRADOR SHELF AND HUDSON BAY 1982

LAT 62° .40' N    LONG 78°35.00' W    DATE 25/08/1982    DEPTH 25 M

I	P	I	P	I	P	I	P
458	.48	411	.60	359	.75	331	.80
331	.69	259	.94	255	.81	231	.82
191	1.27	175	1.37	163	1.37	148	1.42
112	1.49	104	1.36	76	1.61	70	1.74
60	1.43	49	1.64	42	1.52	31	1.43
26	1.41	22	1.00	20	1.11	15	1.21
14	1.18	10	.97	10	1.04	8	.88
7	.98	6	.50	6	.77	5	.32
4	.58	3	.46	3	.35	2	.22
2	.18	2	.18				

PARAMETER VALUES

PS :	1.90	ALPHA :	.127	BETA :	.0051
(	1.81, 2.00 )	(	.118, .136 )	(	.0044, .0059 )

SAMPLE TEMP                          .7°C                          INCUBATION TEMP                  2.0°C

CHLOROPHYLL :                      1.07                          NITRATE :                      3.00

AMMONIA :                          .46                          SILICATE :                      7.94

PHOSPHATE :                      .85

LABRADOR SHELF AND HUDSON BAY 1982

LAT	62° .40' N	LONG	78°35.00' W	DATE	25/08/1982	DEPTH	10 M
I	P	I	P	I	P	I	P
466	2.85	399	3.40	331	3.53	323	3.23
231	4.18	223	3.85	203	3.02	175	3.85
159	2.85	159	3.64	128	3.87	120	3.51
112	3.83	92	3.86	80	3.72	64	3.96
63	3.83	59	3.77	49	3.30	42	2.86
37	3.01	26	2.05	22	1.78	20	2.55
15	1.86	15	1.91	12	1.19	11	1.05
99	.85	8	.85	7	.53	6	.63
55	.41	5	.45	4	.30	3	.27
3	.17	3	.13	2	.07	2	.26

PARAMETER VALUES

PS :	4.23	ALPHA :	.138	BETA :	.0030
(	4.00, 4.46	)	( .128, .148 )	( .0019, .0042 )	

SAMPLE TEMP            3.7°C            INCUBATION TEMP            2.0°C

CHLOROPHYLL :        .34            NITRATE :        .00

AMMONIA :        .38            SILICATE :        2.43

PHOSPHATE :        .57

LABRADOR SHELF AND HUDSON BAY 1982

LAT  $62^{\circ}53.00' N$  LONG  $82^{\circ}25.00' W$  DATE 26/08/1982 DEPTH 25 M

I	P	I	P	I	P	I	P
439	1.77	419	1.56	339	1.74	335	1.55
331	1.52	237	1.20	235	1.45	219	1.68
175	1.54	159	1.38	159	1.31	124	1.50
110	1.93	106	1.63	96	1.34	84	1.74
78	1.87	60	1.85	58	1.79	46	1.80
36	1.59	30	1.45	28	1.18	24	1.37
24	1.15	18	.69	17	.79	14	.57
12	.75	10	.55	10	.70	7	.21
7	.36	6	.11	6	.24	4	.31
4	.22	4	.28	3	.13	3	.15
3	.10						

PARAMETER VALUES

PS :	1.74	ALPHA :	.077	BETA :	.0006
(	1.63, 1.85 )	(	.069, .084 )	(	.0001, .0011 )

SAMPLE TEMP  $.8^{\circ}C$  INCUBATION TEMP  $10.5^{\circ}C$

CHLOROPHYLL : .16 NITRATE : .00

AMMONIA : .37 SILICATE : 2.13

PHOSPHATE : .64

LABRADOR SHELF AND HUDSON BAY 1982

LAT 62°53.00' N		LONG 82°25.00' W		DATE 26/08/1982		DEPTH	10 M
I	P	I	P	I	P	I	P
323	2.44	242	2.38	235	2.77	219	2.38
175	2.80	165	2.45	163	2.28	126	2.31
120	2.08	108	2.40	91	2.12	78	2.56
78	2.71	58	2.39	56	1.89	47	2.23
41	1.70	35	2.28	28	1.48	27	1.71
24	1.03	20	1.14	17	.93	16	.90
12	.60	12	.39	7	.55	5	.58
5	.54	4	.32	3	.00	3	.01
2	.03	2	.00				

PARAMETER VALUES

PS :	2.60	ALPHA :	.080	BETA :	.0005
(	2.34, 2.87 )	(	.072, .088 )	(	-.0008, .0019 )

SAMPLE TEMP            5.7°C            INCUBATION TEMP            10.5°C

CHLOROPHYLL :        .07            NITRATE :        .00

AMMONIA :        .27            SILICATE :        2.18

PHOSPHATE :        .46

LABRADOR SHELF AND HUDSON BAY 1982

LAT  $63^{\circ}31.30' N$  LONG  $88^{\circ}22.50' W$  DATE 27/08/1982 DEPTH 30 M

I	P	I	P	I	P	I	P
439	.53	435	.44	359	1.12	343	.94
325	.94	259	1.51	199	1.50	163	1.55
161	1.59	148	1.76	136	1.51	116	1.64
106	1.72	102	1.52	84	1.77	73	1.64
72	1.70	65	1.78	54	1.79	49	1.83
47	1.93	42	1.97	35	1.83	32	1.41
27	1.28	22	.99	22	1.23	17	1.03
17	1.03	13	.82	12	.84	10	.58
9	.65	8	.45	7	.42	6	.31
6	.30	5	.21	4	.23	4	.14
3	.11	3	.07	3	.09		

PARAMETER VALUES

PS :	2.51	ALPHA :	.079	BETA :	.0073
(	2.33, 2.68 )	(	.074, .084 )	(	.0059, .0086 )

SAMPLE TEMP .2°C INCUBATION TEMP 4.5°C

CHLOROPHYLL : 2.25 NITRATE : .83

AMMONIA : .73 SILICATE : 5.85

PHOSPHATE : .87

LABRADOR SHELF AND HUDSON BAY 1982

LAT  $63^{\circ}31.30' N$  LONG  $88^{\circ}22.50' W$  DATE 27/08/1982 DEPTH 10 M

I	P	I	P	I	P	I	P
439	4.38	439	4.64	367	4.69	315	4.37
303	5.00	259	4.84	250	4.53	189	4.94
175	4.46	167	4.86	153	4.38	128	4.16
112	4.48	110	4.31	86	4.30	80	4.16
76	3.57	63	3.93	57	4.02	42	2.76
36	3.18	30	2.39	28	2.81	22	1.64
20	2.60	15	1.26	12	.91	11	.64
8	.48	8	.34	6	.67	6	.56
5	.21	5	.72	4	.14	3	.31
3	.17	3	.00	3	.02		

PARAMETER VALUES

PS :	4.89	ALPHA :	.113	BETA :	.0008
(	4.60, 5.18	)	( .106, .121 )	( -.0002, .0018 )	

SAMPLE TEMP  $5.7^{\circ}C$  INCUBATION TEMP  $4.5^{\circ}C$

CHLOROPHYLL : .12 NITRATE : .00

AMMONIA : .41 SILICATE : .65

PHOSPHATE : .36

LABRADOR SHELF AND HUDSON BAY 1982

LAT  $63^{\circ}10.00' N$  LONG  $81^{\circ}43.00' W$  DATE 28/08/1982 DEPTH 40 M

I	P	I	P	I	P	I	P
439	.53	387	.46	355	.70	311	.16
255	1.36	231	1.85	219	1.40	177	1.42
169	1.60	159	1.45	136	2.05	126	1.46
116	1.45	95	1.77	85	1.41	67	1.77
58	1.92	38	1.84	30	1.65	28	1.67
22	1.66	18	1.32	16	1.48	13	1.01
12	1.53	99	1.04	99	.92	7	.60
7	.68	55	.49	5	.49	4	.40
3	.28	3	.24	2	.24	2	.13

PARAMETER VALUES

PS :	2.25	ALPHA :	.133	BETA :	.0057
(	2.08, 2.41 )	(	.120, .145 )	(	.0044, .0070 )

SAMPLE TEMP .2°C INCUBATION TEMP 3.5°C

CHLOROPHYLL : .95 NITRATE : .40

AMMONIA : .39 SILICATE : 3.17

PHOSPHATE : .72

LABRADOR SHELF AND HUDSON BAY 1982

LAT 63°10.00' N		LONG 81°43.00' W		DATE 28/08/1982		DEPTH	10 M
I	P	I	P	I	P	I	P
439	4.92	375	5.62	335	5.14	335	4.56
299	5.90	235	5.16	227	5.13	199	4.89
154	5.42	151	4.97	110	5.11	109	5.10
84	4.44	80	5.08	76	4.61	64	3.73
60	4.75	46	3.73	44	3.01	37	3.82
31	2.76	29	2.59	23	2.21	23	1.94
18	1.56	18	1.41	14	1.26	14	.98
10	.71	10	.66	8	.67	7	.52
6	.27	5	.12	4	.15	3	.20
2	.05						

PARAMETER VALUES

PS :	5.94	ALPHA :	.116	BETA :	.0024
(	5.45, 6.43 )	(	.109, .124 )	(	.0006, .0042 )

SAMPLE TEMP	5.0°C	INCUBATION TEMP	3.5°C
-------------	-------	-----------------	-------

CHLOROPHYLL :	.14	NITRATE :	.00
---------------	-----	-----------	-----

AMMONIA :	.46	SILICATE :	.83
-----------	-----	------------	-----

PHOSPHATE :	.47
-------------	-----

LABRADOR SHELF AND HUDSON BAY 1982

	LAT 64° 7.00' N		LONG 79° 6.00' W		DATE 29/08/1982	DEPTH 40 M	
	P	I	P	I	P	I	P
458	.47	419	.42	379	.85	327	.65
307	.75	275	.82	259	1.16	191	1.21
167	1.10	167	1.27	148	1.09	116	.97
113	1.17	100	1.23	82	1.11	81	.91
72	1.14	59	1.01	56	.98	52	.96
46	.82	39	1.13	32	.93	30	.79
23	.79	18	.80	14	.60	11	.68
11	.60	99	.41	8	.50	6	.44
6	.37	55	.23	5	.24	4	.16
4	.21	3	.14	3	.16		

PARAMETER VALUES

PS :	1.31	ALPHA :	.059	BETA :	.0021
(	1.22, 1.40 )	(	.053, .065 )	(	.0015, .0026 )

SAMPLE TEMP	.5°C	INCUBATION TEMP	1.5°C
-------------	------	-----------------	-------

CHLOROPHYLL :	1.53	NITRATE :	3.46
---------------	------	-----------	------

AMMONIA :	.64	SILICATE :	3.43
-----------	-----	------------	------

PHOSPHATE :	.94
-------------	-----

LABRADOR SHELF AND HUDSON BAY 1982

LAT 64° 7.00' N    LONG 79° 6.00' W    DATE 29/08/1982    DEPTH 10 M

I	P	I	P	I	P	I	P
335	2.48	319	1.87	263	2.03	239	2.15
235	2.39	207	2.43	171	2.16	159	1.85
151	2.26	120	2.25	116	2.40	64	2.34
59	1.98	58	2.39	47	2.09	38	2.19
34	1.60	30	1.65	25	1.14	23	1.26
18	.88	16	.98	14	1.11	14	.76
11	.54	11	.61	9	.38	9	.34
7	.35	5	.14	6	.16	4	.08
3	.16	3	.04	3	.05		

PARAMETER VALUES

PS : 2.65	ALPHA : .077	BETA : .0020
( 2.39, 2.92 )	( .070, .083 )	( .0006, .0034 )

SAMPLE TEMP                  1.0°C                  INCUBATION TEMP                  1.5°C

CHLOROPHYLL : 1.10                  NITRATE : .00

AMMONIA : .43                  SILICATE : .30

PHOSPHATE : .35

LABRADOR SHELF AND HUDSON BAY 1982

LAT  $65^{\circ}10.30' N$  LONG  $79^{\circ}14.80' W$  DATE 30/08/1982 DEPTH 30 M

I	P	I	P	I	P	I	P
419	2.40	399	2.26	359	2.78	239	3.28
239	2.94	155	2.86	132	2.87	104	3.13
78	3.03	67	2.55	56	2.06	20	2.08
18	2.04	16	1.55	15	1.40	12	.61
12	.84	10	.68	9	.65	7	.47
5	.43	4	.40	4	.20	3	.17
3	.14	2	.09				

PARAMETER VALUES

PS :	3.33	ALPHA :	.104	BETA :	.0022
(	3.03, 3.62 )	(	.093, .115 )	(	.0009, .0035 )

SAMPLE TEMP .2°C INCUBATION TEMP 1.2°C

CHLOROPHYLL : 1.35 NITRATE : 1.08

AMMONIA : .78 SILICATE : 2.61

PHOSPHATE : .78

LABRADOR SHELF AND HUDSON BAY 1982

LAT  $65^{\circ}10.30' N$  LONG  $79^{\circ}14.80' W$  DATE 30/08/1982 DEPTH 10 M

I	P	I	P	I	P	I	P
399	2.68	371	2.37	291	1.84	219	2.33
219	2.03	211	2.05	171	1.81	116	2.50
106	1.85	81	2.29	76	1.95	60	2.29
56	1.94	45	1.58	44	1.58	36	1.73
30	1.07	28	1.32	22	1.05	21	.76
16	.71	16	.64	13	.58	12	.58
99	.40	99	.38	7	.43	7	.34
66	.18	66	.21	5	.14	4	.14
3	.08	3	.11	3	.12	2	.08

PARAMETER VALUES

PS :	2.24	ALPHA :	.063	BETA :	.0000
(	2.03, 2.45 )	(	.057, .068 )	(	-.0008, .0008 )

SAMPLE TEMP .2°C INCUBATION TEMP 1.2°C

CHLOROPHYLL : 1.33 NITRATE : 1.68

AMMONIA : .48 SILICATE : 3.04

PHOSPHATE : .64

LABRADOR SHELF AND HUDSON BAY 1982

LAT  $63^{\circ}16.00' N$  LONG  $74^{\circ}43.00' W$  DATE 31/08/1982 DEPTH 40 M

I	P	I	P	I	P	I	P
419	.47	399	.33	363	.74	339	.51
299	.64	267	1.06	255	.96	215	.85
197	1.22	155	.92	148	1.21	144	1.06
108	1.07	102	1.18	102	1.22	78	1.06
76	.98	56	1.15	54	1.24	53	1.12
44	.90	40	1.23	30	1.23	22	1.16
21	.96	17	.99	16	1.09	13	.74
12	.71	10	.49	9	.62	8	.44
7	.47	6	.33	5	.23	4	.27
4	.22	4	.16	3	.13	3	.13
3	.11						

PARAMETER VALUES

PS :	1.43	ALPHA :	.082	BETA :	.0031
(	1.33, 1.51 )	(	.074, .090 )	(	.0025, .0038 )

SAMPLE TEMP	.7°C	INCUBATION TEMP	1.5°C
-------------	------	-----------------	-------

CHLOROPHYLL :	1.69	NITRATE :	2.99
---------------	------	-----------	------

AMMONIA :	.97	SILICATE :	1.12
-----------	-----	------------	------

PHOSPHATE :	.66
-------------	-----

LABRADOR SHELF AND HUDSON BAY 1982

LAT 63°16.00' N		LONG 74°43.00' W		DATE 31/08/1982		DEPTH 10 M	
I	P	I	P	I	P	I	P
419	1.30	355	1.19	323	1.70	299	1.44
255	1.34	231	1.32	163	1.69	151	1.67
124	1.57	98	1.61	68	1.81	64	1.82
63	1.75	50	1.50	46	1.75	35	1.43
34	1.35	27	1.01	26	1.19	20	1.33
18	1.00	16	.93	14	.68	12	.72
10	.50	9	.59	8	.38	7	.38
6	.28	6	.16	5	.16	4	.12
4	.13	3	.22	3	.12	3	.00

PARAMETER VALUES

PS :	2.02	ALPHA :	.072	BETA :	.0024
(	1.88, 2.15 )	(	.067, .077 )	(	.0017, .0031 )

SAMPLE TEMP            2.7°C            INCUBATION TEMP            1.5°C

CHLOROPHYLL :        .27            NITRATE :        .00

AMMONIA :        .45            SILICATE :        .23

PHOSPHATE :        .35

LABRADOR SHELF AND HUDSON BAY 1982

LAT  $62^{\circ}13.00' N$  LONG  $70^{\circ}42.20' W$  DATE 01/09/1982 DEPTH 35 M

I	P	I	P	I	P	I	P
419	.35	399	.38	363	.66	339	.76
267	1.21	255	1.10	197	1.12	155	1.54
148	1.58	144	1.64	102	1.48	102	1.29
76	1.31	76	1.66	56	1.64	54	1.49
53	1.55	44	1.57	40	1.36	31	1.28
30	1.24	22	1.39	21	1.35	17	1.30
16	1.18	13	.94	12	.96	10	.73
99	.70	8	.55	7	.57	6	.36
5	.41	4	.36	4	.30	4	.36
3	.03	3	.00	3	.00		

PARAMETER VALUES

PS :	2.07	ALPHA :	.093	BETA :	.0060
(	1.92, 2.21 )	(	.085, .100 )	(	.0048, .0073 )

SAMPLE TEMP  $.6^{\circ}C$  INCUBATION TEMP  $1.2^{\circ}C$

CHLOROPHYLL : 1.46 NITRATE : 2.73

AMMONIA : 1.40 SILICATE : 2.27

PHOSPHATE : .68

LABRADOR SHELF AND HUDSON BAY 1982

LAT 62°13.00' N    LONG 70°42.20' W    DATE 01/09/1982    DEPTH 10 M

I	P	I	P	I	P	I	P
419	2.54	419	2.83	355	2.69	323	2.74
299	2.35	255	2.48	231	2.26	227	2.68
171	2.61	151	2.38	124	2.39	116	2.81
114	2.60	98	2.42	90	2.58	85	2.52
68	2.41	63	2.18	50	2.05	46	2.44
35	1.96	27	1.87	26	1.41	20	1.63
18	1.03	16	1.21	14	.89	12	.76
10	.60	9	.67	8	.47	7	.32
6	.29	6	.32	5	.19	4	.12
4	.13	3	.17	3	.11	3	.10

PARAMETER VALUES

PS : 2.60	ALPHA : .089	BETA : .0000
( 2.48, 2.72 )	( .083, .095 )	( -.0004, .0005 )

SAMPLE TEMP                  3.2°C                  INCUBATION TEMP                  1.2°C

CHLOROPHYLL : .20                  NITRATE : .02

AMMONIA : .44                  SILICATE : .40

PHOSPHATE : .31

## LABRADOR SHELF AND HUDSON BAY 1982

LAT 62° .00' N    LONG 64°35.00' W    DATE 02/09/1982    DEPTH 60 M

I	P	I	P	I	P	I	P
423	.64	359	.97	355	.56	343	1.16
283	.90	263	1.44	243	1.83	199	1.42
185	1.82	140	1.38	126	1.69	96	1.71
84	1.96	69	1.80	61	2.13	61	2.14
49	2.03	48	1.89	41	1.52	33	2.05
30	1.73	26	1.95	21	1.85	20	1.67
16	1.56	16	1.57	15	1.21	12	1.29
12	1.29	99	1.36	7	.95	7	.88
5	.61	5	.58	4	.48	3	.49
3	.40	3	.43	2	.44	2	.19

## PARAMETER VALUES

PS : . 2.29	ALPHA : . 167	BETA : . 0055
( 2.18, 2.41 )	( .153, .180 )	( .0045, .0064 )

SAMPLE TEMP                  1.0°C                  INCUBATION TEMP                  1.5°C

CHLOROPHYLL : .34                  NITRATE : 6.46

AMMONIA : .50                  SILICATE : 8.20

PHOSPHATE : 1.02

LABRADOR SHELF AND HUDSON BAY 1982

LAT	62° .00' N	LONG	64°35.00' W	DATE	02/09/1982	DEPTH	10 M
I	P	I	P	I	P	I	P
399	3.61	379	3.12	311	4.44	303	4.52
239	4.49	231	4.45	211	4.38	159	4.50
155	4.00	148	4.47	106	4.71	96	5.00
82	4.42	62	4.72	58	3.77	53	4.22
48	3.77	41	3.60	38	4.46	30	2.84
23	2.43	22	2.37	17	1.97	17	1.90
14	1.39	13	1.03	11	1.14	10	.56
9	.62	8	.82	7	.52	6	.37
4	.28	4	.37	3	.17	3	.16
3	.07						

PARAMETER VALUES

PS :	5.92	ALPHA :	.139	BETA :	.0075
(	5.41, 6.44	)	( .129, .148 )	( .0049, .0102 )	

SAMPLE TEMP                    1.0°C                    INCUBATION TEMP            1.5°C

CHLOROPHYLL :                .30                    NITRATE :                .00

AMMONIA :                    .32                    SILICATE :                .99

PHOSPHATE :                .49

## LABRADOR SHELF AND HUDSON BAY 1982

LAT 62°23.70' N    LONG 60°27.70' W    DATE 03/09/1982    DEPTH 40 M

I	P	I	P	I	P	I	P
407	.53	375	.53	331	.90	321	.63
291	.59	229	.10	207	1.17	157	1.30
155	1.40	114	1.49	107	1.47	79	1.52
72	1.61	58	1.49	51	1.56	43	1.53
37	1.46	30	1.52	28	1.55	20	1.38
14	1.40	13	1.18	11	.81	11	1.03
96	.88	88	.93	7	.60	7	.55
64	.50	53	.37	4	.32	4	.30
	.26		.20	3	.23	3	.14

## PARAMETER VALUES

PS :	2.02	ALPHA :	.118	BETA :	.0062
(	1.91, 2.12 )	(	.111, .126 )	(	.0053, .0071 )

SAMPLE TEMP                  3.6°C                  INCUBATION TEMP                  1.2°C

CHLOROPHYLL :                  .52                  NITRATE :                  .94

AMMONIA :                  .77                  SILICATE :                  1.35

PHOSPHATE :                  .34

LABRADOR SHELF AND HUDSON BAY 1982

LAT 62°23.70' N    LONG 60°27.70' W    DATE 03/09/1982    DEPTH 10 M

I	P	I	P	I	P	I	P
439	2.44	411	2.61	311	2.54	303	2.51
279	2.26	219	2.63	195	2.34	185	2.06
144	2.27	128	2.40	128	2.08	100	2.25
95	2.15	72	2.11	68	2.17	66	2.13
55	2.29	51	2.19	49	2.11	43	1.80
40	1.93	34	1.75	28	1.46	26	1.56
20	1.22	19	1.34	14	.93	14	1.01
11	.61	10	.56	8	.54	8	.63
6	.40	6	.37	5	.22	5	.24
4	.17	4	.11	3	.10	2	.12
2	.05						

PARAMETER VALUES

PS :	2.39	ALPHA :	.086	BETA :	.0000
(	2.30, 2.48 )	(	.081, .090 )	(	-.0004, .0004 )

SAMPLE TEMP                  6.0°C                  INCUBATION TEMP                  1.2°C

CHLOROPHYLL :                  .28                  NITRATE :                  .00

AMMONIA :                  .18                  SILICATE :                  1.48

PHOSPHATE :                  .27

## LABRADOR SHELF AND HUDSON BAY 1982

LAT 60°39.00' N    LONG 61°31.00' W    DATE 04/09/1982    DEPTH 60 M

	P		P		P		P
391	.99	375	.71	291	1.00	261	.92
203	1.04	159	.91	114	.82	81	.98
74	.98	57	.93	53	1.08	45	.80
37	.86	32	1.09	27	.96	20	1.06
17	1.06	14	.64	14	.84	10	.70
10	.40	8	.56	7	.34	6	.39
5	.17	4	.27	3	.14	3	.15
3	.00	2	.13	2	.03		

## PARAMETER VALUES

PS :	1.03	ALPHA :	.086	BETA :	.0004
(	.96, 1.10 )	(	.075, .096 )	(	.0001, .0008 )

SAMPLE TEMP	.2°C	INCUBATION TEMP	2.5°C
-------------	------	-----------------	-------

CHLOROPHYLL :	.14	NITRATE :	8.74
---------------	-----	-----------	------

AMMONIA :	.71	SILICATE :	9.15
-----------	-----	------------	------

PHOSPHATE :	.97
-------------	-----

## LABRADOR SHELF AND HUDSON BAY 1982

LAT  $60^{\circ}39.00' N$  LONG  $61^{\circ}31.00' W$  DATE 04/09/1982 DEPTH 10 M

I	P	I	P	I	P	I	P
431	1.97	387	2.50	331	2.78	311	2.34
231	2.63	219	2.35	211	2.18	155	2.20
140	2.32	120	2.36	100	2.54	98	2.63
86	2.37	74	2.11	69	2.68	51	2.39
48	2.52	34	1.73	33	2.04	26	1.94
24	1.42	19	1.22	18	.89	14	.83
13	.84	10	.50	10	.54	8	.48
7	.45	6	.32	6	.29	5	.18
4	.21	4	.16	3	.14	3	.13
2	.09	2	.07	2	.05		

## PARAMETER VALUES

PS :	2.71	ALPHA :	.087	BETA :	.0012
(	2.54, 2.88	)	( .080, .094 )	(	.0004, .0019 )

SAMPLE TEMP  $2.1^{\circ}C$  INCUBATION TEMP  $2.5^{\circ}C$ 

CHLOROPHYLL : 2.97 NITRATE : .89

AMMONIA : .49 SILICATE : 1.06

PHOSPHATE : .33

## LABRADOR SHELF AND HUDSON BAY 1982

LAT 60°31.00' N    LONG 64°23.00' W    DATE 05/09/1982    DEPTH 40 M

I	P	I	P	I	P	I	P
439	1.86	399	1.45	331	2.17	303	2.09
299	2.05	211	2.04	159	1.82	151	1.85
108	1.77	108	1.98	84	1.80	74	2.07
74	1.79	60	2.01	54	2.03	52	1.85
44	2.24	34	1.86	27	2.00	25	1.91
18	1.68	12	1.01	11	.96	8	.65
7	.63	6	.64	4	.61	4	.49
4	.34	3	.36	3	.32	2	.14
2	.09	2	.14				

## PARAMETER VALUES

PS : 2.05	ALPHA : .143	BETA : .0005
( 1.97, 2.13 )	( .130, .156 )	( .0001, .0009 )

SAMPLE TEMP                  1.0°C                  INCUBATION TEMP                  2.5°C

CHLOROPHYLL : .23                  NITRATE : 6.91

AMMONIA : .84                  SILICATE : 7.24

PHOSPHATE : .77

LABRADOR SHELF AND HUDSON BAY 1982

LAT  $60^{\circ}31.00' N$  LONG  $64^{\circ}23.00' W$  DATE 05/09/1982 DEPTH 10 M

I	P	I	P	I	P	I	P
411	2.27	371	2.53	287	2.89	259	2.49
195	2.58	187	2.70	151	2.97	144	2.54
104	2.97	94	2.54	88	2.92	70	2.24
56	2.27	52	1.95	48	2.07	36	1.70
30	1.87	26	1.67	25	1.84	18	1.03
18	1.53	14	1.02	14	1.28	11	.96
11	.68	9	.92	8	.65	7	.39
6	.61	5	.48	5	.75	4	.24
4	.44	3	.15	3	.23	2	.14
2	.03						

PARAMETER VALUES

PS :	2.88	ALPHA :	.093	BETA :	.0011
(	2.72, 3.05	)	( .087, .099 )	( .0004, .0019 )	

SAMPLE TEMP             $1.0^{\circ}\text{C}$             INCUBATION TEMP             $2.5^{\circ}\text{C}$

CHLOROPHYLL :        .25                            NITRATE :        6.41

AMMONIA :            .96                            SILICATE :        6.90

PHOSPHATE :        .92

## LABRADOR SHELF AND HUDSON BAY 1982

LAT  $61^{\circ}13.70' N$  LONG  $64^{\circ}59.20' W$  DATE 06/09/1982 DEPTH 50 M

I	P	I	P	I	P	I	P
462	1.98	419	2.20	331	2.06	327	1.87
295	1.81	207	2.23	207	2.38	157	2.58
155	2.49	132	2.67	112	2.18	96	2.49
71	2.33	69	2.48	59	2.52	52	2.43
45	2.27	27	1.92	24	1.93	19	1.56
18	1.64	14	1.07	14	1.23	11	.85
10	.85	8	.48	7	.68	7	.84
6	.34	5	.34	5	.28	4	.20
3	.22	3	.15	2	.13	2	.08

## PARAMETER VALUES

PS :	2.80	ALPHA :	.112	BETA :	.0025
(	2.68, 2.93 )	(	.105, .118 )	(	.0019, .0031 )

SAMPLE TEMP .9°C INCUBATION TEMP 5.1°C

CHLOROPHYLL : 1.02 NITRATE : 4.29

AMMONIA : 1.03 SILICATE : 4.49

PHOSPHATE : .73

## LABRADOR SHELF AND HUDSON BAY 1982

LAT  $61^{\circ}13.70' N$  LONG  $64^{\circ}59.20' W$  DATE 06/09/1982 DEPTH 10 M

I	P	I	P	I	P	I	P
391	2.56	307	2.75	287	2.20	271	3.03
211	2.52	191	2.44	183	2.90	148	3.01
144	2.34	104	3.02	86	3.31	75	2.89
66	2.68	56	2.65	54	3.04	50	2.05
42	2.29	35	2.09	33	2.78	27	2.13
24	2.23	20	1.48	18	1.70	14	1.08
14	.92	11	.61	11	.81	99	.53
8	.50	6	.41	6	.33	6	.29
5	.27	4	.24	3	.21	3	.18
2	.10	2	.15				

## PARAMETER VALUES

PS : 3.34	ALPHA : .105	BETA : .0030
( 3.04, 3.64 )	( .096, .114 )	( .0014, .0045 )

SAMPLE TEMP  $1.6^{\circ}C$  INCUBATION TEMP  $5.1^{\circ}C$ 

CHLOROPHYLL : 1.27 NITRATE : 3.27

AMMONIA : .51 SILICATE : 3.55

PHOSPHATE : .65



PROFILE DATA



**UNITS**

T = °C

Sal = 0/00

Oxy = mg L<sup>-1</sup>NO<sub>3</sub> = mg at m<sup>-3</sup>SiO<sub>3</sub> = mg at m<sup>-3</sup>PO<sub>4</sub> = mg at m<sup>-3</sup>Chl = mg m<sup>-3</sup>

LABRADOR SHELF AND HUDSON BAY 1982

LAT 46°56.1 ' N                    LONG 59°33.4 ' W                    DATE 13/08/1982

Z	TEMP	SAL	OXY	NO3	SIO3	PO4	CHL
1	16.10	30.04	6.11	.00	1.93	.61	.66
10	15.60	30.08	6.20	.00	2.00	.61	.96
20	14.50	30.25	6.15	.00	2.09	.63	1.35
32	12.30	31.06	6.56	1.46	2.33	1.56	1.13
51	1.40	31.90	-	8.26	9.12	1.47	.10
102	1.10	32.89	7.22	7.60	6.10	1.28	.05
150	4.00	34.03	4.08	20.10	22.45	1.88	.03
210	5.00	34.33	3.62	22.36	25.05	1.98	.02
305	5.30	34.80	3.48	23.64	29.07	2.00	.00

LABRADOR SHELF AND HUDSON BAY 1982

LAT  $53^{\circ}53.0'$  N      LONG  $54^{\circ}50.8'$  W      DATE 15/08/1982

Z	TEMP	SAL	OXY	NO3	SIO3	PO4	CHL
1	8.77	31.53	7.76	-	-	-	.24
2	8.77	31.53	7.04	.00	.83	.59	.24
10	8.74	31.52	7.02	.00	.82	.59	.26
13	8.75	31.54	4.21	.00	.81	.53	.23
23	.31	32.66	5.23	.00	.81	.74	.14
41	-1.23	32.98	8.27	6.15	.81	1.10	.22
68	-1.45	33.14	7.63	9.40	2.90	1.26	.41
91	-	33.29	7.62	10.19	8.56	1.26	.14
117	-1.17	33.40	7.53	10.49	8.75	1.35	.10
140	-.97	33.52	7.38	10.94	8.83	1.60	.06

## LABRADOR SHELF AND HUDSON BAY 1982

LAT 54°27.9 ' N      LONG 55°22.3 ' W      DATE 16/08/1982

Z	TEMP	SAL	OXY	NO3	SIO3	PO4	CHL
1	8.33	31.54	7.15	.00	.87	.69	-
14	6.61	31.64	7.61	.00	.82	.59	-
24	1.24	32.30	9.63	.00	.84	.80	-
34	-.50	32.77	9.48	.00	.82	.85	-
53	-1.40	32.96	7.93	6.30	.78	1.11	-
78	-1.44	33.12	7.54	9.00	5.77	1.31	-
103	-1.30	33.28	7.65	9.19	8.47	1.25	-
128	-.65	33.49	7.54	9.69	8.69	1.27	-

## LABRADOR SHELF AND HUDSON BAY 1982

LAT 54°45.0 ' N      LONG 55°52.0 ' W      DATE 16/08/1982

Z	TEMP	SAL	OXY	NO3	SIO3	PO4	CHL
13	7.10	31.84	7.66	-	-	-	-
20	1.93	32.20	8.91	1.15	.94	.76	.20
30	-.19	32.57	9.72	.43	1.02	.66	.18
34	-.86	32.78	9.40	.43	.80	.79	.25
54	-1.46	32.99	7.49	8.66	3.60	1.33	1.29
79	-1.35	33.18	7.46	10.05	10.18	1.37	.17
108	-1.28	33.27	7.43	10.25	10.60	1.36	.09
204	-.15	33.70	7.08	13.93	11.24	1.45	.06
266	1.33	34.17	6.74	14.98	12.96	1.55	.04

## LABRADOR SHELF AND HUDSON BAY 1982

LAT 55°08.2 ' N      LONG 56°40.2 ' W      DATE 17/08/1982

Z	TEMP	SAL	OXY	NO3	SIO3	PO4	CHL
1	-	31.66	7.56	.52	.94	.98	-
10	-	31.83	7.90	.00	.83	.64	-
15	-	32.58	9.89	.00	.81	.71	-
20	-	32.72	9.45	.00	.77	.86	-
30	-	32.80	7.62	7.35	1.21	1.42	-
50	-	32.87	7.65	7.56	3.40	1.77	-
75	-	32.95	7.53	8.47	5.40	1.32	-
100	-	-	7.47	9.04	7.80	1.34	-
125	-	33.10	7.40	9.53	10.01	1.39	-
150	-	33.29	7.32	10.27	11.39	1.71	-

LABRADOR SHELF AND HUDSON BAY 1982

LAT 55°23.9 ' N                    LONG 57°25.3 ' W                    DATE 17/08/1982

Z	TEMP	SAL	OXY	NO3	SIO3	PQ4	CHL
3	6.68	31.67	7.50	.62	.92	.80	.37
12	6.60	31.97	7.55	.77	.91	.94	.36
16	6.17	31.75	7.89	1.52	.89	.93	.31
22	3.23	31.96	8.81	.00	.81	.72	.21
32	-.69	32.64	9.34	.53	.82	.83	.19
60	-1.49	32.83	7.62	7.56	5.33	1.30	.82
78	-1.51	32.90	7.42	8.57	5.76	1.36	.54
103	-1.42	33.02	7.38	9.72	11.23	1.40	.10
129	-1.33	33.14	7.25	10.06	11.50	1.52	.16

## LABRADOR SHELF AND HUDSON BAY 1982

LAT 55°45.0 ' N      LONG 57°50.5 ' W      DATE 17/08/1982

Z	TEMP	SAL	OXY	NO3	SIO3	PO4	CHL
5	4.25	31.90	8.18	.00	.87	.76	-
14	2.91	32.21	8.38	.42	.87	.78	-
19	1.34	32.63	8.88	.84	.94	.83	-
24	-1.02	32.62	8.61	2.96	1.16	1.05	-
34	-1.28	32.67	8.03	5.12	2.02	1.23	-
53	-1.40	32.72	7.79	6.51	4.66	1.34	-
78	-1.40	32.81	7.55	6.37	3.93	1.29	-
104	-1.50	32.90	7.66	8.50	8.76	1.38	-
130	-1.48	32.95	7.42	8.98	9.95	1.42	-
155	-1.48	32.96	7.18	9.09	9.82	1.55	-

## LABRADOR SHELF AND HUDSON BAY 1982

LAT 56°02.2 ' N      LONG 58°08.8 ' W      DATE 17/08/1982

Z	TEMP	SAL	OXY	NO3	SIO3	PO4	CHL
2	6.92	31.59	7.48	.62	.63	.66	.10
10	6.20	31.62	7.51	.45	.64	.67	.10
15	-	32.45	9.87	.43	.69	.85	.13
20	-.14	32.55	9.72	.00	.62	.72	.13
29	-1.11	32.79	9.10	1.05	.79	.89	.94
50	-1.53	32.91	7.47	8.48	5.63	1.77	.22
75	-1.50	33.03	7.45	9.72	9.22	1.65	.08
100	-1.34	33.12	7.41	9.39	9.44	1.45	.12
200	-.25	33.65	7.00	12.06	12.00	1.70	.09
403	2.97	34.55	6.49	15.44	11.40	1.50	.04

## LABRADOR SHELF AND HUDSON BAY 1982

LAT 56°20.1 ' N      LONG 58°44.0 ' W      DATE 17/08/1982

Z	TEMP	SAL	OXY	NO3	SIO3	PO4	CHL
1	3.78	32.00	8.38	.68	.75	.77	-
13	3.59	32.00	8.41	.00	.67	.76	-
17	1.48	32.18	8.95	.00	.70	.85	-
23	2.12	32.31	9.09	.00	.71	.85	-
32	.38	32.38	8.70	.60	.72	.96	-
59	-.53	32.74	7.59	7.21	6.20	1.33	-
78	-.60	33.02	7.51	8.58	8.26	1.40	-
110	-.56	33.07	7.39	9.30	10.22	1.47	-
158	-.71	33.21	7.45	9.27	9.91	1.40	-
206	-.61	33.40	7.16	10.53	11.82	1.45	-

LABRADOR SHELF AND HUDSON BAY 1982

LAT 57°01.9 ' N                    LONG 59°54.4 ' W                    DATE 18/08/1982

Z	TEMP	SAL	OXY	NO3	SIO3	PO4	CHL
4	6.54	31.86	7.43	.49	.81	.76	.10
8	6.26	31.86	7.44	.00	.74	.69	.10
14	3.26	31.95	8.04	.00	.69	.78	.10
18	2.21	32.19	9.03	.42	.67	.72	.08
24	-.11	32.63	10.10	.00	.68	.83	.10
32	-1.08	32.80	9.23	.56	.69	.93	.17
54	-1.29	33.01	7.41	8.71	6.82	1.32	.63
78	-1.38	33.12	7.34	9.56	8.84	1.32	.29
107	-1.18	33.22	7.07	10.12	12.93	1.43	-

## LABRADOR SHELF AND HUDSON BAY 1982

LAT 57°40.2 ' N                    LONG 60°39.6 ' W                    DATE 18/08/1982

Z	TEMP	SAL	OXY	NO3	SIO3	PO4	CHL
6	2.80	31.91	8.64	.47	.83	.77	-
15	2.40	32.15	9.02	.41	.78	.76	-
20	.02	32.48	8.98	1.17	1.17	.86	-
26	-.64	32.72	8.05	4.67	2.68	1.27	-
36	-.98	32.81	7.67	6.80	5.01	1.84	-
55	-1.27	32.92	7.34	8.63	8.73	1.39	-
81	-1.33	32.97	7.25	9.24	10.63	1.40	-
106	-1.31	32.99	7.23	9.27	10.93	1.40	-
156	-1.26	33.06	7.20	9.57	11.97	1.43	-
186	-1.16	33.14	7.16	9.94	12.74	1.46	-

LABRADOR SHELF AND HUDSON BAY 1982

LAT 57°54.5 ' N      LONG 60°55.9 ' W      DATE 18/08/1982

Z	TEMP	SAL	OXY	NO3	SIO3	PO4	CHL
3	3.64	32.68	8.32	.53	1.24	.65	.17
13	3.34	32.80	8.49	.00	1.30	.67	.18
17	2.97	32.87	8.56	.00	1.41	.78	.20
23	2.48	32.93	8.43	.00	1.60	.65	.44
32	2.01	32.99	8.17	.00	1.90	.75	2.67
53	1.06	33.03	8.07	1.90	2.47	.88	1.53
78	-.29	33.08	7.69	6.97	7.48	1.24	.12
104	-.51	33.17	7.52	7.92	9.26	1.26	.13
180	-.30	33.60	6.91	11.17	13.26	1.40	.07
233	.25	33.77	6.72	12.03	14.54	1.42	.05

## LABRADOR SHELF AND HUDSON BAY 1982

LAT  $58^{\circ}12.7'$  N      LONG  $61^{\circ}10.4'$  W      DATE 18/08/1982

Z	TEMP	SAL	OXY	NO3	SIO3	PO4	CHL
5	4.06	31.94	8.25	.51	.91	.70	-
14	3.70	31.97	8.46	.00	.82	.70	-
19	3.42	32.00	8.60	.00	.85	.77	-
24	1.35	32.21	9.41	.00	.87	.73	-
34	.42	32.39	9.25	.00	.84	.74	-
56	-.40	32.67	8.15	3.01	1.05	1.19	-
80	-.63	32.85	7.67	5.83	3.29	1.19	-
106	-.90	33.00	7.46	8.44	7.94	1.39	-
156	-.97	32.33	7.07	10.15	13.42	1.47	-
196	-.90	33.24	7.07	10.59	13.61	1.53	-

LABRADOR SHELF AND HUDSON BAY 1982

LAT 59°15.3 ' N                    LONG 62°01.6 ' W                    DATE 19/08/1982

Z	TEMP	SAL	OXY	NO3	SIO3	PO4	CHL
5	5.29	31.60	7.70	.00	.90	.69	.28
14	4.98	31.65	7.96	.00	.92	.73	.09
18	2.30	32.01	9.04	.00	.89	.71	.11
24	.64	32.27	9.16	.00	.92	.80	.23
34	-.02	32.47	8.82	.89	1.98	.96	13.04
54	-.66	32.75	8.38	2.09	1.00	.97	1.15
79	-1.28	32.94	7.25	8.88	9.51	1.40	.14
105	-1.26	32.95	7.21	8.76	9.73	1.43	.15
114	-1.26	32.95	7.22	8.90	9.84	1.39	.13
126	-1.25	32.95	7.20	8.92	9.90	1.39	.10

## LABRADOR SHELF AND HUDSON BAY 1982

LAT  $60^{\circ}18.4'$  N      LONG  $63^{\circ}24.0'$  W      DATE 19/08/1982

---

Z	TEMP	SAL	OXY	NO3	SIO3	PO4	CHL
5	.66	32.21	8.69	.92	1.91	.97	-
15	.37	32.27	8.48	2.99	2.21	1.04	-
20	.34	32.39	8.30	2.39	3.21	1.02	-
24	.32	32.41	8.22	3.05	3.95	1.04	-
35	.16	32.44	8.06	4.40	5.13	1.08	-
54	-.03	32.55	7.84	5.99	6.67	1.16	-
80	-.11	32.65	7.74	6.48	7.12	1.17	-
105	-.23	32.87	7.64	6.91	7.72	1.21	-
156	-.23	32.89	7.66	6.91	7.68	1.23	-

## LABRADOR SHELF AND HUDSON BAY 1982

LAT 60°48.0 ' N      LONG 64°19.0 ' W      DATE 19/08/1982

Z	TEMP	SAL	OXY	NO3	SIO3	PO4	CHL
2	.53	32.23	8.53	1.94	3.34	1.03	4.72
13	.49	32.33	8.52	1.89	3.33	.97	3.41
22	.53	32.23	8.51	1.78	3.33	1.00	4.04
31	.20	32.32	8.08	4.20	5.03	1.26	1.99
52	.03	32.44	7.87	5.42	6.22	1.25	1.00
77	.01	32.46	7.87	5.59	6.35	1.17	1.11
101	-.11	32.54	7.83	5.87	6.43	1.23	.83
153	-.17	32.79	7.62	7.10	7.80	1.23	.44
210	.02	33.09	7.40	8.20	8.91	1.28	.42
301	.76	33.12	6.79	12.21	12.46	1.41	.19

